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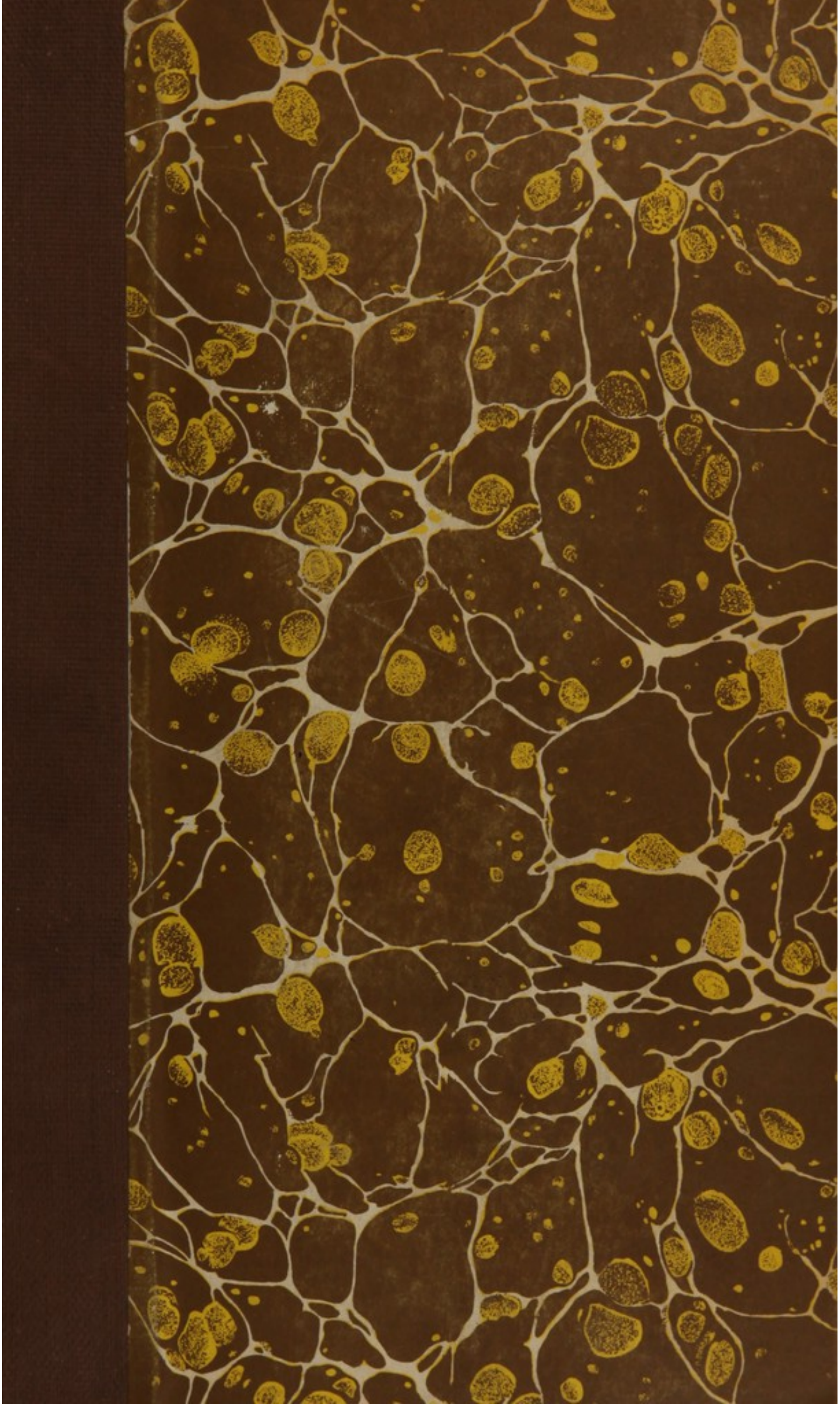

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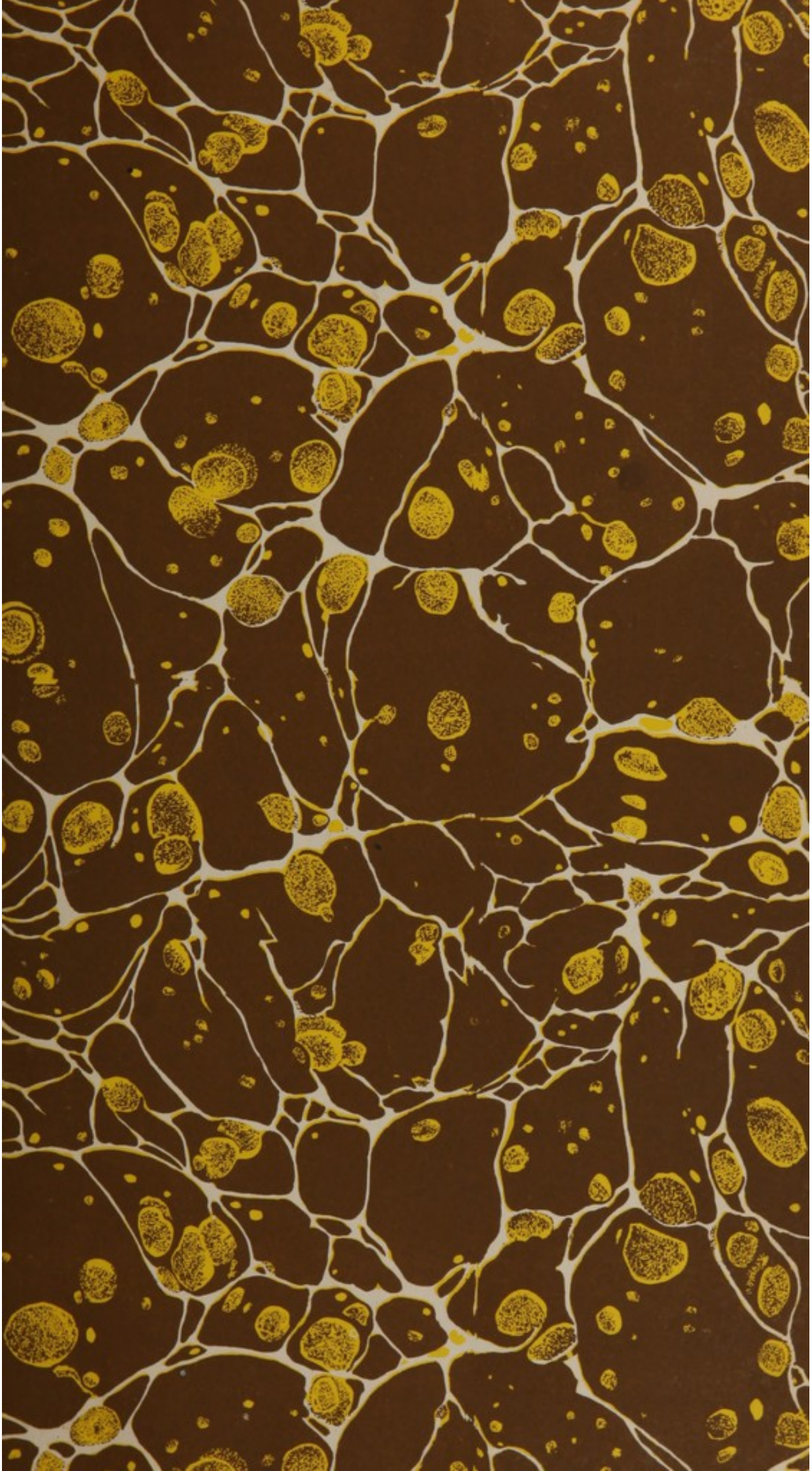

LECTURES

ON THE

THEORY AND PRACTICE

OF

PHYSIC.

BY JOHN BELL, M.D.,

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Corresponding Secretary of the Philadelphia Medical College;
Member of the American Philosophical Society, and of the Georgofili Society of Florence, etc., etc.

AND

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LECTURES

ON THE

THEORY AND PRACTICE OF PHYSIC.

DISEASES OF THE RESPIRATORY APPARATUS.

LECTURE LXXVI.

DR. BELL.

MORE SATISFACTORY DIAGNOSIS OF THORACIC DISEASES IN LATE YEARS—AUSCULTATION AND PERCUSSION.—Auscultation properly includes percussion.—Its application to diagnosis—Laennec the father of auscultation—The physical laws from which it is deduced.—Chief sounds elicited by the pulmonary apparatus: I. During respiration. II. By the voice. III. By coughing. IV. Those of an adventitious kind.—The first class, or the *Respiratory*, subdivided into two orders, the simple and the compound—The simple include the *respiratory* or *vesicular* sound or murmur, also called *puerile* respiration, the *bronchial* and *tubal* or *blowing*, the *cavernous*, and the *amphoric*.—Origin and diagnostic value of these sounds.—The compound sounds, or *rhonchi*, are *moist* and *dry*—of the moist are the *mucous* or *moist bronchial*, *cavernous*, *sub-mucous*, and *humid with continuous bubbles*.—These explained.—*Crepitant* or *moist crepitant*, *sub-crepitant* or *rhonchus redux*, *pulmonary crumpling* sound.—The dry rhonchi are classed under the head of *sibilant* and *sonorous*.—Explanation of these terms. II. VOCAL AUSCULTATION gives *natural and morbid bronchophony*, *ægophony*, *pectoriloquy* and *amphoric resonance*. III. SOUNDS IN COUGHING.—The *bronchial*, *cavernous* and *amphoric* and *metallic tinkling*. IV. ADVENTITIOUS SOUNDS.—These are friction sounds, viz.: the *grazing*, *friction proper* and *grating*.—Table of Morbid Phenomena of Respiration coexisting with Inspiration and Expiration—Sounds of the Heart and Vascular Murmurs modified by state of lungs.—Theories of M. Beau and Dr. Skoda.—M. Beau's views of resonance explained—Dr. Skoda's views of consonance applied to vocal sounds—His division of the sounds in respiration—Stethoscope, and manner of conducting auscultation.

WITHIN the last quarter of a century the investigation of diseases of the organs contained in the thoracic cavity has been conducted on a much more certain basis than formerly; and some well ascertained physical laws are now applied to guide us to a diagnosis, the general accuracy of which is in most satisfactory contrast with the vague generalities before prevailing on this subject. The means for reaching these favourable results, or physical diagnosis, are by AUSCULTATION and PERCUSSION, terms of which the etymology, like most of those of a scientific character, convey a very imperfect notion of the range of subjects that they are actually intended to cover.

Auscultation, literally the art of listening, now indicates a particular method of investigating the state of certain organs, by the different sounds given out when the ear is applied on or over them, or heard when the adjoining cutaneous surface is struck by the fingers or by instruments. To this latter mode of investigation the term *percussion* is applied. It enlightens us only on the physical states and changes of the organs, leaving to other modes of investigation the ascertaining of vital phenomena. But, as no physical change can take place in a living tissue or organ without a modification, at the same time, of its vitality, auscultatory results deduced from a comparison of the healthy and morbid states of an organ, become an evidence of pathological changes, and even of the successive steps of these changes — from the first slightest lesion to complete disorganization.

Auscultation is applied primarily and mainly to the acquiring of a diagnosis of the diseases of the thoracic viscera, and also, but with less determinateness and zeal, of those of the abdominal viscera, pregnancy, fractures, injuries of the brain, and sometimes penetrating wounds of the chest and abdomen. In its application to the study of thoracic diseases it is termed pulmonary or cardiac, according as the sounds heard are elicited from the lungs or the heart.

Laennec, the first to reduce scattered facts to a system, and who must really be regarded as the father of auscultation, based his observations on a well known principle in acoustics; viz., that air in passing through and impinging on tubes of various diameters with varying force, will give rise to particular sounds. He taught and, with few exceptions, his contemporaries and successors have accredited the opinion, that the sounds heard in respiration, on applying the ear to the chest, are the results of the friction of the air against the walls or sides of the trachea, bronchia, and pulmonary vesicles, and, in the case of morbid changes, of dilated tubes and cavernous excavations. Modifications of these sounds will be caused by the interruption to the free passage of air through the canals by mucus or pus adherent to the sides, or detached and partly filling the cavities, or by bubbles of air engaged in mucus, &c. The distinctness and clearness as well as quality of the sounds conveyed to the ear, when it is directly applied to the chest or indirectly by a stethoscope, will vary with the nature and amount of the tissues and morbid products interposed between the pulmonary tubes internally and the skin externally. Hence, when the tissue of the lungs is more compact than usual, as in hepatisation, or is infiltrated with fluid, or when fluid is contained in the pleural cavity, the sounds from the tubes will of course be different from those given out when the pulmonary tissues and its envelopes are in a normal condition. Some farther modifications, as respects force and distinctness, may be expected from the greater or less thickness of the walls of the thorax, and the relative proportion of muscle and adeps between the ribs and skin; but they are of less moment than the obstructions to the conveyance of sound internal to the thoracic parietes.

Into the details of auscultation applied to the diagnosis of pulmonary diseases, I cannot be expected to engage in this place; and must refer you, if not already in possession of one or other of them,

to the manuals on the subject by Dr. Gerhard and by Dr. Walshe, or to my Introductory Chapter to Dr. Stokes's Treatise on Diseases of the Chest, 2d Edition, recently published, and the excellent Lectures of Dr. Williams. You will find that I have indulged in some critical remarks on the want of harmony, as respects terminology and the meaning attached to the same terms, among some of the most esteemed writers on the subject of pulmonary auscultation. In the main, however, there is sufficient accordance of opinion among a large majority of these to entitle their statements to confidence, so far at least as to induce you to make your own observations and thus to verify antecedent experience. The most that I can now attempt is to mention briefly the chief sounds elicited by the pulmonary apparatus. These are of four kinds. I. Those given out during the process of respiration. II. Those furnished by the voice in speaking. III. Those during coughing. IV. Those of an adventitious kind or friction sounds.

I. The sounds of respiration have been divided into two classes. 1. Simple sounds or murmurs. 2. Compound sounds or rattles. The first are caused, with various modifications, by the simple blowing of air; the second, by the admixture of air and liquid together.

The first of the simple sounds or murmurs in respiration, and characteristic of the normal state, is the *respiratory*, as it was termed by Laennec, or the *vesicular* by Andral, a term now more generally adopted. It is that of a soft and gentle, or as it has otherwise been described, a mellow, continuous, gradually developed, breezy murmur, unattended with a sensation either of dryness or humidity. You are to understand, in reference to this word vesicular, that it is meant to designate the seat but not the character of the sound; not one which conveys the notion of a successive dilatation of separate vesicles, or, as it is sometimes called, pure and vesicular. This sound is chiefly inspiratory; the expiratory is not only much weaker but is of less duration. The precise estimate of the degree of difference between the two has been made by M. Fournet, who fixes on 10 : 2 as the ratio of their comparative intensity and duration in the healthy state. These two murmurs follow each other so closely, however, that they may, practically speaking, be said to be continuous.

The vesicular sound is more distinct in thin than in fat or muscular, and in very young than in old subjects. In young persons, whose respiration is naturally frequent, the sound is more loud and slightly blowing, constituting what has been called *puerile* respiration, or puerile vesicular murmur. It is heard best at the anterior and lateral parts, and in the lower two-thirds of the posterior part of the thorax.

In some instances this puerile sound has a pathological signification, as when it is partial, or only heard over particular portions of lung, and then in exaggerated strength to make up for the deficiencies of other parts. Hence the propriety of the term supplemental affixed to it by M. Andral.

Bronchial or *Tubal and Blowing* is the next modification of respiratory sound; or, as M. Louis terms it, an approach to the bellows

sound, heard in the space between the vertebral edge of the scapula and the dorsal spine, at the level of the origin of the bronchia; and this blowing respiration, which exists, also, though in a less degree, towards the sub-spinal fossæ, is more marked on the right than on the left; a difference accounted for by the greater calibre of the right than the left bronchia. This bronchial is also called tracheal or tubal murmur or sound. It is both normal and morbid. It differs from the vesicular, not only in the degree but in the quality of sound; it is louder, harsher, and rougher; and has this additional peculiarity, that the intensity and duration of the respiratory sound are increased to such an extent as to equal, in these respects, the inspiratory. M. Fournet points out the error, occasionally committed, of mistaking the pharyngeal, buccal, and nasal murmurs, for bronchial respiration produced in the regions to which the ear or stethoscope is applied. The correction is made by causing the patient to change the form of the openings of those parts during the auscultation, and to vary the degree of the rapidity with which the air enters them.

Closely allied to bronchial respiration, and by M. Andral described as one of its varieties, is the *blowing* or *puffing* respiration, which gives a sensation as if the air was drawn during inspiration from the observer's ear or from the surface of the chest, and puffed back with equal force during expiration.

Still of the same order and alliance of sounds is the *cavernous*, tersely described by Laennec as the sound produced by inspiration and expiration in an excavation formed in the substance of the lungs, whether it be from the softening of a tubercle, from gangrene, or from abscess. It requires a practised ear to distinguish between the cavernous sound and bronchial or tracheal respiration.

A modification of the cavernous respiration is described by Laennec under the title of *veiled puff*. Very analogous to the cavernous is the *amphoric resonance*, or *amphoric respiration*. M. Louis describes it, as arising from air entering a large cavity through a narrow opening.

I have now mentioned the chief simple sounds or murmurs which are either the vesicular or modifications of this latter; and which are supposed to depend on a current of air impinging, with more or less force, on tubes (larynx, trachea and bronchia), or their minute subdivisions into cells, or on the sides of morbid cavities, as of dilated bronchia, pulmonary abscess, and softened tubercle (vomicæ). Next, I have to speak with equal brevity of the other division of sounds.

Compound Sounds or Rattles (*râles, rhonchi*). These sounds are caused by the partial obstruction to the passage of air through the bronchial tubes, or to its introduction into their terminal vesicles, caused either by a narrowing of these cavities, or its admixture with liquid of some kind. Of this class there are two primary qualities of sound — the *humid* or *moist*, and the *dry rhonchi*. The last is merely a comparative term to establish a kind of contrast with the rhonchi more evidently moist. Many divisions or varieties of these rhonchi have been detailed by different auscultators, which I shall not now repeat; but shall restrict myself to the following, as enough for practical purposes: — 1. The *mucous rhonchus*, or *moist bron-*

chial rhonchus or *rattle*, the large crepitating *râle* of Laennec. The death rattle, as it is called, conveys a good though exaggerated idea of this sound; and evidently depends on the passage of air through tubes containing a fluid which gives rise to a bubbling, compared to that produced by blowing through a pipe into soapy water. The sound of bubbling is generally interspersed with some whistling, chirping, or hissing notes.

This mucous rhonchus is one of the signs, as summed up by Louis; "first of pulmonary catarrh; it then exists on both sides, and progressively descends; secondly, of phthisis when the tubercle becomes soft; it then occurs at the apex of the lungs, under the clavicle; thirdly, of gangrene; fourthly, of dilatation of the bronchia; fifthly, of abscess of the lung. It is generally circumscribed and confined to one side. When alone, therefore, it cannot form a pathognomonic sign." In unnatural enlargement of the bronchial tubes, the bubbling of air through them is of the coarsest kind; it is quite gurgling, and if the liquid be scanty, has a hollow character, entitling it to be called *cavernous rhonchus*.

A roughness added to the ordinary respiratory murmur or more regular but weaker sound of bubbling, constitutes the *sub-mucous rhonchus* of some writers. It may result from a slight degree of bronchitis, but acquires its chief importance by its being permanently present when such inflammation is constantly kept up by the irritation of adjacent tubercles in an incipient state.

Under the title of *humid rhonchus with continuous bubbles*, M. Fournet describes a morbid sound, which, he states, existed in twenty-three subjects, the only ones carefully examined, affected with sanguineous congestion of the lungs.

2. *Crepitant rhonchus* or *moist crepitant rhonchus* has been compared to the sound produced by salt when thrown on live coals, or to that by dry parchment or silk stuff rubbed between the fingers, or by blowing into a dry bladder; also to the sound of tearing a piece of sarcenet, and hence, according to Chomel, who adduces this comparison, it is often called the *sarcenet sound*. Dr. Williams, with more resemblance to the actual sound, compares the crepitation in question to the sound which can be produced by rubbing slowly and firmly between the finger and thumb a lock of hair near one's ear. Dr. Corrigan remarks, on such comparisons, that they are bad, as they lead us away from the manner of the production of the sound.

This is exactly that of small bubbles breaking through fluid, and it is thus produced in the diseases in which the sound is heard — in pneumonia and œdema of the lung — called also *humid vesicular*. Crepitant rhonchus is chiefly, but not exclusively, met with in pneumonia, of which it is represented, however, as diagnostic. Besides œdema it is heard in apoplexy of the lungs, and occasionally in pulmonary catarrh and bronchitis. It is small, clear, and, most usually, it is accompanied by vesicular murmur. M. Louis makes a remark of some importance on this rhonchus, viz., that it is heard over the whole chest of some healthy persons at the moment of a first forcible inspiration, after which it disappears.

3. *Sub-crepitant rhonchus*, or by some (Laennec and Chomel) called

rhonchus redux, râle de retour, produces a sensation similar to that heard in applying the ear near the surface of a liquid slightly effervescing. It has been subdivided into the *true sub-crepitant*, the *liquid*, and the *continuous*. Dr. Corrigan, on the other hand, does not believe sub-crepitant rhonchus to be a division available in practice or recognised by the ear; while M. Louis thinks that it cannot be mistaken. It is met with in pulmonary catarrh, or bronchitis in its most acute and intense form; and in this case it is confined chiefly to the posterior and inferior part of the chest, or is heard in both sides at once; or if it extends to the upper it always begins below.

M. Fournet mentions a *pulmonary crumpling sound*, resembling the *new leather-creak of pericarditis*, and conveying to the ear the impression of the crumpling of a tissue pressed against a hard resisting substance. It was detected by him in the first stage of phthisis, in one-eighth of the cases; also in one case of encephaloid tumour of the mediastinum, and in another of non-tuberculous cavity of the summit of the lung.

Of the *dry rhonchi* we have the *sibilant* and *sonorous*, included under the head of the *dry bronchial*. The sibilant resembles a slight and prolonged whistle, as if through the teeth, either grave or acute, dull or clear; it is capable of masking the respiratory sound. The sibilant rhonchus generally occurs in tubes narrowed by swelling of their mucous or sub-mucous coats; and hence, but in limited extent, is met with in pulmonary catarrh, or in the early stages of acute bronchitis; and, also, in asthma or pulmonary emphysema. In typhoid affections it occurs in three-fifths of the cases, generally about the eighth day, and over the whole of the chest.

The *sonorous rhonchus* is a grave, and sometimes an extremely loud sound; it is one resembling snoring; at another the sound of a bassoon; and very frequently is like the cooing of a turtle-dove. It is most commonly met with at the beginning of pulmonary catarrh.

We are very properly told by Dr. Williams that, as any of these rhonchi may be produced in only one tube and yet make a great deal of noise, it is not to be supposed that they are important in proportion to the noise they make. It is rather when they are very permanent, or when several of them are heard at once in different parts of the lungs that they announce disorder, which may be serious either from its permanency or its extent.

II. *Sounds furnished by the voice in speaking;* or *Auscultatory Vocal Phenomena.* I now come to the second division, or *auscultation of the voice.* That a vibration is communicated to the parietes of the chest during the act of speaking is evident to another person whose hand is applied to this cavity at the time; but still more so if the ear be applied through the intervention of the stethoscope. The phenomenon thus heard is called vocal resonance, and is modified according as the stethoscope is applied over the larynx, trachea, or bronchia. It is then called natural laryngophony, tracheophony, and bronchophony. The voice at this time is transmitted from the larynx and trachea with a startling force and loudness.

Natural bronchophony, which, though loud, is considerably less intense than the vocal resonance of the air tube before its bifurcation,

is heard at the upper part of the sternum on the middle line, and with less force towards the edges of this bone; behind, in the middle line, over the division of the trachea; and, on either side, between the spines of the scapulæ. In proportion as the bronchial tubes ramify and are buried, as it were, in the spongy pulmonary tissue, the sound originating in the vibrations of the glottis becomes deadened or dull; or it is merely an obscure and diffused buzzing, a kind of vibration or *fremitus*, which may, as before remarked, be felt by the hand placed on the chest.

As there is no absolute standard of vocal resonance by which to measure deviations, we cannot say what will be considered a sign of disease, on our applying the ear or stethoscope to any part of the chest. But as there is an appropriate symmetry in the two sides, and as the resonance is equal, except under the clavicles and on each side the spine between the spines of the scapula, in which it is somewhat stronger on the right, any very notable difference between the two sides may be considered as morbid. If, for example, availing ourselves of an illustration offered by Dr. Williams, under one clavicle the voice resounds loudly, while it is scarcely heard under the other, we may be sure that there is some physical difference between the two sides which does not exist naturally. This leads us to inquire what are the circumstances which give rise to changes in the natural voice.

1. *Morbid bronchophony* occurs in the same morbid states of the lung or tube under which morbid bronchial respiration is evolved. The condition for the more ready and complete transmission of sound in the tubes, whether by vibrations of air in breathing, or of the walls of the tubes in speech, are the same, viz.: — increased induration and solidification of the tissue interposed between the tubes and the thoracic parietes. The two kinds of signs are then associated, and whenever one is heard we are pretty sure to find the other. They are met with in red or grey hepatisation of the lung, in pneumonia, in pleuritic effusions, and in indurations of the pulmonary tissue, as in tubercles and dilated bronchia.

2. *Œgophony* is another of the modifications of vocal resonance in certain morbid states of the lungs. It sounds to the ear like the bleating of a goat, and hence the origin of this term, introduced by Laennec. The voice is thus rendered broken and tremulous by its transmission through a liquid effused between the pulmonary pleura and the costal pleura, and which is thrown by a vocal resonance of the lung into a state of irregular vibration.

When most strongly marked, œgophony is distinctly metallic, jarring and muffled, is synchronous with the articulation of each word, or follows it immediately, like a shrill echo of natural resonance, conveying the idea of a distinct origin. It does not appear to traverse the stethoscope, but rather to flutter tremulously about the applied end. Œgophony may be regarded as a favourable sign in pleurisy, as it indicates but a moderate degree of effusion; but we cannot regard it as pathognomonic of this state.

3. *Pectoriloquy* is a still greater degree of vocal resonance, in which not only the voice but speech reaches the ear from a cavity

formed in the lungs, as if the patient spoke directly in the ear of the auscultator. The cavity must be of some size, and communicate directly with the bronchia. This takes place in phthisis, in gangrene of the lung, and in abscess, and in dilatation of the bronchia when it is considerable. *Gurgling* is often heard at the same time with pectoriloquy, and adds to its diagnostic value.

4. *Amphoric Resonance* or *Metallic Tinkling* designates that peculiarity of transmitted sound in speaking, which conveys the idea of its being produced in a hollow space of a large size, and it is hence called *amphoric*. It may be produced in the cavity left by a large vomica or abscess, or by several of these coming together; but its more common seat is the sac of the pleura, into which air has entered through a fistulous opening in the lung.

I must not conclude this division of our subject without apprising you, that the best auscultators of the day are far from attaching the same importance to these different vocal resonances, in a diagnostic point of view, as Laennec did, or believing that they can be as readily distinguished as he supposed.

III. *Auscultatory Tussive Signs* or *Resonance of the Cough.* — In our endeavours to ascertain the sounds elicited by coughing, we pursue the same steps as in the case of the resonance of the voice in speaking, and hence the divisions of the cough in pulmonary disease into *bronchial*, *cavernous*, and *amphoric*, corresponding, in fact, very much with bronchophony, pectoriloquy, and amphoric respiration; the former sounds being elicited by the act of coughing, — the latter by the voice.

Metalling Tinkling, already spoken of in connection with amphoric resonance, is less commonly produced in respiration than as a phenomenon of vocal or tussive resonance. In some instances it is evolved only by forcible coughing. It is a name given to a quick, sharp, ringing sound, closely resembling that produced by gently striking a hollow metallic or glass vessel with a pin. I shall most likely have occasion to speak of the probable origin of this sound in a future lecture.

IV. *Adventitious* or *Friction Sounds.* — These sounds are produced by the rubbing together of the two opposing surfaces of the laminæ of the pleura, when the latter is in a morbid state; and hence the propriety of the title *friction sounds*. There are three varieties: viz., 1. The *grazing sound*. 2. *Friction sound* properly so called. 3. *Grating sound*.

These sounds are always audible in inspiration, but not so in expiration, unless they be strongly marked: thus the grating variety is not perceived in the latter movement, while the others manifest themselves in both. Under all circumstances, they appear first in, and disappear last from, inspiration. It requires great attention to distinguish the rubbing sounds from similar ones arising from the movement of the clothes of the patient to the observer. Friction sound is one of the first signs of pleurisy; but rapidly ceasing with effusion, to return often after absorption, and especially when false membrane is formed between the two pleural surfaces. It is met with in interlobular emphysema, according to Laennec; and it oc-

curs also sometimes in pleuro-pneumonia towards the decline of the disease, and when convalescence has set in. Pleural friction sound consists either of a single, or, more commonly, of a series of jerking sounds, few in number, and manifestly superficial in seat; it is audible over a variable, but usually limited, extent of surface; persistent or intermittent; of variable but commonly more or less considerable duration; almost invariably heard in inspiration, and always more intensely developed with that movement, but most frequently accompanying both inspiration and expiration.

In illustration of some of the important associated phenomena of auscultation, I shall introduce the following table by M. Fournet, for which I am indebted more immediately to the *British and Foreign Medical Review*, vol. ix. :—

TABLE, *showing the mode of coexistence of the Morbid Phenomena of Respiration with Inspiration and Expiration.*

[The order in which the different phenomena are set down in each divisions, exhibits the degree to which they relatively acknowledge the law regulating them all.]

A. *Morbid Characters coexisting exclusively, or almost exclusively, with inspiration.*

1. Humid rhonchus with continuous bubbles.
2. Primary crepitant rhonchus of pneumonia.
3. Mucous rhonchus of third stage of pneumonia.
4. Grazing pleuritic sound.
5. Pulmonary crumpling sound.
6. Dry crackling rhonchus.
7. Subcrepitant rhonchus of œdema.
8. Subcrepitant rhonchus of capillary bronchitis.
9. Rhonchus crepitans redux of pneumonia.

N.B. The first three sounds coexist exclusively with inspiration; the others sometimes occur in expiration also, but exceptionally only. The frequency of these exceptions increases from No. 4, downwards.

B. *Morbid Characters coexisting with both movements.*

1. Humid cavernous rhonchus.
2. Dry cavernous rhonchus.
3. Dry { Bronchial / Tracheal / &c. } rhonchi.
4. Cavernous rhonchus.
5. Grating pleuritic sound.
6. Friction pleuritic sound.
7. Augmentations of intensity.
8. Diminutions of intensity.
9. Augmentations of duration.
10. Diminutions of duration.
11. Amphoric character.
12. { Cavernous character. / Veiled puff. }
13. Bronchial character.
14. Metallic tinkling and echo.*
15. Blowing character.
16. Ringing character.
17. Clear ditto.
18. Mucous rhonchus.
19. Humid crackling ditto.
20. Dry, hard, rough, laborious character.
21. Humid character.

* In some cases of hydropneumothorax with perforation, observes M. Fournet, "the *metallic tinkling* of Laennec is not to be discovered; but, instead, the amphoric character of the respiration seems to reverberate in a sort of vague diffused echo, which rings like the voice under an archway; this phenomena may be called *résonnance métallique*; it often accompanies the voice and cough." The English reader will here recognise the precise description, almost the very words of Dr. Williams, in reference to the phenomenon of *tinkling echo*.

C. *Morbid Characters coexisting chiefly with Inspiration.*

1. Diminution of duration and intensity.
2. Complete cessation.
3. Humid character.
4. Dry character.
5. All varieties of friction sound.
6. Pulmonary crumpling sound.
7. Dry crackling rhonchus.
8. Subcrepitant rhonchus of œdema.
9. Subcrepitant ditto of capillary bronchitis.
10. Rhonchus crepitans redux.
11. Humid crackling rhonchus.
12. Bucco-pharyngeal rhonchi.
13. Cavernulous rhonchus.
14. Gurgling ditto.
15. Humid, bronchial, tracheal, laryngeal rhonchi.
16. Dry acute-toned bronchial, cavernous, tracheal, laryngeal rhonchi.

D. *Morbid Characters coexisting chiefly with Expiration.*

1. Augmentation of intensity and duration.
2. Metallic tinkling and echo.
3. Clear character.
4. Ringing ditto.
5. Blowing ditto.
6. Bronchial character.
7. Cavernous ditto.
8. Amphoric ditto.
9. Dry grave-toned bronchial, cavernous, tracheal, laryngeal rhonchi.

E. *Morbid characters coexisting first with Inspiration, and then extending to Expiration.*

1. Pleuritic friction sounds.
2. Dry and humid crackling rhonchi.
3. Hard, rough, dry, laborious character.
4. Humid character.
5. Crepitant rhonchi, primary and redux.

F. *Morbid characters coexisting first with Expiration, and then extending to Inspiration.*

1. Clear character.
2. Ringing ditto.
3. Blowing ditto.
4. Bronchial character.
5. Cavernous ditto.

Sounds of the Heart and Vascular Murmurs have a diagnostic value in pulmonary auscultation, as when we find them propagated to a greater extent, or with more force in certain directions than in health, without the heart or the vessels being the seat of the disease. The positive intensity of the heart's sounds is unaltered, but its relative intensity, as discovered in different parts of the thoracic surface, is changed. In the latter case, we infer, if the cardiac sound be more intense than common, that the lung or pleura has undergone some change, rendering them unusually good conductors of sound. Or there may be rarefaction in certain limits, so that the sounds of the heart's beats shall be less distinctly heard than common.

Theories of M. Beau and of Dr. Skoda on Auscultation. — I have foreborne from introducing any conflicting theoretical views and explanations which assume a different basis from that laid down by Laennec, and generally by his contemporaries and immediate successors up to the present time. But, brief as is my present sketch, it ought to include, for your information, a notice of certain positions advanced by some other writers and observers, who claim for them also the enforcement of physical laws and of experimental observation. The chief of this class of auscultators are M. Beau of Paris, and Dr. Skoda of Vienna.

M. Beau advanced his new theory of the sounds heard in respiration in the *Archives Générales de Medecine*, in 1834, and in a series of papers in the same journal for 1840 he enlarged and enforced his views with additional illustrations and arguments. His cardinal proposition is, that the sounds heard during respiration are elicited by the same means as those formed by the voice and in coughing, viz.: — primarily at the glottis and upper apertures by vibrations at these parts, and secondarily by the tracheo-bronchial tubes and ramifications receiving and transmitting these vibrations, which finally are transmitted through the pulmonary parenchyma, and envelopes to the walls of the chest, and thence to the ear resting on this last. The movements of the air in them has little to do in either case with the sounds heard externally. If in common respiration a person snores, to make use of a familiar example, the sound thus made at the nostrils, and more particularly at the velum palati and pharynx, resounds through the bronchia and vesicles, and is heard by the ear applied to the chest. This fact, which I have myself noticed, seems to be not a little confirmatory of M. Beau's theory of resonance, as the noise made in the mouth and fauces at this time is not accompanied by any corresponding deviation from the usual respiratory movements, by which the air might be introduced into the bronchia and vesicles with more force than ordinary. The chief sounds made resonant in the bronchia are the glottic, according to M. Beau's explanation.

Dr. Spittal of Edinburgh, after having become cognisant of the views of M. Beau advanced in 1834, instituted several experiments, which, together with accompanying reflexions, he has recorded in the *Edinb. Med. and Surg. Journ.* (1839). Dr. Spittal's results are fully confirmatory of the theory of the French writer.

M. Beau enumerates the orifices or narrowings of the respiratory passages, capable of causing vibrations in the air which traverses them and of producing the superior sound, which afterwards becomes resonant and audible in its several varieties, according to the part of the laryngo-bronchial tube and ramifications over which the ear is applied. These orifices are five in number, viz. — 1. The lips; 2. The nostrils; 3. Isthmus of the pharynx; 4. Orifice of the glottis; 5. Opening of the larynx. The orifice of primary, and indeed paramount importance, among all these, is the glottis; it is the glottic sound "reverberated in the air tubes and pulmonary vesicles that gives rise to all the various sounds of respiration described by auscultators. It is a double sound, at one moment *inspiratory*, at another *expiratory*.

You will find a tolerably full synopsis of M. Beau's papers in the Introduction and Appendix to Dr. Stokes's Treatise on the Chest. In this same work I have also introduced, from the *Edinb. Med. and Surg. Journ.* (1841), an outline of Dr. Skoda's theory of auscultation.

Dr. Skoda explains the different degrees of strength of the voice in the chest, and perceptible to the ear applied to it, by the law of consonance. When one body assumes the same vibrations with another, or when it produces the same note, or its vibrations

form an aliquot part of the note, it is said to be consonant with this body. The note of a Jew's harp is scarcely perceptible when it is struck in the air, and it is heard much more distinctly when played in the mouth. Thus the air in the mouth must increase the sound of the Jew's harp; *i. e.*, must consonate with it.

It sometimes happens that the voice is heard more strongly at the thorax than at the larynx, which itself is sufficient to show that its strength is increased by means of consonance within the chest. As it is certain that the air in the pharynx, mouth, and nostrils, consonates with the sound formed in the larynx, there can be no doubt, Dr. Skoda thinks, that the air in the trachea and bronchia may also be thrown into consonant vibrations with the sounds formed at the larynx. Hence it is, that the air in the chest and not the parenchyma of the lungs which consonates with the voice at the larynx, as the latter seems illy adapted for consonating, being neither stiff nor sufficiently dense. The strength of the consonance depends upon the size and form of the space in which the air is confined, and upon the properties of the walls which bound the space. It appears that the consonating sound of the inclosed air will be stronger the more perfectly the walls reflect the sounds which spread through the air. For air to consonate it must be confined within a circumscribed space. A space surrounded by solid walls produces the greatest consonance, while in a linen tent the sound is but little increased.

The deductions drawn from these physical principles will serve to explain the consonance of the voice in the chest. The air in the trachea and bronchia consonates with the voice as far as their walls resemble those of the larynx; and an increase of consonance of the air in the ramifying bronchia of the lungs is procured either by their walls being cartilaginous or becoming thicker, or by the surrounding tissue of the lungs becoming devoid of air. Provided, therefore, that there is no interruption of continuity between the air in the bronchia and that in the larynx, the walls of the latter, thus thickened and firmer, reflect the sound more strongly than the membranous walls of the bronchia and their vesical terminations.

It does not follow, according to Dr. Skoda's views, that, hepatised lung should transmit sound more readily, or indeed quite as readily, as the healthy parenchyma, provided the lining of the cavities including the bronchia be sufficiently firm and resisting to cause the air to consonate in them. The vibrations in the walls of the larynx and the bronchia are not, he thinks, transmitted along them from the glottis, in vocal movements; but they are received from the air in its state of consonance and are in force and number proportionate to those of the air. They may afterwards spread through a layer of fluid or of muscle several inches thick, even to the parietes of the thorax; and the sounds produced by consonance on the bronchia will be perceptible at the walls of the chest.

But while differing from the school of Laennec as to the mechanism of the transmission of vocal sounds through the chest, Dr. Skoda describes nearly, as his immediate predecessors, and most of his contemporaries have done, the morbid states of the respiratory organ which give rise to an increased resonance of the voice.

The Austrian professor divides the varieties of respiratory sounds as follows — 1. Vesicular respiration. 2. Bronchial. 3. Indeterminate. 4. Amphoric and metallic. The *Rattles* or *rhonchi* are divided by him into — 1, The vesicular; 2, the consonant; 3, the crackling or dry crepitating with large bubbles; 4, indeterminate; 5, rattles with amphoric echo.

I shall conclude by a few directions for the *use of the stethoscope* what I had proposed to say in auscultation proper. The best shape for a stethoscope (from στηθος, the breast, and σκοπεω, I examine), is that of a perforated cylinder, hollowed at the chest end into a conical cavity, and the other end made flat, or slightly concave, to fit the ear; in some cases, as when we want to explore small spots of the chest, to ascertain for example the extent of resonance, and whether it is produced in a small cavity, or merely transmitted by consolidated lung from several bronchial tubes distributed over some extent of surface, we use the instrument somewhat modified. Its conical cavity is filled up by a conical perforated plug, which reconverts the instrument into a simple perforated cylinder, and circumscribes its power. The stopper is also used when we want to shut out the sound of respiration in listening to the sound of the heart or arteries.

The stethoscope serves — 1. To conduct sound by its solid walls. 2. To conduct and concentrate sound by its closed column of air (resonance). 3. To transfer sounds from its column of air to its solid walls, or the converse, when circumstances impede their transmission by one of these ways. 4. To diminish this power of transfer, and contract the field of hearing when small spots are to be explored.

Sometimes a flexible tube, like a common ear trumpet, is used for a stethoscope, and answers well, like that made of brass wire coiled and suitably covered, the invention of Dr. J. L. Ludlow. It has the advantage from its flexibility of being applied more conveniently, both for the patient and the physician, than the straight, rigid tube of wood.

The instrument should be applied in close contact with the chest, at one end, and with the ear at the other. Continued attention is required by beginners to prevent the least tilting of the trumpet end, that next the chest, by which air is interposed and the thoracic sound lost or greatly weakened.

For the manner of conducting auscultation, we cannot give directions more clearly and succinctly than by using the language of M. Louis, on the occasion, as follows:

"The person to be examined should lie on his back, or sit, according as we wish to auscult the anterior or the posterior part of the chest; he must lean neither to the right nor the left; his shoulders must be in the same plane, and his symmetrical muscles in the same state of relaxation or tension as the position of the patient.

"The contraction, tension, and relaxation of the muscles, have a marked influence on the results of auscultation, and when the corresponding points of the thorax are examined in comparison with each other, as we must always do if we want to draw rigorous inferences, we might imagine differences that did not exist, merely from the bad attitude of the patient.

"The auscultator, too, must select a convenient position, as Laen-

nec recommends, and take care that the respiratory sounds are not intercepted by thick clothes, and particularly that the patient does not retain any which might produce a fallacious sound, as, for instance, silk coverings. He must also find out which is his best ear, as experience shows that almost every observer has one ear finer than the other. All these precautions, which at first sight may seem over-punctilious, are absolutely necessary to prevent our falling into gross errors.

"In opposition to Laennec, it is now allowed that the naked ear perceives sounds as well as when aided by the stethoscope; and, indeed, it often happens that it distinguishes shades of sound which had escaped it when assisted by this instrument. The cases in which we ought to prefer mediate auscultation are very rare, and it is often necessary to have recourse to immediate auscultation to determine with clearness what would otherwise be obscure.

"The patient and the observer being properly placed, auscultation, to be successfully practised, requires another condition, namely, the ear, if unaided, is to be exactly applied to the chest; if the stethoscope is used, the whole of its circumference is to be applied to the parietes of the thorax, so that if the patient is so wasted that the intercostal spaces leave a cavity under the stethoscope, it must be filled up by compresses placed upon the thorax."

LECTURE LXXVII.

DR. BELL.

PHYSICAL DIAGNOSIS OF PULMONARY DISEASES (*Continued*).—PERCUSSION—Defined.—Avenbrugger its discoverer for diagnosis in thoracic diseases—Corvisart—Piorry—Two varieties,—*immediate* and *mediate*—Mode of using immediate percussion—Divisions of mediate percussion—Pleximeter—Substitution for it of a finger or fingers—Chief percussing agents—a hammer and the fingers.—Directions for mediate percussion—*Percussion of the Chest.*—Different regions in which it is practised—Postures of the patient and physician in percussing the different thoracic surfaces—What found on percussion—A verifying of different states of the lungs and pleural cavity—Different sounds in different regions of the chest.—Two chief divisions of sound on percussion of the chest—increased sonoriety and diminished sonoriety or dulness—Auscultatory percussion—Autophonia—Succussion—Inspection—Measurement—Instruments for—Two sides of chest seldom quite symmetrical—Comparison—Value of comparison—Application of to diseases of the chest.—Sources of physical diagnosis—Improved diagnosis not always immediately productive of improved therapeutics.

I SHALL continue a description of the methods of physical diagnosis of diseases of the lungs, by some remarks on percussion. This term is applied to the act of striking the external surface of any of the great cavities, but more particularly the chest, for purposes of diagnosis. M. Piorry defines it to be, a method of exploration, by which impulse imparted to an organ, or the walls of a cavity, gives rise to a sound and a degree of resistance fitted to enable us to judge of the physical state of the part explored. This is obviously a kind of auscultation; the sounds listened to being artificially made by the observer instead of being the result of vital actions on the interior of the organs. But percussion is something more than mere aus-

cultation, since it impresses the sense of touch also; and percussion gives rise to two distinct sensations, which the or operator ought to analyse. They are, the sensation of that of hearing; the former of which not being appreciate observers near, prevents them from distinguishing degrees of sound, of which he who percusses is readily sensible.

We are indebted to Avenbrugger of Vienna for the discovery of percussion as a means of diagnosis; but it was not until after the lapse of some years, and when Corvisart became the translator of the German work, and applied the method to detecting diseases of the heart, that it attracted any notice. At the present time we are indebted to M. Piorry more than to any other writer for the extension and precision of view and of practical detail in percussion. Favourable mention may, also, be made of M. Maillot, his pupil and commentator, who, in his *Traité Pratique de Percussion*, has presented with adequate clearness the prominent particulars of the subject.

There are two varieties of percussion; *direct* or *immediate*, and *mediate*. *Immediate* percussion consists in striking directly with the fingers or hand on or over the part to be explored. Mediate percussion consists in striking the part by the intervention of another body. Avenbrugger and Corvisart practised direct percussion. The former used the four fingers of his right hand closely united on a level with each other; the ball of the thumb being placed firmly against the articulation of the second phalanx of the index finger, so as to support and give firmness to the fingers. The points of the fingers are then to be brought down perpendicularly on the surface with a sharp and quick stroke, which is found to produce a sound varying in properties with the condition of the subjacent parts. Avenbrugger recommended that the patient's chest should be covered with a thin dress, or that the operator should wear a glove, so as to prevent the sort of click resulting from the contact of the naked hand and skin. Corvisart struck the chest with his open hand, in order, as he alleged, to be able to appreciate the extent of the portion of the thorax which did not resound, and to determine more accurately the nature of the obstacle.

Mediate percussion consists in striking the parts to be examined by the intervention of another body. Some, and they include the larger number of English and American physicians, make use of one or more fingers of the left hand resting on the chest, while they strike with those of the right. Others, and chiefly the French physicians, have recourse to some foreign body, usually of a solid nature, interposed between the chest and the percussing fingers to receive the first impulse of the latter. The body interposed is called a pleximeter (from πλῆξις, percussion, and μετρον, a measure). Hence we have *digital mediate percussion*, and *pleximetral percussion*.

The pleximeter used by M. Piorry is a thin circular plate of ivory, about an inch and a half in diameter, provided with two prominences, slightly hollowed and filed on their outsides, to allow of their being held with the fingers and thus secure the better the application of the instrument on the skin of the part to be explored. Of the various modifications of this pleximeter and

the new ones proposed from time to time, the left index finger and a flat piece of India rubber are to be preferred. The pleximeter, of whatever nature it may be, should be in close apposition with the surface, so as almost, to use the words of M. Piorry, to make one body with the part that it covers. For this reason it appears advisable to apply the palmar rather than the dorsal surface of the fingers to the chest, when this takes the place of a regular pleximeter.

There are varieties of percussing agents; the chief ones are the fingers and some modification of a hammer. Preference should be given to the former, of which, generally, the index and median are the ones used. They should have their ends brought exactly to the same level, and be supported by the thumb with its ball laid firmly upon the outer surface of the former, between the articulation of its second or third phalanx. The fingers employed in percussing should strike at the same moment, as if constituting one body, on the pleximeter or its digital substitute, and they should strike perpendicularly on the part examined. Care must be taken not to let the nails strike, as the noise which would thus be made must interfere with or drown the sound elicited from the organ beneath the body struck. All necklaces, breastpins, &c., should be removed from the patient, as their resistance is apt to interfere with the sounds proper to percussion.

In proceeding to *Percussion of the Chest*, we should be aware of the different regions in which it is practised. Laennec and Piorry have divided the chest into twelve regions, on which examinations by percussion may be performed, with a view of ascertaining the physical conditions of the lungs. These are, 1. Sternal; 2. Supra-clavicular; 3. Clavicular; 4. Sub-clavicular; 5. Mammary; 6. Vertical; 7. Sub-scapular; 8. Supra-spinal; 9. Spinal; 10. Sub-spinal; 11. Sub-scapular; 12. Axillary.

1. The sternal region is bounded by the limits of the sternum, which lie between the articulations with the clavicles and the cartilages of the ribs. 2. The clavicle and the cleido-mastoidean and trapezius muscles express the bounds of the supra-clavicular region. 3. The clavicular region will include all the portion of lung covered by the clavicles. 4. The sub-clavicular region is limited by the sternum, the anterior border of the axilla, the clavicle, and the fourth rib. 5. The mammary region begins at this point to terminate at the eighth rib. 6. The vertebral region will include the extent of the twelve dorsal vertebræ, and the ribs attached to them as far as the angles which they form. 7. The sub-scapular region will embrace the whole extent of the posterior portion of the thorax, comprised between the limits of the lung and the superior border of the scapula. 8, 9, 10. The limits of the supra-spinal, spinal, and sub-spinal regions, are indicated with sufficient clearness by the relations which these bear to the scapula, so as to render any farther description unnecessary. 11. The whole space comprised between the vertebral column, the posterior border of the axilla, the inferior angle of the scapula, and the tenth, eleventh, and twelfth ribs, will constitute the sub-scapular region. 12. The

axillary region extends from the top of the axilla to the eighth or ninth rib.

The physician should be at his ease, whether sitting or standing, in order to make the exploration with more effect. The degree of force of percussion, will be regulated by the thickness of the tissues interposed between the plexímeter and the lungs, and, also, the intention of the examiner, as, for example, whether the means to ascertain the state of the superficial portion of the lungs, or their density at greater depths. Percussion should be practised in preference on the ribs, but not to a neglect of the intercostal spaces if it is only for the purposes of comparison.

In percussing the front part of the chest, if the patient be seated the physician should also sit; if the former be in bed, he should stand. The shoulders should be thrown back by elevating the arms, so as to protrude the chest, and give a relative degree of tension to the skin and muscles. Percussion of the chest, made with equal force on both sides, will give rise to the same degree of sound from the apex of the lungs to the fourth rib; but below this latter different results may be expected, and a modified process is to be adopted. The mammæ, particularly in the female, prevent a continuance of the percussion downwards, and afterwards the heart on the left side and the liver lower down on the right give different qualities of sound.

In examining the *posterior part of the thorax*, the patient should be directed to sit on a stool without a back, or on the outer angle of a chair, and with the head inclined forwards and arms crossed on the breast. Percussion is then to be made, by pressing with some degree of firmness either the plexímeter or the fingers of the left hand on the muscles, covering the scapula and the vertebral sulci; and striking with various degrees of force, in different points down to the regions where the pulmonary orifice ends, behind the liver and spleen.

For percussion on the *sides of the thorax*, the patient should lie on the side opposite that to be examined, with the arm raised, but not to such a degree as to give tension to the pectoralis major, latissimus dorsi and teres major muscles; and thereby prevent their separation and the application of the plexímeter or finger directly below the axilla.

You may perhaps ask, before proceeding to practise it, what ought we to find in percussion of the chest? The answer is ready. You will have vibrations giving rise to sounds, varying in intensity and clearness according as you strike over the lungs in health or in disease, that is hollow and distended, or partially obstructed and compact; or, according as they are encroached on by solid organs, such as the heart or liver, or are covered with effused fluid. Considering the simplicity of the principle—the production of sonorous vibrations by percussion—and its application to common every-day use, as when we strike a wall with a hammer to ascertain what part is brick and what wood, or, suspecting fraud, to discover concealed cavities or walls, by the difference in the sound emitted according to the density of the body or part struck; or in the familiar example of striking on an empty, a half-filled, and an entirely full cask—it is a matter of surprise that this principle was not earlier applied to

investigate the physical state of the different regions of the thoracic cavity and the different states of the same region when the contained lung is healthy and when it is diseased.

With this preliminary notice of the general nature of percussion, we are prepared to learn the difference of sounds in the different regions of the chest. The sound is clear above the clavicles, somewhat clearer behind these bones, and still more a little below them. The resonance is greatest over about the third rib; but becomes less distinct in the mammary region, and null in a great part of the precordial region. It disappears on a level with the seventh or eighth rib, to be replaced on the right by the dulness of the liver, and on the left by the sonoriety of the stomach.

On each side, the chest sounds clearly over all the parts which correspond with the lungs.

Behind, there is little sound above the scapula, less again on the supra and infra-spinal fossæ; but towards the lower angle of the scapula the sound becomes clearer, — to be gradually succeeded by that of a less distinct nature, until we have the complete dulness of the hepatic and splenic regions. On each side of the spine there is considerable resonance.

Age and sex cause modifications in the sound of the chest on percussion. The lungs are at their maximum density in adult age, and minimum in old age; and hence, while the chest of children sounds more clearly than that of adults, it is exceeded in this respect by that of old people. The greater fulness and extension of the mammæ in a well formed female interferes with percussion of the anterior part of the chest, and hence this does not furnish quite so full data for diagnosis as in the case of an individual of the other sex. The individual differences are very great. In some persons, whose chest is very muscular, there is a want of clearness; and in others, cushioned as it were in fat, dulness prevails.

The diagnostic value of the two chief divisions of the states of sound; that of increase and that of diminution or of dulness is easily inferred. We find that the first or increased sonoriety is met with in all cases in which the pulmonary tissue is lighter; and the latter, on the contrary, whenever the density of the lung is increased.

Examples of increased clearness of sound, on percussing the chest, are found, 1, in dilatation of the bronchia, whatever may be the cause (chronic mucous catarrh, pituitous catarrh, dry catarrh, &c.); 2, in dilatation of the air cells or vesicles (the emphysema, properly so called, of Laennec); 3, in infiltration of air in the cellular tissue connecting the pulmonary vesicles (the emphysema of systematic writers); 4, in infiltration of air into the cellular tissue beneath the pleura (subpleural emphysema). To this enumeration we might add, as causes exaggerating the clear sound heard on striking the thoracic parietes, the excavations following phthisis, hepatisation, gangrene, and pulmonary apoplexy.

Diminished clearness of sound, approaching more or less to dulness, is met with in congestion, inflammation, gangrene, and œdema of the lungs, and in pulmonary apoplexy and tubercles; it being understood that these diseases have not reached that stage in which

cavities are formed in, and at the expense of, the parenchyma of the lungs.

A few aphorisms of Avenbrugger, as we find them quoted by M. Maillot, may quite appropriately be introduced in this place:

1. So soon as a portion of the chest, usually sonorous, suddenly loses its natural sound in this respect, and gives out that of striking on leather, disease is concealed in the part which emits this quality of sound.

2. If the chest, percussed on a spot, commonly sonorous, gives out the leather sound, we may be sure that disease is co-extensive with the limits of the new sound.

3. If the chest, when struck on a particular region which is generally sonorous, emits the leather sound, the patient should be directed to make a full inspiration and to hold his breath. If, while the air is thus retained, the leathery sound be still heard, we augur a great depth of the disease in the cavity of the chest.

4. If the chest, on being percussed at its anterior part while the inspired air is retained, gives out a sound of striking on leather, then percuss the region behind and directly opposite; and if it emits at this spot, which is usually sonorous, the leathery sound, we may infer that the disease pervades the entire thorax.

Modified auscultation, to consist of listening with the stethoscope applied to the chest while the latter is percussed, has been recommended. It is alleged that, by this means, the sound elicited by percussion is conveyed to the ear with a force and distinctness superior to that which occurs in the common method; but there is the inconvenience of loudness superseding the particular quality of sound really caused by the state of the parts beneath. We have, it is true, the testimony of Drs. Cammann and Clark (*New York Med. and Surg. Journ.*, vol. iv.), in its favour, who assure us that they were able, by the difference in the sound elicited, when the instrument was over the heart, on its margin, or external to this area, to measure that organ in all but its antero-posterior diameter, under most, perhaps all, circumstances of health and disease, with hardly less exactness than they would be able to do if the organ were exposed before them. Like success attended trials to define the outlines of the liver. But, after all, these are negative results, and do not prove the propriety of the method for detecting real and actual respiratory phenomena. Dr. Walshe, in his work already referred to (*The Physical Diagnosis of Diseases of the Lungs*), speaks in very disparaging terms of this modified auscultation.

Autophonia is another modification of auscultation, which consists in the observer listening to the voice while his ear is applied to the chest of the patient. The voice is represented to vary in character with the state of the contained viscera. This mode, originating with M. Taupin, is represented by M. Hourman to be a useful auxiliary in the investigation of the pulmonary diseases of children.

Succussion is the oldest practised fashion of auscultation, as it dates from Hippocrates. It detects the presence of air and fluid in a cavity, and hence is a useful aid to the diagnosis of pneumothorax, and of a tuberculous cavity in the lungs containing pus and air. It

is performed by imparting a sudden and somewhat violent motion to the patient, as by jolting on horseback or suddenly getting up and setting down on a hard seat, or by another person shaking him, and then applying the ear suddenly to the chest, a sound of fluctuation is heard, if there be the mixture of fluid and air as just described, in a cavity. Sometimes the slightest agitation of the body, as from coughing, sneezing, turning quickly, walking up stairs will elicit the sound. The formal method of practising succussion consists, while the patient is seated on a chair or bed, to take him by the shoulders and shake him with some force; the operator ceasing suddenly from the succussion and listening to the sound of fluctuation.

Inspection is another means of physical diagnosis by which we detect difference in the size of the two sides of the body, and particularly of the chest. What thus strikes the eye is more confirmed in a certain manner by *measurement*.

For the purpose of measuring the chest we may use the graduated tape coiled in a metallic box by the spiral spring. Dr. Stokes prefers a pair of broad steel callipers, the free extremities of which terminate each in a wooden ball. By either of these instruments we measure, first from the projection of a vertebra round the side of the thorax to a line marked with ink, to the middle of the sternum, and thence round on the other side to the vertebral spine whence we set out. In this way any difference between the circumference of the two sides will be ascertained. Inequality in this respect is not, however, always a sign of disease, for, on the contrary, a symmetrical conformation of the chest is rare. According to the observations of M. Woillez the right and left segments were found equal in twenty-seven only of a hundred and thirty-three subjects. The right side was more expansive than the left in ninety-seven, and the left than the right in nine individuals.

"The morbid conditions discovered by circular measurement are, increase or diminution of bulk of either side as compared with the other; and defective expansion during the act of inspiration. Deficiency of expansion, confined as it usually is on one side of the chest, is best ascertained by comparing the width of the two sides at the end of expiration and of inspiration; little or no difference will be found to exist in the former; a very marked excess on the sound side at the latter period, under the supposed conditions of deficient expansion" (*Walshe, op. cit.*).

Measurement, by showing a retraction of the side following atrophy of the lung, is a most important part of diagnosis in the early stage of phthisis. In empyema, on the other hand, we detect a notable dilatation of the affected side.

In connection with the subject of physical diagnosis and as illustrative of the manner in which it is turned to the best account for practical purposes, the mode of investigating the thoracic diseases by comparison, so ably set forth by Dr. Stokes, is worthy of your careful study. I cannot do more than indicate the chief traits here, but would recommend you to follow it out in its various bearings in the pages of this distinguished teacher's work (*Treatise on Diseases of the Chest*), already referred to at different times.

The symmetrical conformation of the thorax favours greatly the study of the diseases of its contained viscera by comparison; just as we judge of the extent of tumefaction or degree of deformity of a limb, by comparing it with its fellow, in addition to a study of the direct symptoms of the disease. To take some of the examples adduced by Dr. Stokes:—Feebleness of respiration occurs in many diseases of the lungs, and in phthisis particularly we often meet with feeble vesicular murmur under one of the clavicles. Now, if we were to restrict our examination to this side, we might be led to error by this symptom, for extended auscultation on the other side might show that there is naturally in this person feeble respiration over the whole chest. An opposite state may occur, as in a case of a loud vesicular respiration approaching to puerile. This is common when some other portion of the lung has been disorganised or otherwise suspended in its respiratory function; but it may be universal, and it then ceases to have a special diagnostic value. To be available as a symptom, we must discover it in one portion of the lung co-existing with feebleness of respiration in another portion.

So also in the phenomena of the voice. Greatly increased resonance would induce suspicion of solidified lung, if we did not, on examining the corresponding region on the other side, find that there also is bronchophony prevented, and that both lungs exhibited this phenomena habitually in this case. It is only where the resonance is loud and distinct in one lung, and either wanting or much less intense in the corresponding portion of the opposite one, that it becomes a symptom of decided value.

"Independent of the importance," says Dr. Stokes, "of the principle of comparison, its practice in all cases is of the greatest utility, by leading to the discovery of lesions which would otherwise escape us. I remember being called to see a patient, who had received an injury of the side, and who was labouring under fever, cough, expectoration, and dyspnœa. His attendants had examined him repeatedly with the stethoscope, and discovered nothing but bronchitis. I had him stripped, and found the phenomena of empyema and pneumothorax in the lower part of the right lung; his attendants had examined the upper part of the chest carefully, but had neglected the lower, and thus the true nature of the disease had escaped them."

I believe that I cannot conclude these remarks and directions respecting physical diagnosis in a more appropriate manner than by enumerating, after Dr. Stokes, its sources, viz.: —

1st. *Signs* purely acoustic, including the results of percussion and of auscultation, mediate and immediate. It may be observed here, that of all the signs these are of the most universal application; there being no disease of the lung or heart in which they do not occur.

2d. *Signs* derived from the alterations of shape and volume of the thorax. This source of diagnosis is capable of application to many, though by no means to all the diseases of the lungs, heart, and great vessels. Changes of shape and volume imply either the existence of acute diseases, in which the products of the disease have rapidly accumulated, or which is the more frequent case, of diseases which have

a great degree of chronicity. Under the first head we may reckon rapid liquid effusions into the pleura or pericardium, the result of inflammation, and recent pneumothorax, from fistula. Under the second, we have chronic liquid and aëriform effusions, hypertrophy and atrophy of the lung, both the result of chronic disease, and aneurismal or other organic tumours.

3d. *Signs* referrible to the sense of touch: these we find to occur in a considerable number of thoracic diseases; as, for instance, in bronchitis, with effusion; in the dry pleurisy and pericarditis; in various diseases of the heart and great vessels; in abscesses of the lung, communicating with the bronchial tubes; in certain cases of liquid effusions into the serous cavities; and in hepatisation of the lung.

4th. *Signs* derived from the inspection of the motions of the thorax during respiration: these occur in cases of local or general impermeability of one lung, and in cases where the motions of respiration are otherwise impeded or altered.

5th. *Signs* derived from the inspection of the thorax, with reference to the action of the heart and great vessels.

6th. *Signs* derived from the existence of an external collateral circulation, as indicative of the existence of obstruction of the great internal venous trunks, such as the cava and innominatæ.

7th. *Signs* derived from the observation of the displacement of the thoracic or abdominal viscera: of these, some may be appreciable by the senses of sight and touch merely, while others must be ascertained principally by that of hearing. The displacement of the heart (perceptible to the eye and touch), and the protrusion of the liver into the abdominal cavity, are examples of the first division; while the displacements and compression of the lung, from liquid or aëriform effusions into the serous sacs, furnish examples of the second.

Now it is never to be forgotten, that although in these various classes we have a vast number of well-marked and essentially differing physical phenomena, *there is not one of them which, taken singly, can be considered as a pathognomonic sign. Nay, we might go farther, and declare that no possible combination of them can be considered absolutely pathognomonic.* By some of them, taken singly, or by various possible combinations, we may, indeed, ascertain the existence of certain mechanical conditions of the intra-thoracic viscera — as, for instance, permeability or impermeability; increase or diminution of the quantity of air; the existence of cavities of various sizes and with various communications; the roughened state of a serous membrane; or the displacement of particular organs: but if we seek to determine by physical signs alone, the cause of all or any of these phenomena, we shall find it to be difficult or impossible. It is only, as we have said before, by the connection of the accurately ascertained physical signs with the previous history and actual symptoms of the case, that a correct diagnosis can ever be arrived at.

If after a survey of our whole position and the bearings of physical diagnosis on therapeutics, you should ask whether the domain of the latter has been enlarged by a better diagnosis, and whether we have gained either a new remedy or a better plan of treatment gene-

rally in phthisis, for example, I am unable to reply in a direct manner to the whole question. Physical diagnosis has not certainly revealed or suggested any new remedy or new plan of treatment generally. It has not advanced our therapeutical boundaries; but within the old limits it has given a better insight into and a better appreciation of the value of remedies, and a better understanding of the time and the precise indications for their use, by pointing out, as it were, the very spot or point of disease to be acted on, and the changes of tissue to be completed before recuperation of function can be brought about.

LECTURE LXXVIII.

DR. BELL.

DIVISION OF DISEASES OF PULMONARY ORGANS.—LARYNGITIS, or *Cynanche Laryngea*.—Its varieties.—*Erythematic Laryngitis*—General mildness of the disease and simplicity of its treatment—*Catarrhal Laryngitis*—chiefly dangerous in infants—Its treatment—*Acute Œdematous* or *Sub-mucous Laryngitis*.—A most formidable disease—Its symptoms—Respiration and deglutition both affected; and afterwards the cerebral functions—Duration—*Œdema of the glottis* not a separate disease—Two varieties of acute laryngitis established by Cruveilhier—Is not of frequent occurrence—Treatment actively and speedily antiphlogistic—Venesection—General Washington's case—Leeches to the throat, or cups to the nucha—Blisters—Tartar emetic with small doses of opium—Calomel and opium—Early recourse to laryngotomy—Mortality from active laryngitis.

I SHALL follow the division of the diseases of the pulmonary organs laid down by Andral, viz., into, 1, those which are seated in and primarily and chiefly affect the air-passages; and 2, those of the vascular and parenchymatous structure in which hematosis takes place.

In the first section we have the diseases of the larynx, both acute and chronic; which, again, may be inflammatory or nervous; and, if the former, may be accompanied by an erythema or a tumefaction of the mucous membrane of the part, or by the secretion of mucus or of pus, or the formation of false membranes.

Simple ERYTHEMATIC LARYNGITIS is the mildest of all the forms of inflammations of this organ. Its causes are external and internal. The former are sudden variations of temperature; breathing air in which irritating molecules are suspended; throwing open the neck, which had been habitually covered, to a cold air. Of the internal causes we find enumerated fatigue of the larynx in protracted and loud singing and speaking. Sometimes it supervenes on the diseases of other organs, and by simple continuity of tissue, as we see in inflammation of the pharynx or of the bronchia, or sympathy as in gastro-enteritis. It is sympathetic, as in measles, in which the same inflammatory congestion is present in the conjunctiva and the bronchia. It also shows itself in small-pox and in erysipelas.

Erythematic laryngitis is sometimes preceded by a feeling of general discomfort; sometimes by fever: and again it make its attack suddenly, and manifests itself by a pain in the larynx, which may be slight, or of a more acute nature, augmented when the

patient speaks or coughs, or when the larynx is pressed on. The voice loses its force, is changed in character, and hoarse. Deglutition is painful, and the cough is harassing by its frequency and dryness. After a while some mucus tinged with blood, and more frequently opaque, is excreted. When the inflammation is slight, it is not accompanied by any notable symptom; but when it is intense, the *innervation may be so profoundly disturbed as to mask the evidences of the local disease.* This last is an occurrence common in nearly all the anginose affections, and should be borne in mind by the physician when he is called upon for his prognosis. The patient when questioned will often reply that he feels no pain: he is disinclined to speak, and dozes much.

The treatment of the milder cases of this form of laryngitis is very simple; consisting in tepid mucilaginous drinks, a mild purge, followed by warm pediluvium. But if the inflammation be more acute, blood should be drawn from the arm; and if relief does not soon follow, leeches must be applied to each side of the larynx, from opposite the os hyoideus to the thyroid cartilage. There will be risk of the inflammatory afflux being increased, unless the leeches are in sufficient number to act decidedly on the injected mucous membrane, by the abstraction, from its minute and capillary vessels, of a sufficient quantity of blood. Mild counter-irritation will follow, if necessary, and a mercurial purge. Sometimes, though rarely, this disease may be converted into bronchitis, or into another kind of laryngitis, or become chronic and give rise to laryngeal phthisis: hence, though it is never to be neglected, it demands more especial attention in those who have had laryngitis before in any form, or who are predisposed to phthisis. The expression — 'it is only a slight cold or sore throat,' is a foolish, and has been often a destructive remark, by lulling suspicion of danger, and preventing the requisite remedial means from being adopted.

Catarrhal laryngitis, little different from the preceding, is caused more directly by atmospherical changes, sometimes of an epidemic nature, and by suppressed perspiration. Its treatment is the same as that of the erythematic variety, with the difference that more benefit is obtained by the administration of an emetic. This remedy is the more necessary in the catarrhal laryngitis of infants, who are unable to throw off the accumulated mucosities in the windpipe, and are in imminent danger of suffocation in consequence. Here is an instance of the importance of removing an effect which may be more perilous than the cause, or inflammation of the mucous membrane itself. Derivation by purgatives is also advisable in this case; and if the principle be admitted we should select those which most excite to increased secretion the mucous follicles of the intestinal canal. Calomel, therefore, with aloes or rhubarb, will be preferable to the saline purgatives, which often excite excessively without their exerting a good effect on the laryngeal disease. The common cough mixtures are of very doubtful efficacy in laryngitis, since they contribute to increase the secretion of mucus without a corresponding augmentation of ability to throw it off. Free expectoration, by which the bronchia are cleared, will not suffice for the

laryngeal tube without additional efforts of a voluntary nature, which children cannot make, or rather will not, because they do not understand the necessity and use of the measure. Counter-irritation, by stimulating liniment rubbed on the neck, or even a small blister over the part, is at times called for, in cases of continued and excessive secretion of mucus in the larynx.

Acute Œdematous or Sub-mucous Laryngitis. — A formidable variety of laryngitis is that called *œdematous*, which should be regarded as an aggravated degree of the erythematic. *Œdematous* ought not in propriety to designate this more violent stage of inflammation of the larynx — the effusion in the sub-mucous cellular tissue being only an effect of the inflammation. Acute laryngitis in this degree is one of the most alarming and intractable diseases we are called upon to combat. It is more frequent in adults than in children. Sometimes it begins with the symptoms of cynanche tonsillaris. Soon, however, its diagnosis is rendered evident by difficult and even laborious inspiration, accompanied with stridor and hissing sounds, whilst the expiration is free ; pain and feeling of constriction at the larynx, greatly increased by pressure on the thyroid cartilage, flushed face, lustrous eye, great thirst, full and frequent pulse. The cough is very troublesome, harsh and more stridulous than in croup, and accompanied by constant and voluntary hawking, as if to clear the passage by expectoration. The voice, at first acute and piping, gradually becomes thick, then hoarse and whispering, and at last is completely suppressed. There is sometimes great difficulty in swallowing owing to the epiglottis ceasing to perform its valvular office; whence it happens that when the patient begins to drink, a portion of the fluid escapes into the larynx, and produces a fit of coughing, which seems to threaten instant suffocation. The pain from ineffectual trials to drink produces in some a real hydrophobia ; the sight of a fluid recalling so vividly former sufferings. An examination of the fauces shows them, in most instances, to be inflamed, and very often, by pressing the tongue as much as possible downwards and forwards, the epiglottis can be seen erect, thickened, and of a deep red colour.

Laborious respiration and an inadequate supply of air affect the appearance of the patient, as manifested in his pallid countenance, anxious expression, livid lips, protruding and watery eyes; pulse quick, feeble, and irregular ; with a colder surface of the body. The patient is restless and apprehensive; he seldom sleeps for many minutes at a time : when he begins to doze, he starts up in a state of the utmost agitation gasping for breath, every muscle being brought into action which can assist respiration, now become a convulsive struggle. He is quite enfeebled, becomes delirious, drowsy, at last comatose, the circulation being more and more languid ; and he dies on the fourth or fifth day of the disease, or even earlier. Instances, says Dr. Cheyne (*Cyclopædia of Practical Medicine*), have come to our knowledge, in which the disease has terminated fatally within twelve hours (one of Dr. Armstrong's patients died in eight hours and another in seven); and, therefore, continues Dr. C., if a person dies suddenly in the night, who had complained on the foregoing

day of sore throat, laryngitis may be suspected as the cause of death. I have myself seen such. Contrasted with these are other cases in which the disease has lasted three or four weeks.

By some an œdema of the glottis has been regarded as a different disease from that now under consideration ; but without good cause. The term is misleading : it ought to be *œdema rimæ glottidis.* The only difference between this and the acute sub-mucous laryngitis just described, is in the extent to which the cellular tissue is inflamed. Sometimes there is simple effusion ; at other times pus is met with. Cruveilhier (*Dictionnaire de Medecine et de Chirurgie Pratiques*) makes a division of laryngitis into *super*-glotteal and *sub*-glotteal. The former coincides more with that form just described, and depends on the anatomical lesions in the mucous folds which extend from the epiglottis to the arytenoid cartilages (aryteno-epiglotteal ligaments), and which become by inflammation so enlarged and tumid as to be felt by the finger on examination. The epiglottis itself is sometimes the chief seat of the lesions observed. The sub-glotteal variety consists also in an inflammation of the cellular tissue, but of that portion below the *rima*, and extending to the cricoid cartilage, which is necrosed. The symptoms are the same as those of the first variety, except that they are somewhat less violent ; as owing to the greater density of the cellular tissue below the folds of the glottis, there is less infiltration than when these latter are inflamed. Hence, also, the disease is not so speedily fatal in the sub-glotteal variety, which we should, therefore, regard as that with which those persons are affected, who, as has been already stated, have lived for weeks under an attack of acute œdematous laryngitis. The causes of acute laryngitis are not very obvious. Sometimes they are atmospherical vicissitudes. At times the disease supervenes on convalescence from fevers, and, again, on chronic laryngitis. It has been observed in connection with erysipelas, and especially the epidemic variety.

Happily this formidable disease is not of frequent occurrence. I have already said that it is confined almost entirely to adults ; there being very few cases on record in which it has attacked children, or persons under the age of twenty. Authors describe, among the accompanying phenomena, in some cases, swelling of the integuments which surround the larynx, especially on the forepart of the neck. I have had one case of this kind under charge, in which the tumefaction was so rapid that it could hardly be exaggeration to say that its progress was almost visible. The subject was a child between two and three years of age. Venesection and purging seemed to have little effect in controlling the disease, which was obviously arrested, however, by leeches applied to the neck. Calomel was given at the same time, and seemed to be useful in completing the cure.

Treatment. — But I am anticipating what is to be said on the treatment of acute œdematous laryngitis. The weight of experience is in favour of free bloodletting, which, to be serviceable, must be early resorted to. At the same time, it must be admitted that we cannot hope by this means to remove the œdema and the consequent obstruction to respiration, which constitutes so much of the character as well as gives

danger to the disease. But if the physician should be fortunate enough to be present at its inception, and aware of its symptoms, he may, by the use of the lancet, arrest the inflammatory action which causes the œdema ; or if the first critical period have passed, the farther swelling may still be prevented and absorption facilitated by this means. It is not often that a French writer can be quoted, whose directions, of a therapeutical character, so nearly correspond with our practice, on this side of the Atlantic, as those of M. Andral (*Cours de Pathologie Interne*). He says: In this dreaded malady we act promptly and energetically. The first indication to be fulfilled is, to detract blood largely by venesection, which will be quickly followed by a vomit or a purge. Leeches are to be applied round the neck in large numbers; in a short time the intestinal canal is again to be acted on, and sinapisms are to be applied to the lower extremities: in a word, we should adopt a treatment eminently perturbating.

On this main outline of practice I shall offer some remarks. The use of the lancet will be more serviceable in a case in which the patient is yet in the prime and vigour of life, than when he is farther advanced and his constitution impaired. It promises more, also, if the complexion is good, that is, if it indicate arterialization of the blood; as when the face is flushed, and even turgid, and eyes bloodshot. But when the face and lips, especially the latter, become livid, the expression anxious, and the eyes protruded and watery, we can no longer hope for a removal of the swelling and stricture of the glottis by general bloodletting, which has the disadvantage at this time of weakening the action of the heart and of the respiratory muscles, and thus of disabling the patient from bearing up yet awhile against the depressing influence of the disease. But even in this latter stage it may be justifiable to open a vein, and to watch whether any relief follows the discharge of blood, an effect manifested by a somewhat less laboured inspiration, and an amended colour of the face and lips. If such a change take place, we shall be encouraged to let the blood flow until the main indication be fulfilled. Otherwise we promptly close the orifice, and prevent farther loss of the circulating fluid. When we have them at our disposal, leeches applied in the manner already advised exert a more evidently controlling influence over the inflammation of the laryngeal membrane than venesection. Both in the case of the child before mentioned and in that of an adult, a married female, about thirty years of age, patients of mine, leeching arrested the disease, after copious venesection had failed to do so. But, in both, the amount of blood drawn in this way was large. From the adult nearly twenty ounces were taken, under my own eye, after venesection had been used to procure a smaller quantity in the early part of the day. Tartar emetic was also freely administered, both as an emetic and counter-stimulus. Dr. Francis of New York, about nineteen years ago, was attacked with acute laryngitis, for which he was bled to the extent of a hundred and fifty-two ounces in six days: and three or four days after, as he was still thought to be in a precarious state, he was bled again. (See a paper on Laryngitis by Dr. Beck, in his Journal, No. 12.) Dr. Cheyne (*op. cit.*) gives a still more marked case of the value of vene-

section, because the general appearance and the habits of the patient would not seem to bear such heroic treatment. It was of a young woman, who earned a pittance by gathering cockles on the strand at ebb tide, and afterwards by hawking them through the streets of Dublin. This person presented herself, July 13th, 1813, on the second day of laryngitis, pale, scarcely able to articulate or swallow, the effort producing a convulsion, as when a crumb enters the windpipe; the voice sounded as if she were throttled, inspiration being slower than natural, and sibilous. The successful treatment consisted in bleeding her at noon, *ad deliquium*, which, by the way, says Dr. Cheyne, had nearly proved fatal. The venesection was repeated twice in the course of the evening. On the following day respiration was rendered difficult by the least exertion. Hitherto she was unable to swallow. She was again bled, and a purgative enema and blister were prescribed. Next day she began to expectorate yellow mucus, and could swallow fluids. On the 16th July, convalescence was begun.

Of the inefficacy of bloodletting on other occasions, a remarkable instance was presented in the practice of Dr. Armstrong. The loss of one hundred and sixty ounces of blood within six hours gave temporary respite to the difficulty of breathing, but yet it was so far from arresting the inflammation that death took place within twenty-four hours. The first accurately reported case of acute laryngitis, and one which will ever have deserved historical importance attached to it, was that which proved fatal to Washington. "The disease," says Drs. Craik and Dick, his physicians, "commenced with a violent ague, accompanied with some pain in the upper and forepart of the throat, a sense of stricture in the same part, a cough, and a difficult rather than painful deglutition, which were soon succeeded by fever, and a quick and laborious respiration." The General had himself bled in the night of Friday, 10th Dec., 1799, that of his seizure, to the amount of twelve or fourteen ounces. On the following morning "were employed two pretty copious bleedings, a blister was applied to the part affected, two moderate doses of calomel were given, and an injection was administered, which operated on the lower intestines, but all without any perceptible advantage, the respiration becoming still more difficult and distressing. Upon the arrival of the first of the consulting physicians, at half-past three in the afternoon, it was agreed, as there was yet no signs of accumulation in the bronchial vessels of the lungs, to try the result of another bleeding, when about thirty-two ounces of blood were drawn without the smallest apparent alleviation of the disease. Vapours of vinegar and water were frequently inhaled; ten grains of calomel were given, succeeded by repeated doses of emetic tartar, amounting in all to five or six grains, with no other effect than a copious discharge from the bowels. The powers of life seemed now manifestly yielding to the force of the disorder; blisters were applied to the extremities, together with a cataplasm of bran and vinegar to the throat. Speaking, which was painful from the beginning, now became almost impracticable; respiration grew more and more contracted and imperfect, till half-after eleven, on Saturday night, retaining the full possession of his intellect, when he expired without a struggle."

Harsh strictures were made at the time by English writers on the treatment of the illustrious patient by his physicians; particularly on the score of such large sanguineous evacuations. The disease was, in fact, at that time unknown — at least as laryngitis; and it was not until the year 1806, according to Dr. Cheyne (*op. cit.*), that a case was duly recorded as such. Dr. Monro, who was called into consultation, announced, as his opinion, that the symptoms arose from inflammation and thickening of the windpipe; and afterwards recommended, in case suffocation should be imminent, to perforate the larynx between the thyroid and cricoid cartilages. Laryngotomy was performed, but only after stertorous respiration had come on, and the countenance was changed from the purple of imperfect respiration to cadaveric paleness: the patient died two hours afterwards.

The most approved method of treatment recommended at this day will be found to vary little in its general features from that pursued in the case of General Washington. One very important means was not used by his physicians — the application of leeches. Objections have been made on valid grounds to vomiting the patient, whose epiglottis in this disease remains stiffened and erect, and of course leaves the glottis open to the introduction into the larynx of fluids ejected from the stomach, or, at any rate, to the irritation of the *rima glottidis* in their passage from the œsophagus into the mouth. But whilst we deprecate vomiting, we are not forbidden the use, in relatively large doses, of tarter emetic, which, in this form of laryngitis, as well as in croup, is tolerated to a great extent. By toleration, I mean its not causing either vomiting or purging; at the same time that it tends to abate arterial action. The medicine may be administered in quarter and half grain doses every hour, or even half hour, according to the intensity of the disease. A very minute fraction of opium combined with it will enable the stomach to retain it more readily, without diminishing its sedative or contra-stimulant effects.

If we are deprived of the use of leeches, cups to the nucha should be applied, after venesection, so as to detract as much blood as can possibly be spared from the laryngeal region. The two means of bloodletting may even be had recourse to in very severe cases almost conjointly, or in quick succession. Tartar emetic failing to produce the desired reducing effect on the system without, vomiting, or even after its beneficial but incomplete sedative operation, calomel, conjoined with minute doses of opium, should be given every hour, or at most two. If want of confidence be felt in the tartar emetic alone, or fears entertained that it must necessarily vomit in this as it is known to do in various other states of disease, the medicine may be advantageously combined with calomel and opium, and continued until relief be procured. After venesection and leeching, a blister over the upper part of the sternum may be of service, or preferably on the nucha; and, if there be much, as often there is, spasm of the glottis and larynx, it may be dressed with morphia or belladonna ointment. For the relief of this symptom, while we are removing its cause — inflammation — assafœtida

in mixture, with a few drops, in each dose, of the tincture of belladonna, will be of service. Gentle frictions with the belladonna tincture or liniment over the larynx and trachea will contribute to the same end.

Mr. Crampton and others recommend the application of leeches to the inflamed palate and tonsils: the objection is not in any danger or subsequent inconvenience but in the difficulty of the operation. The leech must be directed to the required spot by its being inclosed in a tube, the introduction and application of which is itself not a little irritating at any time; but in laryngitis must be productive of great distress. Remembering, also, the temporary tumefaction of the part to which leeches have been applied, we reasonably fear even a slight increase of this condition of the glottis, although it would be of short duration.

On one point in the treatment of acute œdematous laryngitis there is unanimity of opinion. It is, to have recourse to laryngotomy so soon as symptoms of suffocation are exhibited, and the remedies which have been employed do not exert a marked ameliorating effect. The designation by Dr. Baillie of the period of thirty hours of treatment, by bleeding and opiates, without relief, after which bronchotomy should be performed, is entirely too arbitrary. Dr. Cheyne very properly remarks, that "thirty hours may be too long to wait, or it may be too short. If the circumstances of the patient, especially the condition of the circulating fluid, be such as to contraindicate bleeding, and to show that asphyxia is imminent, it may be improper to put off the operation for thirty minutes. If the complexion is good, if asphyxia is not threatened, the operation may be delayed for thirty days." Seldom, indeed, has the operation been performed soon enough to afford well grounded expectations of relief; for, as Mr. Ryland justly observes (*Diseases and Injuries of the Larynx and Trachea*), when the disease has continued some time, the lungs become gorged with venous blood, serum is effused into their reticular texture, and emphysema is likewise induced in them. The brain suffers, probably from the nature of the blood circulated through its vessels, and gradually loses its functions. The consequence is, such an exhaustion of the vital powers that reaction and recovery cannot take place even when the respiration is rendered free by means of laryngotomy.

But whilst stress is laid upon an early recourse to the operation, we must still not deprive the patient of the chance of recovery by omitting it even in the last and apparently hopeless stage. Mr. Goodeve relates the case of a patient of his who was quite insensible when the operation was performed; no pulse could be found at the wrist; his face was suffused with blood, and his lips livid; and it was hard to say whether he breathed or not, and yet he recovered. The spot to be selected for laryngotomy is the triangular space between the thyroid and cricoid cartilages, over the crico-thyroid membrane. An incision of an inch in length is made through the integuments along the central line of the neck, just over the crico-thyroid space; the edges of the wound are then separated, and the incision is continued down to the membrane, which, upon being exposed, may

either be punctured with a trocar or divided in a transverse direction with the scalpel. If the disease, for the relief of which the operation has been done, requires that the artificial opening be maintained for some time, it will be necessary to introduce a cannula through the wound, and confine it there by bandages, as the irritation produced by it will cause strong expulsive efforts on the part of the patient; but if the disease is of a temporary nature, it will suffice to cut away a portion of the crico-thyroid membrane. Laryngotomy is more suited to adult males than to any other class of persons, because the larynx is lower in the neck, and its dimensions larger, and consequently the crico-thyroid space more ample. The cannula has been worn by different persons for a length of time without inconvenience; the periods varying from six months to fifteen years.

The mortality is great in acute laryngitis. Of twenty-eight cases collected by Mr. Ryland, eighteen proved fatal; and even this is under the average, in his opinion.

Œdema of the larynx, which I have described in its acute stage, does, however, occasionally present itself in a sub-acute, if not chronic form, as part of general dropsy; or supervening gradually on phlogosis of another organ, with but little premonition of its approach. It constitutes the serous infiltration of Bayle. It is not less dangerous in this than in the acute form. Hydragogue cathartics and diuretics, among which digitalis must not be forgotten, and vesication of the forepart of the neck, will be the chief remedies. It is in the chronic form that we may anticipate most from laryngotomy.

LECTURE LXXIX.

DR. BELL.

LARYNGITIS MEMBRANACEA—CROUP.—Anatomical peculiarity characteristic of the disease; lymphatic exudation in a membranous form in laryngeal inflammation—Phlogosis extends to trachea and bronchia; sometimes to the lungs—The chief seat of croup is in the larynx—Proof from dissections and the leading symptoms—Character of the breathing and the voice in croup—Dyspnœa evincing affection of the lungs at the same time.—*Causes*—referrible to locality, states of atmosphere, and age of the patient—Seasons in which it prevails—Mortality from croup in New York, Philadelphia, and Boston—Epidemic croup—Age at which croup is most common—Proportion of the sexes.—*Symptoms*—Precursory or common; and imminent and special—First and second stages.—Duration.—*Mortality.*—Varieties of croup—Spasmodic croup—Dr. Ley's theory—*Differential diagnosis*—Difference between primary and secondary or consecutive croup—Membranous exudation from air-passages forms in some other diseases.—*Treatment*—Intentions of cure—First remedy, an emetic—Tartar emetic to be preferred—Venesection—The warm bath—Leeching or cupping—Calomel with tartar emetic—In approaching collapse, perseverance in the use of calomel and stimulating and antispasmodic expectorants; blisters, epithems, etc.

LARYNGITIS MEMBRANACEA — CROUP. — Croup has received a variety of names: *Laryngitis Pseudo-membranosa, Cynanche Trachealis, C. Laryngea, C. Stridula, Angina Palyposa, Suffocatio Stridula, Morbus Strangulatorius; Bronchitis*, by Young; and *Empresma Bronchilemmitis*, by Good. The attempt to designate this disease by a symptom, whether of a sound in breathing, or of a

sense of imminent suffocation, must be misleading, because not exclusively belonging to it: and a term which implies its primary fixation in any other part than in the larynx is erroneous. Croup is now adopted, both by continental as well as English writers, and is a title which cannot mislead by its connexion with any hypothesis of cause or nature. In the United States the disease is known, among the people, commonly by the term Hives.

The anatomical peculiarity which distinguishes croup from other varieties of laryngitis, is the production, primarily in the larynx, of a false membrane. This production is secreted from the mucous or lining membrane of the larynx; it consists of albumen with a proportion of phosphate of lime and carbonate of soda; and occasionally fibrin. It is corrugated and hardened by diluted sulphuric, nitric, and hydrochloric acids; and, on the other hand, rendered softer and diffluent by concentrated acetic acid, liquid ammonia, alkaline solutions, and a strong solution of the nitrate of potassa. Regarding this false membrane or lymphatic exudation as a product of inflammation, we should naturally expect to see the surface from which it is given out evince this morbid state. Accordingly, the mucous membrane itself is often found to be rough, red, and thickened; but at other times one is not a little surprised to find it unchanged in these particulars. It is no forced supposition, however, that the inflammation may be so far relieved by this pseudo-membranous secretion that there would be diminished redness, which, as in many other cases of greatly increased vascularity during life, disappears entirely by death. The same explanation will apply to those cases in which there is neither false membrane nor increased redness observable after death, although there had been unequivocal symptoms of croup before this termination. Even when we speak of this new product as the anatomical character of the croup, we must at the same time admit that it is not always present: it should rather be regarded as one of the chief proofs of an inflammation of the mucous membrane of the larynx, which may still be checked early; and thus the lymph will not be given out with sufficient freedom to form the membrane. Sometimes, in place of this latter lining entirely the cavity of the larynx, we find patches and shreds and at times merely thickened mucus.

But, farther observation shows, that the morbid action, in croup, is not long confined to, although it commonly begins at, the mucous membrane of the larynx. The trachea and bronchia are soon interested, and to such a degree as to be lined with this membranous exudation now continuous with that of the larynx; and the bronchia are filled with a tenacious mucus. Evidences of inflammation may generally be discovered over the whole of the mucous membrane of the lungs: their cavity is always full of fluid; the interstitial cells are sometimes filled with serum. Nay, we have known, says Dr. Cheyne (*Cyclopædia of Practical Medicine*), parts of the lung hepatised, and inflammation to extend not merely to the parenchyma but to the serous membrane, in consequence of which we have seen fluid effused into the cavity of the pleura. In many

dissections the lungs have a solid feel, do not recede when the thorax is opened and cannot be compressed. Some have divided croup into varieties according to the extent of the region of the mucous surface affected; hence we have *laryngeal*, *laryngeo-tracheal*, and *laryngeo-bronchial*. We may not be able, nor is it very desirable for practical purposes, to designate in advance these varieties; but it is exceedingly important that we should be fully aware of the coincidence of tracheitis and of bronchitis, and at times even of pneumonia with croup, or the laryngitis of children. For the most part, the first lesions are felt and seen in the mucous membrane of the fauces and larynx, and subsequently extend to the tracheo-bronchial portion. At other times the irritation begins at the bronchial terminations, is manifested in cough, and then suddenly and violently fixes itself in the larynx. Dr. Stokes, in treating of the primary inflammatory croup of children, lays down, as one of the most important considerations, *the complication with inflammation in the remaining portions of the respiratory apparatus*. In a considerable number of cases, he assures us, that the laryngitis is preceded by some inflammatory affection of the lung, which continues during its progress, but which is overlooked in consequence of the prominence of the croupy symptoms. "I have little doubt," continues this author, "that many children that die with symptoms of croup are carried off as much by disease of the lungs as by that of the larynx and trachea; for I have seen many instances in which, during life, the stethoscope indicated unequivocally the existence of intense bronchitis or pneumonia, and have invariably found that the diagnosis was confirmed by dissection." We cannot doubt the correctness of the opinion of a frequent conjunction of croup with bronchitis and pneumonia. In the few fatal cases of the disease, or at least of a pulmonary disease beginning with croup, which I have seen, this conjunction or complication was unequivocal; the patient having recovered from the laryngitis, but sank under the pulmonary lesion. But it would be generalising too much were we to say, that, in the majority of cases of croup, in its first stage and in its first attack, pneumonia existed either antecedently to laryngitis, or even came on contemporaneously with the latter. The absence of the diagnostic signs, and the prompt and entire relief afforded, in many instances, by the very first remedy, an emetic, forbid such a supposition to the extent advocated by Dr. Stokes. In reasoning on the order in which the pulmonary complications show themselves, we cannot be unmindful of the effects of the mechanical impediments to respiration by the encroachment on the calibre of the larynx and the almost occluded glottis. The breathing will be laboured and hurried, the blood is imperfectly changed in the lungs; there is effusion of serum in their parenchyma, and accumulated mucus in the bronchial cells. The frequent complication of lobular pneumonia with croup has also been pointed out by MM. Rilliet and Barthez (*op. cit.*, p. 1, p. 321).

Special Pathology of Croup. — The seat of the inflammation of croup has been already stated to be the mucous membrane which lines the air-passages, and in a more particular matter, the larynx and the trachea. The membranous exudation varies in thickness,

consistence, and extent of surface over which it is spread : it is most commonly found in the larynx and upper third of the trachea than in any other situation (*Ryland*). Bretonneau gives three instances in which the false membrane extended from the epiglottis, without breach of continuity, to the extremities of the bronchial ramifications. In reply to the remark of Laennec, that this false membrane is generally found in the larynx, but that it very rarely extends above the glottis, we may cite the experience of Dr. Thomas Davis, who, in his published lectures, remarks, that of six preparations then upon the table before him, nearly every one presents the false membrane also in the inner surface of the epiglottis. We must even go farther, and admit that, in a great many cases, especially those in which croup proper has been preceded by fever and anginose symptoms, a lymphatic exudation forms on the tonsils and pharynx. M. Guersent estimates at nineteen out of twenty the number of cases of croup in the child originating in this way. This proportion is doubtless too large to represent croup in general. In twenty-six fatal cases of croup in the Children's Hospital at Paris, between 1834 and 1839, there were but thirteen with inflammation other than of the air-passages ; in nine there was an accompanying membranous exudation of the tonsils, pharynx, and isthmus of the fauces.

As many English writers, and most of our own, persist in calling croup cynanche *trachealis*, and one of the former even takes credit to his countrymen for having established beyond doubt its tracheal seat, I shall adduce additional, I would call it conclusive evidence, in favour of the disease being more especially laryngeal than tracheal. Desruelles, in his *Traité Theorique et Pratique du Croup, d'apres les Principles de la Doctrines Physiologique*, 2me ed., Paris, 1824, quotes or refers to the following writers respecting the seat of croup : — It is probable, says Vieusseux, that croup, which is suddenly fatal, is that in which the larynx is the part first affected. Royer Collard holds the same opinion. Bard has seen a whitish coat on the fauces, epiglottis inflamed, and covered with mucosities extending to the larynx. MM. Beauchéne, Sedillot, Carron d'Annecy, Leveque Lasource, Lechevrel, Latour, Valentin, Dejaer, Mercier, Carus, Regnaud de Lormes, have published cases in the *Journal General de Médecine*, in which a lesion of the larynx was manifest. Albers, after an inspection of the cadaveric phenomena, believes that most frequently inflammation arises in the larynx and upper part of the trachea. Boisseau (*Diction. Abregé des Scien. Med.*) says, the larynx is always affected in croup ; it is also the only part. The bronchia are frequently intact, and are never alone inflamed. The trachea is never affected without the larynx being in a similar condition. Simple croup, in the opinion of Desruelles himself, has its seat in the mucous membrane of the larynx ; but the false membrane is often thicker in the trachea, and the traces of inflammation greater in it. From these appearances, Dr. Jackson, of the University of Pennsylvania (*American Journal of the Medical Sciences*, vol. iv.), has drawn an inference that the exudation begins lower down, as in the bronchial ramifications, and, ascending to the trachea, ultimately reaches the larynx ; an opinion coincident with that of Dr. Stokes, already detailed. In two

fatal cases, the symptoms of which and the *post-mortem* appearances are described by Dr. Jackson, the membrane was continuous from the superior margin of the glottis down and into the bronchia, or the lungs. It became thicker in its progress downwards. The mucous membrane of the larynx, trachea, and bronchia, beneath this lining, was highly injected with blood and inflamed; presenting an appearance rather rougher than common. Blaud (*Nouvelles Récherches sur la Laryngeo-Trachéite — Connue sous le nom de Croup*) details twelve fatal cases, in all of which there was a membranous exudation lining the upper part of the air-passages; and in almost every case, when regions are specified, the larynx is shown to be affected, and thence mostly down to the middle of the trachea: in one instance the false membrane is stated to have extended from the trachea to the bronchia and their ramifications. In the case of a child three years old, which terminated in six hours, false membrane formed, and was found after death, in the whole of the larynx and greater part of the trachea, adherent and coming off in strips. Sometimes even in primitive croup the pharynx is partially lined with a membranous exudation, continuous with that in the larynx.

The character of the voice and breathing in croup, which arises from a spasmodic contraction of the constrictor muscles of the larynx, is further evidence of its laryngeal seat. The glottis can be voluntarily narrowed by some persons, so as to produce or imitate the sonorous hissing of croupal breathing. Croupal voice depends on two causes; viz., the spasm of the constrictor muscles of the larynx, and an alteration of the mucous membrane lining the vocal cords, by inflammation. Hoarseness, or a raucous voice, depends on the vocal cords in croup becoming softer and relaxed, by which the air is prevented from causing the complete vibrations in health. The thicker the covering of the mucous membrane, that is, the greater the inflammation, the hoarser will be the voice; and the hoarser the voice, the more serious the affection of the glottis and larynx. This state may extend to aphonia itself, which is temporarily relieved by expectoration. A grave or bass voice indicates a serious affection of the larynx and its vocal cords. An acute tone of voice is generally the result of a spasm of the laryngeal muscles and of the smaller opening of the glottis.

We cannot understand, nor give any adequate explanation of spasmodic croup, or of the fits of threatened suffocation in common croup, unless we admit the laryngeal seat of the disease. The irritating cause is in the mucous membrane of the glottis and larynx: by a reflex-motor action, the irritation of the membrane, transmitted to the brain, causes a return of innervation on the muscles of the glottis and larynx, and they are contracted with more or less violence. The cerebral excitement is kept up in these cases, and often augmented, 1, by the external air which is not in relation with the morbid sensibility of the inflamed organ; 2, by the duration of the inflammation itself; 3, by the various products of inflammatory secretion, which, like so many foreign bodies, irritate the air-passages. Hoarseness, or an equivalent condition of voice, may be the fixed

one in croup; but the modifications depending on spasm of the laryngeal muscles must be considerable. The spasm may be continued, remittent, or intermittent; varieties which may exist in laryngitis with false membrane from the glottis down to the bronchia. A suspension of the more violent symptoms may take place, and the disease seem so far to be *intermittent;* but it is the spasm of the muscles, not the secretion of the exuded membrane and croup proper, which intermit. Inflammation of the membrane, like any other of the phlegmasiæ, is liable to exacerbation; but this latter does not always correspond with the spasm or fits of laborious breathing and imminent suffocation. The spasm of the glottis is most common at night; and hence a mucous irritant, hardly a source of complaint during the day, may, without any, or with very slight increment, be a source of imminent suffocation at night, owing to the greater susceptibility of the nerves and muscles at this time. Death rarely results from the occlusion of the glottis, by the thickening of the mucous membrane or the superposition of false membrane on this latter; but it may by the spasmodic action of the muscles. Even where the false membrane is formed and adherent, the breathing is sometimes free just before death.

But, although the characteristic symptoms of croup depend on organic lesion of the larynx, we cannot render an account of all the phenomena of the disease if we overlook its tracheo-bronchial and even pulmonary complications. Of these I have already spoken. The dyspnœa gives a tolerable good measure of their presence and intensity. Hence, when we see the lips of a livid or violet colour, the face tumefied, the eyes prominent and shining, headache, somnolency, comatose stupor, convulsions, a peculiar anxiety, hurried breathing, and throwing the head back, we recognise symptoms of impeded pulmonary circulation and decarbonization of the blood, and feel ourselves more urgently called upon to remove this state of things, whether the laryngeal symptoms proper be urgent or not.

Causes. — The circumstances under which croup most readily and generally appears, are in reference to *locality, states of atmosphere, and age.* As regards locality, we find that large bodies of water, running or stagnant, fresh or salt, predispose to the disease. A damp and cold atmosphere has a similar tendency; although we must consider cold as relative. An easterly wind with rain, and a reduction of the thermometer by a few degrees even in July, will bring on an attack in a child not suitably protected from these influences.

The influence of locality in the production of croup is manifested very clearly at Warsaw, particularly in the spring season, at the time of the breaking up of the ice in the Vistula; in the circumstance of the disease being worse on the banks of the river and lower part of the city than in the upper. It is comparatively rare among the children who live in the upper stories, or on the first stage. The children of the poor who reside on ground floors are the greatest sufferers. But, contrary to what we would suppose, croup is little seen at Venice, bedded in the sea; and it is more frequent in Florence, bordering almost on the Appenines, than at Leghorn, on a paludal soil, on the sea-coast.

Winter and spring are spoken of as the seasons in which it most frequently makes its attacks; but the line of separation between exposure and immunity from croup is not always designated by the almanac. In New York the months exhibited mortality, during a period of sixteen years, in the following order: October, November, January, March, December, February, April, May, September, July, August, and June. Croup is represented to be more frequent when epidemic catarrh or influenza prevails; but the fact is only of occasional occurrence, for in some influenza seasons which I have witnessed I have not found such coincidence. In Boston, on the other hand, the disease would seem to increase at a faster rate than that of the population, the deaths, from 1811 to 1820, were 43; from 1821 to 1830, 245; and from 1831 to 1839, 376; being in these periods respectively 5; 21·3 and 15·9 per 1000 deaths from other diseases.

Croup has prevailed at times epidemically, although we may suspect that some of the accounts of its appearance in this way are really those of its aggravated endemical occurrence. Vieusseux of Geneva, in his *Memoire sur le Croup ou Angine Tracheale*, relates that croup has been observed to be epidemic in different parts of France. Between 1772 and 1783 it occurred twenty times in Geneva; from 1776 to 1784, four times in Tarascon; from 1771 to 1783, four times in Etampes; and from 1780 to 1784, four times in Beziers. It is not unlikely, as the inquiries of M. Bretonneau have satisfied him, that these visitations, or some of them at least, were of secondary croup or *angina diphtherite*, already described, Lecture X. Valentin (*Recherches Historique et Pratiques sur la Croup*, Paris, 1812), who lived for some time and travelled extensively in the United States, and is known to some of our old physicians, speaks of the epidemic returns of croup at Cremona, in Italy, in 1747 and 1748; at Frankfort on the Main in 1758; in Sweden four different times; at Franconia in 1775; also in Warsaw in 1780; at Altona, Tubingen, and Stuttgard, in 1807, and Vienna in 1808. He also mentions the disease having appeared in this way in Portsmouth, Virginia, in 1805.

Dr. Valentin gives some statistics of croup in this country, thirty-eight years and more ago, which are not without interest as forming data for comparison with its mortality at this time. Thus in the city of New York the deaths from croup in 1804 were 75, in 1805, 70, and in 1806 they were 106. The population of that city at the time was estimated at 70,000 inhabitants. If we compare these returns with the mortality in 1838, which was 182, and in 1839, which was 141, and bear in mind the increase of population, we shall draw the inference that croup prevails less extensively now than formerly in New York. The average number of deaths annually from croup, for a period of 16 years, from 1819 to 1834, was 140; or 1 death from croup for 37·3 of other diseases. In Philadelphia, in 1807 the deaths were, in all, 2045, of which 54 were from croup; in 1808 the annual mortality from all diseases was 2271, and from croup 53. On referring to the mortuary returns for 1838, I find the deaths from croup in this city were 101, and in 1839 but 83;

leading to the same conclusion as that just drawn respecting New York.

As respects age, croup may occur at any time between the second or third month after birth and puberty. The younger children are when weaned, the more liable they are to the disease. Out of 350 cases presented in a tabular form by M. Andral (*op. cit.*), 21 took place between birth and eleven months after this epoch; 61 between a twelvemonth and two years of age; 45 between two and three years; 54 between three and four years; 42 between four and five; 39 between five and six; 29 between six and seven; 3 between seven and eight. From the period between eight and twenty years of age, there were but 27 cases; and between twenty-six and thirty, none. At thirty and at thirty-four years of age there were, respectively, four: and one was reported at seventy years of age. We may reasonably doubt its being genuine primary croup which assailed these persons in adult life. In the Philadelphia return for 1839, the only one before me, all the deaths were under ten years of age, viz., 19 in the first year from birth, 18 in the second year, 33 between two and five years, and 13 between five and ten years. In New York, of 88 males, I omitted to notice the females, 63 died under a twelvemonth; 25 between one and two years of age; and 43 between two and five years. The narrower glottis of a child than of an individual who has reached puberty is adduced as a probable predisposing cause of the croup in early life. The difference, says Dr. Cheyne, between the glottis of a child of three years and that of one at twelve is scarcely perceptible, whereas at puberty the aperture of the glottis is quickly enlarged, in the male in the proportion of 10 to 5, and in the female of 7 to 5; the bronchia at the same time enlarging, and the voice undergoing a corresponding change. Respecting the relative liability of the two sexes, it would seem that this disease is much more frequent in males than females. Of 252 cases treated by Goelis, 144 were boys and 108 girls; Jurine gives the proportion as 72 boys to 47 girls in 119 cases. The return in the New York Bill of Mortality for 1839, already mentioned, gives 88 males for 53 females: in Philadelphia, on the other hand, for the same year, the proportion was reversed, the deaths of boys being 38, and of girls 45.

Symptoms. — The symptoms of croup are precursory, or those common to catarrh and other affections of the larynx and bronchia, and imminent or special. Among the first are hoarseness, cough, and modification of the common voice, with some febrile irritation. These may exist a day or two before the others are apparent; or they may only show themselves a few hours before the more alarming and distinctive manifestations of the disease. Indeed, if we are to credit even formal professional accounts, we should be led to believe that sometimes croup shows itself at once, in all its intensity and danger, without any prodrome. But a more careful inquiry would have satisfied the narrator that the child, said to be thus suddenly and unexpectedly attacked, had previously some of the symptoms first mentioned, to which may be added, in certain cases, gastric derangement owing to the eating of some indigestible substance.

Hoarseness has a signification in children more distinctive than in adults; since, it seldom precedes common catarrh in the former, as it so commonly does in the latter; and hence, if accompanied with a rough cough, hoarseness should at once excite the attention of the parent, and induce a call on the physician.

The approach of an attack of croup, which takes place almost always in the evening, and generally at an advanced hour, or towards midnight, is often indicated, after a day of unusual exposure to the weather, or getting the feet wet, by variable spirits, greater readiness than usual to laugh or to cry, a little flushing, and occasionally coughing; the sound of the cough being rough, like that which attends the catarrhal stage of the measles. More generally, however, the patient, after a period of sleep, gives a very unusual cough, which it is not easy to describe in words, but which is readily recognised by a person who has once heard it. Comparisons of the cough in croup have been made to the coughing through a brazen trumpet, to the crow of a cock, and to the low sharp barking of a dog, or better still, to the noise made by a dog or a cat which has swallowed something the wrong way, as it is called, and makes half efforts at vomiting. A repetition for a few times of this cough rouses the patient, who now evinces a new symptom in the altered sound of his voice which is puling or whining, and as if the throat was swelled. The cough is succeeded by a sonorous inspiration, not unlike the kink in pertussis; the breathing, hitherto inaudible and natural, now becomes audible and a little slower than common, as if the breath were forced through a narrower tube; and this is more remarkable as the disease advances. The ringing followed by crowing inspiration; the breathing as if the air were drawn into the lungs by a piston; the flushed face; the tearful and bloodshot eye; quick, hard, and incompressible pulse; hot, dry skin; thirst, and high-coloured urine; — form a combination of symptoms which indicate the complete establishment of the disease. The sensation of pain about the trachea is indicated in young children by a frequent application of the hand to the throat. The patient exhibits great anxiety and restlessness, and frequent desire to change from place to place; he is thirsty, and drinks, and in many cases without difficulty, although, by some writers, difficult deglutition is mentioned among the diagnostic signs of the disease. At each inspiration the tumid larynx descends rapidly towards the sternum, whilst the epigastrium is drawn upwards and inwards. Such are the symptoms which indicate the first, confirmed, or inflammatory stage of croup, and which, violent as they are, sometimes subside about midnight, even without medical treatment; to return, perhaps, in the course of the following evening. But in general, unless the disease be treated with promptitude and judgment, the second stage, characterised by a new order of symptoms, comes on the following day and terminates fatally.

This second stage is called the purulent, the suppurative, or the suffocative. It may commence from the second to the seventh day, or, in the suddenly fatal, it may succeed the first stage in a few hours. This period is characterised by the absence of any remission, and

the increased severity of all the symptoms, particularly the acceleration and diminished power of the pulse, and of respiration. The cough, from being loud and sonorous, becomes husky and suffocating; it resembles the cough which attends tracheal phthisis, and cannot be heard at any distance from the bed; the voice is whispering; the respiration wheezing; the countenance pale; lips livid; the skin motley; the eyes languid; the pupils are dilated; the iris with less colour than natural: a symptom, this last, which attends the advanced stage of diseases of the lungs; and mentioned by Dr. Cheyne, with a remark that it has been, he thinks, overlooked. The tongue is loaded and has purplish edges; thirst considerable; skin much less hot, and the stools dark and fetid; the surface of the body is covered with a cold, viscid perspiration; the feet and hands swelled. In this, the second stage, or that of suppuration, the breathing may be often remarked as most free in positions which are generally least favourable to easy breathing, as, for example, when the head is low and thrown back. There is seldom recovery from this stage, last described. Sometimes temporary relief is obtained by the expectoration of a portion of the albuminous, membranous, and muco-puriform matters obstructing the larynx and trachea. When the excretion is free, recovery may take place, but slowly; but when it is scanty, or if the inflammation has extended downwards, through the bronchia, as it usually does when thus severe, the issue is commonly fatal. In this case the patient tosses about in great distress; he seizes on objects around him, and grasps them convulsively for a moment; he throws his head back, seizes his throat as if to remove an obstacle to respiration, makes forcible efforts to expand the lungs; and after a longer or shorter time of distress, seldom above twenty hours, he expires, sometimes with signs of convulsive suffocation, but as frequently with continued increase of the foregoing symptoms, and evidences of exhaustion of the vital energies, and in a state of lethargy. The stethoscope generally furnishes information in this period of the extension of disease to the larger bronchia. This extreme state of disease seldom lasts more than twenty-four hours: it corresponds with the stage of *collapse* of some writers.

Croup, when fatal, at an average, occupies a period of four days: it has destroyed life in twelve hours. Sometimes, however, the second stage is prolonged for two or three weeks, and the patient, expectorating freely, emerges slowly from that which had seemed to be an utterly hopeless condition. Along with puriform fluid, of which the sputa chiefly consists, there is sometimes expectorated a white, soft, tubular matter, like macaroni stewed in milk, which is called the membrane of croup. We can hardly admit the chronic character of true croup, *laryngitis membranacea*. That the patient, relieved from the inflammation and its consequent morbid productions in the larynx, should suffer for many days, perhaps weeks, from the extension and persistence of a sub-acute disease of the bronchia and lungs, we can well understand. I have seen cases of this nature myself; and believe them to be of more ready occurrence, and, I may add, more frequently mortal in children of a strumous habit.

Mortality. — The mortality from croup has varied at different

periods, and is rated very differently by writers in different countries. M. Andral estimates the recoveries to the deaths as barely 1 in 10; adding, that in a small village in France (near Treste-sous-Jouarre), during a period of epidemic croup, in 1825, of sixty children attacked, the entire number perished with the disease. It is encouraging to know that the treatment is more successful now, or, at any rate, the relative mortality is less than it was at the beginning of the present century. M. Double (*Traité du Croup*) has taken the pains to prepare a table exhibiting the results of the practice of fifty-eight writers who have published their experience in this disease, from which it appears that the number of cures is rather more than a third part of the whole. The authors being ranged in chronological order, we can make at once two classes, twenty-nine in each; and show that, whilst nearly four-fifths died of croup of those who had been attacked and who had been attended by the first class, not quite one half of the entire number attended by the second, or more modern class, fell victims to the disease. In the spring of 1760, that of its first appearance in the county of Lancaster, England, Mr. Fell, a surgeon, who announces this fact, adds that, during the season, six children labouring under croup were committed to his care, to all of whom it proved fatal. But even at the present day our professional vanity is rebuked at the great mortality from croup in different parts of Europe. In a capital like Paris, where all the knowledge and resources of the art would, we might suppose, be brought to bear for the cure of disease in every form, the American student will be not a little surprised at the results of hospital practice, in croup, as exhibited in the prize essay on the subject by M. Boudet (*Archiv. Gen. de Medicine, Fev. et Avril*, 1842). Thus, of twenty-six cases of croup, received into the Children's Hospital in Paris, for a period of six years, or from 1834 to 1839, the deaths were twenty-two in number. In this year (1839), and in the two following years, croup was epidemic in Paris; the deaths from this disease having been in 1838, '39, and '40, respectively, 187, 286, and 326. In the Children's Hospital, in 1840, the deaths were 23, and the recoveries but 2; in 1840, during the first six months the deaths were 12, being the entire number of all the cases received in the hospital. This terrible mortality might reasonably be attributed to the deteriorated constitution of the poor children brought to the hospital, did we not read in M. Boudet's essay, that a physician, whom he names (M. Loyseau), living in Montmâtre, near to Paris, lost twelve out of fourteen cases, which he was called upon to attend at the houses of his patients. I have not the requisite data on which to express an opnion of the proportionate mortality of croup in the United States; but, adding my own experience to that of my professional friends, I should say, that it is not nearly so great as that given in any of the preceding statements of European authors, particularly the continental ones. Cases of croup are of very frequent occurrence with us — the deaths compared to the number attacked, are few.

Varieties and Complications.—Before I speak of the treatment of croup, it will be necessary to say something of its varieties and complications; for, on a clear understanding of these points will depend

very much our selection of appropriate remedies. *Laryngeal* croup is distinguished by the symptoms already mentioned, and more especially great aggravation of the disorders in voice, speech, and breathing, with more or less feeling of strangulation and pain in the larynx. In the *tracheal* croup, in which, although the larynx is not free by any means from disease, the trachea is chiefly affected, there is a dry, shrill, or sonorous cough, and a sharp lacinating pain in the course of the trachea, sometimes with slight tumefaction. The patient speaks in an undertone; but there is little hoarseness, and the voice and speech are not lost, or at least not so much affected as when the disease is seated partly or chiefly in the larynx. The cough, as the disease advances, although frequent and severe, has not the distressing sense of suffocation which accompanies the laryngeal variety. The fits of coughing are often followed by vomiting, or the rejection of membranous shreds, with a thick, glairy, and sometimes sanguinolent or purulent mucus. Generally the excretion of the substance is productive of much relief, which is increased after each discharge, unless the inflammation has extended down the ramification of the bronchia; and then the respiration continues to be extremely difficult, and the disease assumes all the characters of an acute bronchitis, and frequently terminates unfavourably. Cases of this description seldom run their course so rapidly as those do which chiefly affect the larynx. All the symptoms evince less severity, especially when treated early; and it sometimes continues twelve or fifteen days, but usually from five to nine.

Croup with predominance of *bronchial inflammation.* This variety corresponds with the *Cynanche Trachealis Humida* of Rush, and the *Mucous Croup* of some still more recent modern authors. I follow the specifications of its character as laid down by Dr. Copland (*op. cit.*). It is not unfrequent in young children of the lymphatic temperament, who are fat and flabby, with a white soft skin. It is often met with soon after the period of weaning, and in those who are brought up without the breast. It commences with coryza and the other symptoms of catarrh, and often with a little fever. After these have been present for some time, the child is attacked in the evening, or during the night, by a sudden hoarseness, and a suffocating, dry, sonorous, or shrill cough, with a sibilous inspiration. The countenance is pale and covered with perspiration, and the lips are violet. Several slight fits succeed to this first attack; the voice remaining hoarse and low, the respiration sibilous and slightly difficult; but a remission usually takes place in the morning. In the following evening there is a return of the croupal cough in a slighter degree. Sometimes the invasion is more gradual; the remissions but slight, or hardly evident, and the accession of expectoration much earlier; the disease approaching nearer as respects its seat and character to acute bronchitis. After the first, second, or third day, the cough is no longer dry, its fits become shorter; it is sometimes accompanied with a mucous rattle, and begins to terminate in the expectoration of a thick, glairy mucus. The disease now assumes many of the features of, or passes into,

bronchitis. It is the bastard or false croup of M. Guersent, more properly the *laryngeo-bronchial* variety of M. Dugés, milder n its character than the first, which I have described at length.

Thus far there can be no doubt about the inflammatory nature of croup, whether it be simply laryngeal, laryngeo-tracheal, or laryngeo-bronchial. The difference is simply in the degree and diffusion of inflammation along the mucous membrane of the air-passages; and the treatment in all must be of the same kind But another variety with more distinctive peculiarities is alleged to be common in children, and every now and then to be seen in adults; it is called *laryngismus stridulus* or *spasmodic* croup, and is represented to be dependent on a temporary affection of the nerves, by which the muscles of the larynx are thrown into spasmodic action, and thus diminish so rapidly and greatly this canal as to cause feelings of imminent suffocation, and on occasions death itself. This variety of croup occurs chiefly in weak, irritable children of a nervous temperament, and liable to worms. A quite different view of the cause of this affection was presented a few years ago in a work on the subject by the late Dr. Ley. He attributes it to a suspended or im perfect function of the branch of the eighth pair of nerves which is distributed to the larynx, caused, as he supposes, by the pressure of the enlarged cervical and bronchial glands. Children of a strumous and scrofulous habit are the greatest sufferers. Dentition is an exciting cause, by the swelling and inflammation of the glands to which it gives rise. The distressing symptom of crowing and prolonged inspiration is not, Dr. Ley thinks, owing to a spasmodic closure of the glottis, but rather to an inability of this part to enlarge to its normal size, owing to the want of innervation from the diseased *glandulæ concatenatæ*. From the same cause, the trans verse fibres, behind and connecting the rings of the trachea, losing their contractile power, the sputa accumulate; hence the "prodigious rattling in the upper part of the aspera arteria, resembling the sound which attends when there is phlegm that cannot be got up, scarce sensible when they are awake, but very great when they are asleep, described by Dr. Molloy; 'that kind of noise which an increased secretion of the mucus on the air-passages would produce,' noticed by Dr. North." The approximation of the sides of the glottis, thus produced, Dr. Ley argues, is owing to defective power of the opening muscles, and may be either complete or partial. If complete, the child may be carried off by convulsions or by asphyxia without convulsion. More commonly, however, the glottis, becoming gradually, but partially open, air rushes through the still contracted aperture, producing the sonorous inspiration so characteristic of this disease, and this commonly announces the partial recovery of the child.

The pathological views of Dr. Ley would lead to a prophylaxis which consists mainly in removing both the enlargement of the obstructing glands, and in giving tone to nutrition, so as to prevent their becoming subsequently diseased. But whilst admitting the propriety of this course as far as it goes, we cannot give our adhesion to the pathology on which it is founded. Croup is too readily as

well as promptly curable, and yields too frequently to a removal of specific irritation, such as dentition, indigestion, &c., for us to suppose that it could depend on a cause so decidedly and fixedly organic as that advanced by Dr. Ley.

Spasmodic Croup. — In reference to spasmodic croup, in general, there is no sufficient diagnosis to enable us to distinguish it from common inflammatory croup. Cases of pure and unmixed spasmodic croup are rarely met with in practice, the intermediate states between it and the inflammatory variety being more constantly observed. It is worthy of notice, also, that, in the undoubted inflammatory and membranous variety of croup, the obstruction of the larynx, or the laryngeo-tracheal canal, by new formations, is not sufficient to prevent the access of air to the lungs, — but that a great part of the phenomena and consequences of the disease are to be attributed to spasm of the larynx and trachea. This, however, it has been justly remarked, is spasm caused by inflammation, for which no antiphlogistic will be equal to venesection. Its nature may be understood from my preceding remarks on the laryngeal seat of croup. Dr. Copland says, that he has scarcely ever seen a well-defined case of spasmodic croup unconnected with dentition; or one terminate fatally without the concurrence of convulsions in its advanced stages, or towards its termination; and it has very commonly presented evidences of cerebral congestion. Dissection has revealed, in some cases, albuminous concretions, sometimes extensive, but more frequently consisting of small isolated patches in the larynx; sometimes an adhesive glairy fluid, with vascular spots in the epiglottis and in the larynx. The congestions of the brain, particularly about its base and the medulla oblongata, and of the lungs, cavities of the heart and large vessels, which were also found, were most probably consecutive changes. Still it must be conceded that there is a variety of croup of primary origin meriting the name of spasmodic. It may be induced by a preceding attack of the inflammatory; it appears to be most common in strumous and scrofulous habits. To a sudden invasion of croup, following and apparently caused by indigestible substances, such as nuts, apples, &c., and which is promptly removed by their expulsion, the title of spasmodic would seem to be applicable enough. In using it I could wish that we had a terminology which would serve to designate croup thus occurring in children, and sometimes, though but very rarely, it is true, in adults, in which there is a temporary congestion of the mucous membrane of the larynx, and, often, trachea, and thickening of the vocal cords, constituting a morbid change very analogous to that which takes place in the bronchial ramifications, in nervous or dry asthma. The suddenness of the attack, its frequently gastric origin, and immediate removal, sometimes by an emetic, sometimes by a common antispasmodic, or opium or other narcotic, are farther points of resemblance between this nervous or spasmodic croup, and nervous or dry asthma. With both of these may be associated not only congestion, but actual inflammation of the mucous membrane, — that of the larynx in croup, that of the bronchia in asthma, — and both with very slight modification of symptoms may require decided antiphlogistic remedies, antecedent

to and sometimes in place of those of the antispasmodic, opiate, and narcotic class just referred to.

In our *differential diagnosis* it is very important that we should not confound primary and idiopathic croup, either inflammatory or spasmodic, with secondary and symptomatic croup, in which the false membrane or puriform exudation is consecutive to an extension of that which lines the fauces and pharynx. The latter state is found in angina maligna, or *diphtherite*, by which latter term of late years it has been called by Bretonneau, and others after him, and under which it has engaged our attention. We are the more required to study this complication, as, unfortunately, some of the French writers, including even Laennec, have thought that it represented true croup, which, on this account, they have spoken of as not only epidemic but contagious. Such confusion in pathology must of course greatly obscure the treatment; and physicians, by an erroneous refinement, would be tempted to a practice in true croup that must be unfortunate and destructive, since it would recognise typhoid complications, which only exist with the membranous angina and secondary croup. The contrasted features of the two diseases are so well exhibited by Dr. Stokes (*op. cit.*), that I shall give them entire: —

PRIMARY CROUP.	SECONDARY CROUP. (*Angina Maligna vel Membranacea.—Diphtherite.*)
1. The air-passages primarily engaged.	1. The laryngeal affection *secondary* to disease of the pharynx and mouth.
2. The fever symptomatic of the local disease.	2. The local disease arising in the course of another affection, which is generally accompanied by fever.
3. The fever inflammatory.	3. The fever typhoid.
4. Necessity for antiphlogistic treatment, and the frequent success of such treatment.	4. Incapable of bearing antiphlogistic treatment; necessity for the tonic, revulsive and stimulating modes.
5. The disease spasmodic and in certain situations endemic, but never contagious.	5. The disease constantly epidemic and contagious.
6. A disease principally of childhood.	6. Adults commonly affected.
7. The exudation of lymph spreading to the glottis, from below upwards.	7. The exudation spreading to the glottis from above downwards.
8. The pharynx healthy.	8. The pharynx diseased.
9. Dysphagia either absent or very slight.	9. Dysphagia common and severe.
10. Catarrhal symptoms often precursory to the laryngeal.	10. Laryngeal symptoms supervening without the pre-existence of catarrh.
11. Complication with acute pulmonary inflammation common.	11. Complication with such changes rare. [Gastric complications common.]
12. Absence of any characteristic odour of the breath.	12. Breath often characteristically fetid.

In the accuracy of one of the features (7) of true or primary croup, I must, however, express my disbelief. I need not go over the argument again, nor repeat the proofs of the downward extension of the lympathic exudation from the glottis and larynx to the trachea, and thence to the bronchia. I will just add one familiar fact to the proofs already presented, viz., alterations of the voice,

of course glotteal disorders, preceding the other symptoms of the disease.

The occurrence of secondary croup, or of angina membranacea, with extension to the air-passages, is frequent in times of real epidemic croup; of which proof is furnished in the late epidemic at Paris, before referred to. The prevalence of exanthematous diseases, and great tendency to mortification of tissues, particularly gangrenous tonsillitis, was also apparent to all, and is so described by M. Boudet (*op. cit.*). This writer speaks of epidemic croup having been contagious, but without specifying the form of the disease which manifested this property.

In many instances of the malignant sore throat, the exudation thrown out from the inflamed surface forms a pellicle coextensive with the spread of the morbid process from the fauces to the pharynx and air-passages. In some cases, ulceration and slight apparent sloughing occur in the central parts and those first affected, whilst the surrounding surface and the parts subsequently diseased, become covered by a soft and easily lacerated exudation. The complication, with croup, of various states of angina or sore-throat — malignant or epidemic — whether commencing in the pharynx or in the fauces, and extending to the pharynx, is not uncommon. Bretonneau describes a remarkable epidemic affection of this nature, which he called *scorbutic angina*, or *angina maligna*. In eighteen cases of which he gives the dissections, the air-passages were affected. In five the disease occurred in children, aged from eight months to seven years, and in all of them the exudation was first formed in the pharynx. In one case it descended into the minute bronchia. The remaining thirteen cases proved fatal by the air-passages having been attacked; and in one case the laryngeo-bronchial membrane seemed to be alone affected.

The lympathic exudation is sometimes formed in the course of other diseases, as typhous fever, gastro-enteritis, chronic pleurisy, &c. In some cases the morbid action originates in the tonsils, and extends to the adjoining parts. In the croup epidemic in Buckinghamshire, in 1793, described by Rumsey, the croupal symptoms were stated to have been coeval with inflammation of the tonsils, *uvula* and *velum pendulum palati;* and large films of a white substance were formed in the tonsils. Croup may also be complicated with *thrush;* and with all the exanthematous fevers, — *measles*, *small-pox*, and *malignant scarlatina.*

Treatment. — The intentions of *cure* of croup are properly defined by Dr. Copland to be, — 1st, to diminish inflammatory and febrile action, when present; and to prevent, in these cases, the formation of a false membrane, or the accumulation of albuminous matters in the air-passages; 2d, when the time for attempting this has passed, or when it cannot be attained, to procure the discharge of these matters; 3d, to subdue spasmodic symptoms as soon as they appear; and, 4th, to support the powers of life in the latter stages, so as to prevent the recurrence of spasms, and to enable the system to throw off the matters exuded in the larynx and trachea.

Called up in the night to see a child who, after having gone to

sleep in the evening, is at this time suffering from well-marked croup, the physician ascertains the antecedent and collateral circumstances, in regard particularly to prior attacks, their duration and treatment, and the general habit and morbid predisposition of the patient, and then prescribes an antimonial emetic. He may find that, before his arrival, either ipecacuanha or antimonial wine, or the compound honey or syrup of squills, had been administered. If already nausea has ensued by means of some one of these, and the system shows a readily excitable impression to their action, it will, sometimes, be enough to continue the article in perhaps larger doses than had been given before his arrival. But if no amelioration has been produced, he should at once proceed to administer a solution of tartar emetic in a dose of from a quarter to a third of a grain, to be repeated every ten or fifteen minutes, until either emesis and the accompanying relaxation are brought about, or the medicine fails to vomit at all, or to abate materially the violence of the symptoms. In reference to the dose and frequency of its repetition and the entire quantity of tartar emetic to be given at this time, we must remember, that the greater the phlogosis in general, but more particularly of the thoracic viscera, the greater will be the toleration by the system of the medicine; or, less equivocally expressed, the longer will be the time before its ordinary effects are manifested. Commonly, between one and two hours will be the interval in which the salutary operation of the tartar emetic may be expected. If after two hours' administration of the medicine in full doses it fails to even nauseate, recourse must be had, not to other emetics, but to means calculated both to abate the now evidently violent disease, and to renew the susceptibility of the system to the tartar emetic. The remedy next in order, and the one indicated by the symptoms and our knowledge of the pathology of the disease is bloodletting. If a vein in the arm can be found it should be opened — if there be failure in this respect, we may sometimes procure blood near the ankle-joint or the instep, both feet being immersed during the time of the flow of blood in warm water. You frequently will be recommended to open the jugular vein, on account of its being superficial. The operation is simple, but not quite so easy as you might be led to suppose; and the appearance of the thing is revolting to the mother and others present. But as essentials ought never to be sacrificed to appearances or prejudices, if we cannot open a vein elsewhere, we must not hesitate to draw blood from the jugular, even although there be sometimes difficulty, which I have not myself experienced, in stopping the flow. A diminished pulse, paleness overspreading the face, and a feeling of sickness, nausea, and even vomiting, are frequent effects of the detraction of blood, and evidences, in this case, of its having been carried to a suitable extent. Often, after venesection, free vomiting will be caused by the tartar emetic, which had been given before the operation, without then any such effect resulting. The quantity of blood drawn will vary with the intensity of the symptoms and the habits of the patient. I often direct four ounces to be taken from the arm of a child between a year and two years old.

Associated with the two remedies already mentioned, viz., tartar emetic and the lancet, is the warm bath; and hence it is proper that the physician, immediately on his arrival, should ask to have warm water in readiness in case of need.

Failing to produce the desired impression with the tartar emetic, and either fearing to draw blood from a vein on account of the prior state and diseases of the patient, or unable to perform the operation, owing to the vein being imbedded in adipose and cellular tissue, it is proper, if a regular bathing-tub is not at hand, to have a large wash-tub three parts filled with water of the temperature of 94°, in which the child should be immersed up to its neck. If the vessel is not deep enough for this purpose, a blanket must be drawn over its back, so as to cover the shoulders and leave the head alone free. The period of immersion will vary from one hour to two or three hours, according to the effect produced by the bath, and the other remedy or remedies which may be had recourse to conjointly with it. The system which, before immersion, was intractable to the tartar emetic, will after a time evince its renewed susceptibility by nausea and free vomiting. It may be, also, that the attack is so violent and the danger imminent, as to require recourse to the appropriate remedies in quick succession: so that immersion in the warm bath will accompany the administration of the emetic tartar, and whilst the patient is yet subjected to the trial of this treatment, blood will be drawn from the arm or jugular vein. It rarely happens that a decided and salutary impression is not produced by these three agents in the cure of croup. I have found vomiting and the warm bath adequate to produce a complete solution of the paroxysm in cases in which, but for the fatness of the children and consequent difficulty of finding a vein, I should like to have bled. The free perspiration begun in the bath is kept up the remainder of the night, by having the patient enveloped in blankets and administering minute doses of tartar emetic and a little sweet spirits of nitre, with a drop or two of laudanum each time. In the city, when the indication is urgent for the abstraction of blood, we can obtain the desired end by the use of leeches applied to the upper part of the sternum, or directly above the clavicle, on each side of the trachea. The same object is attained also by cupping between the shoulders, or on the nape of the neck. The quantity to be thus abstracted is a little more than an ounce and a half for every year that the child has completed; but this recommendation need not be literally followed out.

In the few more severe cases, in which the course of the disease is still unchecked by vomiting, bloodletting, and the warm bath; or in which after partial relief there is a renewal of the symptoms, we direct leeches to the throat. I have treated successfully by leeches and an emetic a case of croup in a child six weeks old. If we are not called on until the suppurative stage is begun, and the distressing symptoms undergo scarcely any remission, we must endeavour to act on the mucous surface, and procure a detachment of the false membrane, by combining with tartar emetic calomel in full doses; and if the bowels have been already freely acted on, we add a little opium.

Impressed, as we should be, with a belief in the diffusive operation of mercury, and of its more especial action on the mucous membranes, we cannot hesitate to have early recourse to it in those cases of croup which do not yield promptly to tartar emetic and the lancet, as well as in those which evince complications of bronchitis or of gastro-hepatic disorder. To Dr. Benjamin Rush are we indebted for the free use of this valuable remedy in croup. Dr. Hamilton, on the other side of the Atlantic, soon adopted the practice, which he carried to a still greater extent than our Philadelphia professor. As the ultimate effects of mercury, when given in large quantities, are to attenuate the blood by destroying its fibrin and colouring matter, and to produce a cachectic state of system utterly incompatible with the existence of adhesive inflammation, we have additional indications for its use in croup. It may be given in doses of one to three grains, combined with a sixth of a grain of tartar emetic, every two hours, until its effects are evinced on the bowels by increased and green alvine discharges. Afterwards, especially if the skin have lost its febrile heat and the excitement generally be diminished, a minute portion of opium may be added to the articles already mentioned; the more readily, too, if at intervals there is an aggravation of the distress in breathing by an apparent spasm of the glottis. The calomel once begun to be administered, its use should be persisted in until its desired effects are obtained; care being taken all the while to adapt other remedies, which may be employed at the same time, to the varying states of the general system. Thus, if there be a suffused blush of the face, turgid jugular vein, strongly throbbing carotids, with a heaving of the chest, we may venture, even though venesection has been freely used, to apply leeches in the manner advised already, and sinapisms to the extremities. Evidences of depression of the vital powers, in a paleness of the face, coldness of the skin, and smaller pulse, will, on the other hand, require abstinence from the tartar emetic and recourse to the hot-bath, frictions of the surface, and warm infusion of the root of the polygala senega, and oxymel of squills, and even the addition of a little carbonate of ammonia. During all this time, the calomel will be regularly administered, until the breathing is free and equable, and the expectoration loose and abundant.

In the suppurative stage, or that of approaching collapse, we should stimulate the cutaneous surface by sinapisms to the extremities, volatile or turpentine liniments and epithems to the chest, or by a blister between the shoulders. More stimulating expectorants, consisting of the fetid gums, as assafœtida or ammoniacum, mixed with squills and ammonia, are also to be administered by the mouth, and enemata given, both to evacuate the bowels and to produce derivation from the seat of disease. A warm hip-bath will contribute to the same end. The inhalation of watery or other vapours, never easy to be done by adult patients, is still less so in the case of children: when it can be accomplished it is no doubt of considerable service.

The treatment of croup with bronchitis, or of croup followed by bronchitis, is nearly the same as for this latter disease. Cups to the

chest, or between the shoulders, succeeded by blisters; and calomel with very minute doses of opium, and tolerably free purging, are leading means of cure at this time.

Having thus sketched the outlines of the treatment of croup of the severer kind, I must add a remark, that, in a majority of cases of this disease, an antimonial emetic will suffice to give immediate relief, and a purge in a few hours afterwards to complete the cure. In spasmodic croup, or in that kind supervening suddenly on catching cold, or on indigestible matters in the stomach, even if it should be inflammatory, these remedies will generally suffice, on the day following an attack of croup. Febrile irritation, and unusual fulness of face and cough still remaining, we ought either to bleed or to give full doses of calomel, until the mucous membranes of the air-passages are relieved. This is done both by the direct removal of their congestion and inflammation, and indirectly by the full action of the medicine on the gastro-hepatic apparatus. It ought to be laid down as an invariable rule, that a purgative is to be given in the morning following an attack of croup of the preceding evening, if we would greatly diminish the probability of a fresh attack the second night. A croupy cough, without much fever or symptom of laryngeo-bronchial irritation, may often, in delicate subjects, be treated with antispasmodics, to which a little ipecacuanha or squills has been added. I have relieved entirely an adult from an attack of croup by the extract of stramonium and blue mass given in pill; although during a prior one I deemed it necessary to bleed, leech, and vomit her freely, and afterwards give calomel in large doses.

Before speaking of local treatment in croup, and the probable utility of bronchotomy, — laryngotomy and tracheotomy, — let me bespeak your attention to some remarks on the curative powers of tartar emetic and of calomel, and, likewise, of some other remedies, in croup. The first two are not, I think, regarded in all their therapeutical bearings as they ought to be. But I postpone these subjects to another lecture.

LECTURE LXXX.

DR. BELL.

THERAPEUTICAL ACTION OF TARTAR EMETIC AND OF CALOMEL IN CROUP—Practitioners who have employed calomel—Venesection—its advocates—Leeching—*Expectorants;* those of the antiphlogistic kind to be first used—Tartar emetic and opium; calomel and opium—Squills—The alkalies—Polygala senega; its alleged powers and true value—*Diaphoresis;* is sometimes critical; when useful, and how procured—Tartar emetic, as a diaphoretic, to be given in the smallest doses—Warm pediluvia and counterirritants to the lower extremities—Vapour bath—Warm bath not to be confounded with the hot bath—The arm bath—*Antispasmodics;* the best antispasmodics, venesection, tartar emetic, calomel, and the warm bath; opium, and afterwards assafœtida, camphor, &c.—*Topical remedies;* blisters—when and where to be applied—Stimulating liniments—Cauterization of the fauces and pharynx—Tracheotomy.—LARYNGISMUS STRIDULUS; not identical with spasmodic croup as often met with—Description of L. stridulus—With affection of the glottis are associated spasms in other parts—Causes of the disease; the children most liable to it.—*Treatment;* commonly mild—mixed, hygienic, and medical.—Prevention.

NOT unfrequently the relief from an attack of croup will be as per-

manent as it was speedy, by means of vomiting and its accompanying effects; and no other remedy after an emetic will be required for the solution of the paroxysm. I would lay stress on the words 'accompanying effects,' which I have just used; for it seems to me that they are overlooked by not a few practitioners, who think that the simple act of vomiting is itself the prime and sole means of detaching and expelling the morbid accumulations in the air-passages; and that the chief mischief from the disease consists in the mechanical obstruction of these passages. With such persons the selection of an emetic is a matter of comparative indifference, provided they can cause their patients to vomit. But a very slight retrospect of the pathology of croup must convince us, that, from the outset, our remedies should be selected with reference to their power of abating morbid arterial and secretory action, not only in the larynx and trachea but in all the bronchial ramifications; and, also, sedation of the vessels of the lungs proper as well as those of the brain. The effects produced by an emetic should harmonise with, and in degree be a substitute for, those caused by the next remedy, to which, if the paroxysm persists, we must immediately have recourse. This next remedy is venesection.

Now, we know of no emetic substance which is comparable in these respects with tartar emetic. It diminishes the excitement of the heart and arteries, is a sedative also to the capillary tissue, checks morbid secretion, itself dependent on capillary excitement, and allays spasm — effects these manifested after vomiting, but which often precede this latter and are independent of it. The mere act of vomiting is an evidence, rather than a cause, of relaxation: it will serve to eject mucosities and albuminous shreds and membranous exudations from the larynx and trachea; but there must have been an antecedent state of diminished excitement and turgescence of the mucous membrane and its withdrawal from the adherent plastic lymph, before this latter can be readily detached and new formations prevented. It is true that certain substances, by a peculiar irritation of the gastric nerves, will call the muscular parietes of the stomach and the diaphragm and abdominal muscles into combined action, and give rise to vomiting: but their effect is confined merely to evacuating the contents of the organ; and if their dose have been large, they cause continued straining efforts to vomit, with, at the same time, little or no increased secretion from the tracheo-bronchial vessels and mucous follicles; but rather an accumulation or temporary congestion of the thoracic and cranial cavities. Such emetics as these, sulphate of copper, for instance, may produce continued expulsive motions; but their sedative effect on the mucous membrane of the air-passages being slight, or none at all, they fail to arrest its morbid secretion, or to produce a separation of that which is already formed. The notion, that the mere act of vomiting will separate, to any notable extent, adherent false membrane, or that the mere scraping off of membrane and glairy mucus will give much relief to a croupy patient, the mucous tissue of whose larynx and trachea is inflamed, is too purely mechanical.

Our object, then, being to abate and speedily remove the morbid

excitement manifested by abnormal secretion, and the turgescence and injection of the mucous membrane of the air-passages, and particularly of the upper portion, we shall have recourse at once to the agent best calculated to attain this end. Some writers recommend us to use, in the precursory or forming stage of croup, ipecacuanha wine, or syrup of squills, and to reserve the tartar emetic for the inflammatory stage. Dr. Cheyne, who advises an emetic in the inflammatory stage, but without specifying the substance to be used, lays great stress on the peculiar advantages to be derived from the administration of tartar emetic in the suppurative stage. Having myself seen so repeatedly the failure of attempts to arrest the forming stage of croup by the domestic prescriptions of ipecacuanha wine, or even by the compound syrup of squill, I uniformly prescribe at once a solution in water of tartar emetic, proportioning the dose to the exigency of the case, that is, to the probable duration and degree of inflammation. By this means, the disease is either at once prevented from maturing, or we acquire a measure of its violence and an index to a speedy recourse to the lancet. In a majority of cases of even distinctly formed croup, tartar emetic will be found adequate to stop the paroxysm, by removing the peculiar cough, restoring the voice to its natural tone, and giving ease to the respiration; while, at the same time, it procures the discharge of mucus, and, it may be, of albuminous shreds and portions of false membrane. The little patient in a state of languor hardly unpleasant, induced by the operation of the tartar emetic in the manner already described, now goes to sleep; and the anxious mother is in a great measure relieved from her solicitude for the remainder of the night.

Not only in the incipient stage, but in the milder forms of actual croup, are other substances preferred by some practitioners to tartar emetic; on account of the prostrating effects of the latter. Were our diagnosis so certain that we could ascertain positively the precise degree and duration of the changes in the mucous membrane, from its first increase of natural secretion to the exudation of plastic lymph, and the congestion and thickening of the membrane itself, a graduation of medicines at this time might be attempted; but as this is not in our power, and as we know that, from the first coming on of hoarseness and cough, precursory of croup, there is a tendency to increase of excitement and phlogosis of the passages, the safe practice seems to me to be that which shall prevent these probable and often dangerous and fatal results, even though it be at the expense of momentary strength, and with the tax of temporary prostration. I believe, therefore, that the early use of tartar emetic is not only the safer but the milder practice, as it will most probably prevent unpleasant consequences, and save the necessity of recourse to harsher and complex measures, which would be called for if medicines of less power had been used in the beginning of the disease. I have met with but one case in which alarming prostration was caused by a persistence in full doses of tartar emetic, after the violence of the paroxysm of croup had been subdued by the medicine. The mother mistook my direction, to give the solution conditionally, that is, if the symptoms returned after my departure, for a positive injunction; and the re-

sult was a sinking of the vital powers, and *deliquium* of my patient; from which state, however, I soon succeeded in restoring her by active frictions, sinapism to the epigastrium, and laudanum and ammonia internally. It will often be proper, if, after free emesis, there be much straining to vomit without corresponding discharge, to give a drop or two of laudanum to the little patient, and to allow it to sleep, for which it will be sufficiently prone, for a while.

You must by this time be fully aware of the therapeutical basis on which I rest my use of tartar emetic in croup, as well as in so many other of the phlegmasiæ. It is not merely as an emetic, but as a contrastimulant or sedative, opposed to inflammatory action irrespective of its procuring evacuations, that I habitually use this medicine. Its utility in this way is beginning to be perceived by some of the practitioners of Great Britain, one of whom, Dr. Wilson, of Kelso, relates his successful use of tartar emetic in croup; he having cured ten out of twelve cases. He gave, after leeches had been applied to the larynx, followed by warm poultices frequently renewed, the antimonial salt, in doses of one-fourth to one-third of a grain, at first every hour, until a decided impression was made, and afterwards every two hours, till the patient was considered in safety. The toleration of the medicine did not extend so far as that it did not vomit at first quite freely; but it had no action on the bowels, which required castor oil or some other laxative to obviate costiveness. For children, Dr. Wilson properly directs from half a minim to a minim of laudanum in addition to the tartar emetic.

With these opinions, and the ground on which they rest respecting the operation of tartar emetic, you may readily suppose that I put no faith in blue vitriol (sulphate of copper). Its astringency following emesis is not a property which we want at this time.

It is not a little vexatious to find writers of established and deserved reputation take such limited views of the effects of *calomel* on various diseases. One will tell us, that unless it purges it will do little good; another assures us, that its administration will be useless in this stage of croup, because time is not allowed for it to touch the mouth. This last notion, that we cannot procure the full revolutionising and alterative effects of mercurial preparations in general, unless the salivary glands are inflamed and incipient ptyalism caused, is rank empiricism, and has completely blinded us to their therapeutical operation. Calomel, which we may speak of as in a great measure representing the other preparations of mercury, when taken into the stomach acts very speedily on the mucous membrane of this organ and of the small intestines; and, in a short time, on the liver and pancreas, which, by means of their excretory ducts, are placed in close and continuous relation with the intestinal mucous surface. Soon the large intestines are affected, and increased defecation is the consequence. But the operation of the medicine even in purgative doses is not confined to the gastro-intestinal canal and its subsidiary glands: it is extended to all the other mucous surfaces — the respiratory in one direction and the genito-urinary and its secretory apparatus in another; and is followed by increased expectoration and diuresis, together with an abatement of prior irritation which may

have prevailed in one or other of these divisions. Calomel acts in a more especial manner on all portions of the mucous system, and through it on their glandular appendages; and hence its use is more immediately applicable to irritations and inflammations of the mucous membranes and their glands than to other forms of disease. Most mischievous has proved the notion that the general system is not affected by mercury, and notably by calomel, unless and until ptyalism is produced. Under the influence of this error, immense quantities of the medicine are introduced into the stomach, with the effect often of a great depression of the vital powers, and particularly of the functions of the nervous system, cold skin, excessive inertia, &c.; the prescribing physician all the while waiting for the action of the calomel. In this way the patient may be actually destroyed by mercury, without any suspicion being entertained of the fact by the doctors of the salivating school.

Calomel, says Delafontaines, Inspector-General of Military Hospitals at Warsaw, is the first and the most efficacious of all the remedies employed in croup. I regard it, he says, as a specific, at least as certain against croup as against syphilis. Albers and Olbers recommended and used calomel; sometimes alone, after venesection, sometimes alternating it with kermes mineral and musk. Frank, at Wilna, relies on calomel, after venesection, general and local. Autenrieth used it to act on the stomach and bowels as a revulsive, and to prevent the formation of a false membrane. Copious and fetid alvine discharges were followed in a surprising manner by a removal of the affections of the larynx. Dr. James Hamilton, the younger, gave a grain of calomel every hour to children within the year, and two grains and a half for those two years old, until relief was obtained; then he gradually diminished the dose. Commonly evacuations upwards and downwards resulted. A child, five months old, took thirty-two grains of calomel in twenty-four hours, and another took eighty-four grains in seventy-two hours. Two children were lost by the weakness which resulted from continuing the calomel after the symptoms of the croup had subsided. Drs. Kuhn, Redman, and Rush, gave calomel in large doses. Dr. Rush gave six grains two or three times a day. Dr. Physick gave thirty grains one day to the child three months old which was bled three times in the day. Bond first recommended it. Bayley used it. Bard also praised it, as augmenting the secretions and rendering them more fluid, and thus diminished or prevented the secretion and adhesion of the membrane. The use of calomel and enemata made up the chief treatment of Autenrieth, in croup.

On our chief remedy in croup, bloodletting, some remarks will appropriately find a place at this time. Venesection was first recommended by Ghisi, who was also among the first (in 1737) to describe the disease; then by Home, Crawford, Michaelis, Ferriar, and Cheyne. Balfour, Bayle, Middleton, and Cheyne, opened the jugular. Vieusseux (of Geneva), recommends, in the case of a child three years old, that venesection to the extent of six or eight ounces be practised, and then that leeches be applied to the neck, to be repeated if necessary. Michaelis recommends large bleeding; he has

taken seventeen ounces of blood at once from a child six years old. But large and small are relative terms: the large bleeding is that which produces a decided impression at the time, by lowering the pulse, causing paleness, relaxation, and approaching syncope. This is the kind required in croup. Dr. Rush preferred frequent to copious bloodletting; he has taken altogether twelve ounces, in three different times, in one day. Dr. Physick has bled a child three months old three times in one day. Both these children recovered. Müller advocated and practised venesection. Dr. Dick, of Alexandria, carried it *ad deliquium*: thirty cures in a winter attest the value of his practice. Dr. Stearns, of New York, on the other hand, tells us that, of fifty cases of croup which he has treated without bloodletting, he lost but two, and in these there were complications. He does not think that venesection ought to be used in simple croup, because he does not believe the disease to be inflammatory. My own experience leads me to believe that in the majority of cases of croup the lancet may be dispensed with, if tartar emetic be early used and persisted in, until an adequate impression is produced; but if this remedy fails to arrest the progress of the disease, and to remove the urgent symptoms, no time should be lost in having recourse to the lancet, or analogous means of sanguineous depletion. Arteriotomy has been practised by Drs. Olbers and Duntze of Bremen.

Local bloodletting by leeches is a common and favourite method with a great many practitioners. It is that preferred by the French, who direct the leeches to be applied to the neck, or between the ears. Some have pretended to specify the number which should be put on at a time, but, as in the case of venesection, the bleeding must be relative to the violence of the attack and robustness of frame of the little patient; and, also, to the vigour and quality of the leech. Michaelis recommended eight or twelve; Reil of Halle, ten to twelve; and he allowed the blood to flow afterwards until fainting was induced. This, generally speaking, in the first stage of the disease, is the proper practice. It is that followed and recommended by, among others, Mr. Robins (*Lond. Med. Gaz.*, 1840). He applies "a dozen or more leeches, as the case may require, to the upper part of the sternum, so as to produce a state of syncope, as soon as possible, and then to check any excess of bleeding by the application of the nitrate of silver." Whenever the bleeding from leech-bites continues after the desired full effect is produced, measures ought to be taken at once for stopping it; and in order to prevent a repetition of sinister results, such as death itself, from the continued hemorrhage from leech-bites, the physician should give special injunction on this score; first, that the nurse or mother look, at short intervals, to ascertain whether the bleeding still continues; and then that she apply the prescribed means for arresting it; failing in which he himself is to be sent for. Mr. Yate, in commenting on Mr. Robins's practice just quoted, thinks that six or eight leeches are enough to put on any child under four years old; and after that age we may readily have recourse to the lancet. In drawing any deductions from the remarks of European writers respecting the number of leeches which they recommend, we must bear in mind

that one European is nearly equal to three American leeches. At Geneva (Switzerland), where croup is so common, one of the fundamental parts of the treatment of this disease is leeching. M. Odier speaks of it as the most sure and expeditious means of curing croup. It is so well known, as he informed Dr. Valentin, whose work furnishes me with these comparative therapeutics in croup, that most of those persons who pass the summer in the country with their children provide themselves with leeches, in order that they may be able to apply them themselves, at once, in case of need; "and I know," continues M. Odier, "that several cases of croup have been cured in this way before the arrival of a physician." The very tender age at which we can draw blood by means of leeches is in favour of the practice. In the case of a child but a few weeks old, who was severely attacked with croup, and to whom I gave ipecacuanha, and even tartar emetic, without either vomiting or relief following, I directed leeches to the forepart of the neck, with the effect of almost immediate ease and speedy cure. My own belief was coincident with that of the parents, that but for the timely application of the leeches the infant would not have lived, even if it had survived the night.

Expectorants.—While we recognise as one of the chief indications of croup, the procuring a solution of the inflammation of the mucous membrane of the air-passages, and a detachment of lymphatic exudation which may have been formed on it, we cannot, as an inference, admit with equal readiness the propriety of giving expectorants, without a rigid inquiry into their mode of action. Emetics are expectorants, and of the best class; because they depress the system, while they encourage secretion from the laryngeo-bronchial apparatus. But, although we cannot continue for any length of time to vomit our patient, we can direct those medicines which make a near approach, in their sensible effects, to the emetic class, and in this way render them instrumental both in keeping down excitement and favouring expectoration, which last is not so much a cause or means of reducing congestion and inflammatory excitement of the air-passages and lungs, as an evidence and an effect of such reduction. Coincident with this view will be the administration of small doses of tartar emetic, combined with very minute doses of opium, or of calomel with the same addition; or of tartar emetic, calomel, and opium. These remedies will come in as adjuvant to the lancet and purgatives. When direct repletion has been carried sufficiently far, we may substitute squills, in the form of syrup, for tartar emetic, unless the excitement runs high; and direct at the same time polygala senega in syrup, or what is preferable, in the form of sweetened decoction, with nitre — letting one or both of these be given alternately with calomel and opium. As more nicety is demanded in the use of opium at this time than of any other medicine, it will be well, whilst administering regularly the other articles mentioned, to direct it conditionally, according to the state of the bowels, and the restlessness, agitation, and wakefulness of the patient, and to leave word with the nurse or attendant to either add a drop or two of laudanum in every second dose of the other medi-

cines; or to mix with the latter a definite proportion at these times of a syrup of laudanum or of acetate of morphia, prepared for the occasion. Together with squills, the most approved expectorants in croup, under the supposition that we have reduced the general excitement as much as in our power, without producing a too great and alarming prostration of the system of our patient, are ammoniacum, senega, and the carbonates of the alkalies, to which some add, but not, as it seems to me, on sufficient grounds, camphor. Of these the alkalies are best calculated to diminish the plasticity of the blood; and hence they are entitled to be used in a state of arterial excitement and phlogosis, in which some other medicines of the class would be improper. We direct, according to the degree of excitement, either the carbonates of potassa and soda, or the carbonate of ammonia. The last is commonly reserved for states of great and commonly alarming depression; but much more good would be procured from its earlier and freer use in this as well as in many other of the diseases of the respiratory apparatus. Both it and its congeners, the fixed alkalies, ought to be steadily given at short intervals, with diluent drinks at the same time. Palloni gave sub-carbonate of potassa with assafœtida.

In the United States the polygala senega acquired for a time great vogue, as of itself commonly competent to the cure of croup. Dr. Archer, the father, and afterwards his two sons, Drs. Thomas and John Archer, of Maryland, most contributed to confer this reputation on the senega. It was the subject of the inaugural essay of the latter, when taking his degree at the University of Pennsylvania. To the outlines of treatment of croup laid down by Dr. Archer, few of us at this time will make objections. He recommends, in the first period of croup, venesection, mercurial purges and diaphoretics, chiefly tartar emetic. He has no reliance on blisters. After this comes his favourite senega, which ought, he thinks, never to fail, if the false membrane is not entirely formed; and when it is formed, the medicine will cause its expulsion, by the irritation of the throat and the cough which ensues. The decoction, which he prefers, is made by boiling half an ounce of the root in eight ounces of water down to four ounces. Of this a teaspoonful is to be given every hour or half hour, according to the augury from the symptoms. It stimulates, we are told, the throat, and acts as an emetico-cathartic; but it has cured without exciting vomiting. In the second period, calomel is advantageously given at the same time with the senega. Now, that the charm of novelty and the fervour of admiration in consequence have subsided, we are better able to estimate the senega at its real worth; and while we admit that it is a good adjuvant to other remedies, we must also add that it is one on which alone we cannot place much reliance. The *emetised polygala senega* of Dr. Bouriot may be enlisted more frequently in our service in the treatment of the first stage and more violent forms of croup. It is made by adding to Archer's formula an ounce of the syrup of violets and two grains of tartar emetic. Of this compound Dr. B. gives a table-spoonful every quarter of an hour, in order to procure four or five ejections from the stomach; and then a tea-spoonful every hour or two as an expectorant. Gradually,

in proportion as the laryngeal and pulmonary oppression is relieved, the interval for giving the mixture may be increased. Among the means occasionally employed to promote expectoration is the inhalation of the vapour of water, or of vinegar and water. In one case, the child, a patient of Mr. Coigné, of Courbevoie, expectorated a membranous sac, two inches and a quarter in size, after having eagerly snatched up a vessel holding pure vinegar for the purpose of fumigation, and swallowed four or five mouthfuls. The child was immediately seized with violent cough, threw up a false membrane, and was cured.

Diaphoresis is occasionally critical in croup. At least I have seen a child, whom I kept for upwards of an hour in a warm bath, where I administered to it tartar emetic so as to excite vomiting, on its being afterwards wrapped up in a blanket, remain for several hours in a copious sweat, during which time the breathing became more and more easy. In the morning the patient awoke quite free from oppression, and only suffering from a little fever and cough, which were removed by a purgative. In a somewhat more advanced period of the disease, after venesection and analogous antiphlogistic remedies, the coming on of diaphoresis is accompanied often by a relaxation of the laryngeal mucous membrane, freer breathing, and occasional excretion of tough mucus or muco-purulent matter. When the skin is of unequal temperature, the pulse frequent and contracted, and the breathing hurried, we may give with advantage saline sudorifics — the acetate or citrate of potassa, or of ammonia — in conjunction with minute quantities of tartar emetic or ipecacuanha wine, and a few drops of laudanum. The doses of tartar emetic should be decreased in the order of the following series of its therapeutical effects; from an emetic to a contrastimulant or sedative, then expectorant, and finally diaphoretic. It is a great mistake to suppose, as is, however, so commonly taught, that its property of causing sweat is manifested or bears any proportion whatever to the nausea it produces. Never are the diaphoretic effects of this medicine so satisfactorily exhibited as when the patient makes no complaint of sickness, nausea, or pain, nor experiences any sensation at the stomach or other organ. The full effects of sudorifics will be not a little increased by warm and stimulating pediluvia, or, in their stead, warm flannel wrapped round the feet, and friction of these parts with a warm hand. It was early remarked in the history of croup, by Ghisi of Cremona, that patients were cured by an abundant sweat towards the end of the disease. Dr. Wallenbourg informed Dr. Valentin, that in parts of Russia the Jewish women run with their children in their arms, when the latter are seized and almost suffocated with croup, to vapour baths, and remain there until a copious prespiration is induced. Returning home, they cover them up carefully. Some, he adds, are cured by this means, and slight remedies in addition.

One of the best aids to other remedies, and itself one of our best diaphoretics, is the warm bath. But in directing it, you must not fall into the careless, it may even be called blundering fashion, so common among otherwise well informed physicians, of confounding the warm with the hot bath. You will read of objections to the former, which are only applicable to the latter, such as its un-

duly exciting the patient, determining blood to the neck and head, and flushing the cheek; and, in fine, inducing efforts the very reverse of those which we most wish for at this time. Direct the warm bath of the temperature I have mentioned in my last lecture, and you will find that your patient will be soothed and comforted, and inclined to go to sleep in a warm, diffused, and febrifuge sweat. Dr. Grahl, of Hamburg, adduces cases in proof of the signal efficacy of arm baths in croup. They are indicated, he thinks, at the commencement of the stage of exudation. He recommends that the arms of the patient be placed in a vessel sufficiently deep to admit them to a hand's breadth above the elbow-joint, and filled with water as hot as can be borne. A cloth should now be thrown over the head of the patient, which, falling down round the edges of the bath, retains the vapour; and this the patient should be allowed to respire for a quarter of an hour at a time, repeating it at short intervals. The first application usually induces some degree of moisture in the Schneiderian membrane, and diminishes the dyspnœa. With its repetition the cough usually loses its hoarse tone, and the patient expectorates exuded lymph. Dr. Grahl admits, however, that when the symptoms are extremely urgent, calomel in large doses should be given, and adds a recommendation of much more doubtful propriety, that a blister be applied to the throat.

Antispasmodics. — Witnesses to the spasm of the glottis and larynx in croup, which often threatens suffocation, and at any rate interferes with the full expansion of the lungs and circulation through them, you will be naturally very desirous of removing it. With this view you may perhaps be induced to have recourse to antispasmodics. These medicines, in the common acceptation of the term in Materia Medica, are not, however, those on which you must rely in the early stage of croup. The best antispasmodics, experience will soon prove to you, are venesection, tartar emetic, calomel, and the warm bath, in the phlegmasiæ. After this opium is entitled to a preference, alone, or what is better, combined with the tartar emetic and the calomel. In proportion as the inflammation subsides, recourse will be had to the recognised antispasmodics, such as assafœtida, castor, camphor; and, I may add, extract of conium, and at this time digitalis, which sometimes serve very well to allay this irritability of the glotto-laryngeal muscles, by which they contract with spasmodic frequence and force under a slight irritation of the lining mucous membrane. They are used by friction, enemata, and inhalation, as well as by the stomach. Underwood praises highly assafœtida, both by the mouth and *per anum*, in which he is joined by Millar, Cheyne, Thomson, and others. Olbers and Albers place great reliance on camphor, and still more on musk. The practice of Dr. Rush was the simplest and best, viz., to prescribe a few drops of laudanum towards the decline of the disease. I would not go so far as Gregory and others, in recommending full doses of opium or laudanum after venesection and vomiting, in croup; but I well know that after these operations, and when we are giving the tartar emetic and calomel as antiphlogistics, or, as I prefer terming it, counter-stimulants, if we join a minute dose of an opiate to these medicines, as already re-

commended, we shall do more to mitigate and remove spasm and oppression, than by any of the more common antispasmodics, at the same time that we carry out, undisturbed, the indications of cure.

Of *topical remedies*, blisters are the chief ones and those in most common use. The application of a blister ought always to be withheld until a reduction of phlogosis has been obtained by emetics, antimony, and bleeding. The remedy is best adapted to the second stage, after the skin becomes cool and damp, and the pulse has lost its resistance and fulness. It will often cause a salutary cutaneous reaction, and aid the operation of tartar emetic and opium, or calomel and opium, in bringing on diaphoresis. Opinions are not uniform, as to the precise spot where a blister should be applied. The most common practice is, to place it on the forepart of the neck, over the larynx and trachea; but there is no special advantage can be promised for its use in this way, to compensate for the probable increased afflux to the larynx and trachea; to say nothing of the pain and continued irritation at every movement of the head and neck which are felt until the vesicated surface is healed. We are deprived also of the privilege, if it should be thought desirable, of afterwards putting leeches on this part, the call for which may come up at different periods of the disease, even after we have begun to use blisters and other counter-irritants. The three best spots for the application of a blister in croup, are the nucha, on the upper part of the sternum and between the shoulders. Vieusseux regards them, after venesection, as the chief means of cure, — an opinion certainly, which greatly overrates their value. In bronchial complications good may be expected of them; but in order to be fully efficient, they ought to be kept in a state of suppurative discharge, by the repeated application of blistering or other irritating ointments to the vesicated surface.

Stimulating liniments, such as sweet-oil and aqua ammonia, oil of turpentine and tincture of cantharides, and acetic ether, rubbed over the larynx and trachea at short intervals, so as to keep up a permanent redness and injection of the cutaneous capillaries, have been had recourse to at different times with reputed benefit. Ammoniacal cerate, made of simple cerate, ℥i., mixed up with carbonate of ammonia, ʒi., has been applied every four hours in quantities of ʒij., on the forepart and sides of the neck, which are then to be covered with a bag of hot ashes. The skin is soon studded with little pustules, which cause itching and a pricking pain for two or three days, after which the cuticle is separated and falls off. Dr. Copland speaks very highly of oil of turpentine sprinkled on a fold of flannel just wrung out of hot-water, and then applied around the neck and throat.

I may, in this place, as it is classed among the topical remedies, mention cauterisation of the fauces and pharynx, by rubbing these parts over quickly with lunar caustic. The alleged effects of this process are to arrest, if it be done early, the spread and formation of pseudo-membrane in the air-passages, and at once to relieve the breathing and cough. In primary and common croup, while we do not forget cauterisation, we should be aware that it must not divert our attention from the more active and heroic measures so fully and pointedly recommended already.

Tracheotomy has been recommended as the last resource in croup. Apart from the reasons, *à priori*, which would either forbid recourse to it, or show its nullity, we have unfortunately general experience adverse to its success. The different state of the mucous membrane of the larynx and trachea, owing to the lymphatic exudation on its surface in the advanced and last stage, from that in œdematous laryngitis of adults, independently of the complications or congestions of the lungs, common to both, forbid us to hope for the same benefit from the operation in croup that has followed it in the latter disease. Still, we have the favourable experience of MM. Bretonneau and Trousseau, who have performed it ninety-eight times. Of 140 cases of croup in which it has been performed of late years by different French surgeons, 25 *per cent.* have terminated in recovery.

Laryngismus Stridulus — *Angina Stridulosa — False Croup — Thymic Asthma — Spasm of the glottis.* — I have already expressed my doubts whether *laryngismus stridulus* be properly identical with spasmodic croup. The latter mostly exhibits all the distinctly marked symptoms of the inflammatory variety, with the addition of increased difficulty of breathing and sense of imminent suffocation; the spasm being an incident in the train of inflammatory symptoms. In the laryngismus stridulus, on the other hand, the attacks will come and go, will return frequently, and, on occasions, without any sinister result, although in general a first attack should excite watchfulness on the part of the mother or nurse, and induce her to give early notice to the physician of a repetition of the disease. The period is still more restricted than that of croup, in which laryngismus stridulus is manifested; rarely exceeding three years from birth. Dr. Kerr (*Edin. Med. and Sur. Journ.*, 1838), has known the symptoms of the latter to appear as early as eight days after birth. I have had the treatment of a case for the last twelvemonth, in which there is good reason for believing that the first attack was at the second day after birth, when life was almost extinct after symptoms of spasm and suffocation. Dr. Kerr agrees with Drs. Ley and Marsh, in the opinion, held also by Kopp, that the children who are most liable are those of a very full and large habit of body, and who exhibit marks of the strumous diathesis, or have sprung from scrofulous parents; but he also adds, and my own experience is confirmatory of the fact, that he has seen it in thinner habits, and in whom no scrofula could be suspected.

Symptoms. — *Laryngismus Stridulus* is characterised by attacks of spasm of the chest and severe fits of suffocation. The breathing suddenly stops, or rather there is an extremely slight, piping, imperfect inspiration, forced, as it were, through the contracted glottis. The respiratory sound has some resemblance to the crowing inspiration of hooping-cough, but is much smaller and more acute; it is still more like the choking attempts at inspiration made during the hysteric paroxysm. In some cases, but rarely, there may be five or six piping or whistling inspirations, and then a few deeper and stronger, alternating with expirations so slight as scarcely to be perceived. In extreme cases the respiration stops entirely; the small inspiratory pipe then takes place, either in the beginning of the paroxysm or on its termination, being quite suppressed by the strength of the attack;

and this symptom is pathognomonic of the affection. In addition to the affection of the glottis, when it has occurred with such intensity and frequency as to excite attention and alarm, there are commonly other symptoms associated. The chief of these are exhibited in the thumbs being turned into the palms, and the hands more or less clenched, and when opened by force immediately returning to their former position. The feet are turned inwards and downwards, and the backs of the hands and feet are swelled. These symptoms are most distinct when the crowings are numerous, or, as just remarked, when convulsions are threatened ; at other periods they are seldom present. The disease frequently terminates by convulsions ; and more rarely is ushered in by them. Other parts of the muscular system are affected, as when the child is unable to stand or walk erect, or to swallow liquids, except when given in small quantities. In severe cases, the child does not void urine as frequently as in health, and the quaniity of the secretion is diminished. In a few cases, continues Dr. Kerr, the buttocks or groins, become tender, and exude watery lymph ; and in perhaps every case of the disease, the buttocks, even when well covered, are as cool as if newly washed.

It is not correct to speak of the paroxysm being ushered in by fever, croupy cough, and sneezing, as often, there are no such preludes and accompaniments.

Mental emotion, such as any vexation, is apt to bring on a paroxysm. Frequently the child is awakened out of sleep by one. A current of cold air will produce the same effect. Indigestion is a frequent exciting cause. In one case the use of milk invariably brought on an attack. In another, the irritating organic cause seemed to be in the rectum. Straining with some tenesmus would always bring on the disease. In some days from twenty to thirty attacks of crowing will occur. During some weeks the crowings will be numerous, and during other weeks there may be very few. During an attack, the sufferings appear to be occasioned wholly by the want of air, and are not unfrequently so great that the child becomes somewhat livid. Instances have occurred of a paroxysm of crowing terminating life by the glottis remaining so long shut as to occasion suffocation ; but in general danger proceeds from the occurrence of convulsions. These are to be expected whenever the crowings become numerous. Sometimes they are succeeded by insensibility, and at other times the child becomes sensible as soon as the fit is over. In general, when the disease is approaching a fatal termination, the epileptic fits become more numerous, and the child dies apparently rather from the effects of convulsions than from any affection of the glottis. Boys are represented to be much more liable to the disease than girls.

Dr. Kerr thinks that laryngismus stridulus is almost always a consequence of cold : occasionally indeed it commences in summer, but only when the weather is cold, and especially if the child resides in a cold or damp house. Dr. Kopp, who has written fully on the disease, which he also terms thymic asthma, states, that all diseases of the respiratory organs predispose to it, — such as catarrh, bronchitis, croup, measles. In a case in which the attack was brought on by intestinal irritation, no spasm occurred during a violent and some-

what tedious attack of bronchitis. Teething also predisposes to it. Autopsic examinations have not revealed any deviation from health in the larynx or trachea. If convulsions have occurred, the morbid appearances in the brain are similar to those produced by convulsions unaccompanied with laryngismus (*Dublin Journ. Med. Science*, 1838).

This disease is obviously the same in its essential features as that described by Dr. Underwood under the head of *Inward Fits*, p. 109–10, and by Dr. Clarke as "A Peculiar Species of Convulsion in Children," whose account of it is introduced in a note by Dr. Hall, p. 111–12, to the last edition of Underwood. It also closely resembles, if it is not identical with, the *thymic asthma*, a detailed description and pathology of which are furnished by Dr. Montgomery (*Dublin. Journ.*, 1836). Mr. Hood had previously (*Edinb. Med. and Surg. Journ.*, vol. iii., 1827) pointed out, after numerous dissections, the enlarged thymus gland as the cause of this disease. Taking into consideration all the phenomena of the disease, we must go farther in our explanation of its organic cause than Dr. Ley, who supposes a paralysis of the glottis to be induced by pressure of swelled glands on the recurrent nerves, and of Dr. Marsh, who suggests that the seat of the disease may be at the origin of the pneumogastric nerve. The real cause is, a lesion which will give rise not only to the affection of the glottis, but also to the convulsions, and occasionally paralysis in the muscles of the limbs as well as those of deglutition. This must necessarily be in the brain, or more particularly at the medulla oblongata. The explanation furnished by Drs. Montgomery and Kopp, of the disease they describe being caused by pressure of the thymus gland on the nerves, is too partial; the disease has came on from other causes.

Dr. Griffin (*Dublin Journ. of Med. Science*, 1838), thus sums up the essential facts connected with this disease, at the conclusion of an elaborate critical inquiry on the subject: "1. By the concurrent testimony of almost all who have noticed the affection, it occurs for the most part, if not wholly, in strumous habits. 2. It is frequently found in connexion with enlarged glands in the neck, and perhaps in the thorax. 3. It is frequently found in connexion with eruptions on the face, ears, or scalp. 4. It frequently terminates in convulsions, and is sometimes, though very rarely, ushered in by them. I believe it may be said, that nearly half the fatal cases on record terminated in convulsions. 5. It is met with in families in which children are subject to head affections or convulsions, but have also the strumous disposition. 6. It is sometimes met with in connexion with an apoplectic or comatose state from the commencement, as in cases of crowing apoplexy which I have described. 7. In a great proportion of the cases which terminated fatally, there was not the least symptom of head affection through their whole course, if we do not look upon the occasional fits of breathlessness and crowing as indicative of it; and the children were as well, apparently, a few moments before death, as they were previous to the first attack of the disease, or as any children could be. 8. The complaint is sometimes, but rarely, attended by cough and permanent difficulty of respiration. 9. Perhaps it may be said that

from one-third to half of all the cases of which we have any account terminated in death." This last conclusion will serve to indicate the character of the *prognosis* in laryngismus stridulus.

Treatment.—That of the paroxysm would seem to be first in order from the nature and danger of the symptoms; but the duration of the fit is so short, that it is over before the physician can arrive on the spot. On the mother or nurse, then, will devolve the first measures in the emergency. The little patient should be raised and placed in a sitting posture, or with the body inclining slightly forwards, so as to allow the respiratory muscles their full power; then he must be slapped on the back, cold water thrown on his face, and ammonia held to the nostrils. By these means the respiratory organs are powerfully stimulated; and crying, sneezing, or some other strong expiration is produced, so that the glottis opens, and the fit is terminated. Other remedies, and they are the same with those adapted in inflammatory croup, or where there is any doubt in the diagnosis, will then be had recourse to, viz., an emetic and the warm bath. These failing, and life becoming rapidly or being, in fact, extinct, artificial inflation of the lungs has been recommended, and laryngotomy practised, as the speediest method of accomplishing this purpose.

When the attacks of crowing are severe and numerous, or the one attack is prolonged, the lower bowels should be emptied by an enema and some purgative medicine, such as calomel and rhubarb, or turpentine and castor oil administered by the mouth. Both constipation and diarrhœa occur, and may even alternate in the same subject in this disease; the latter, however, will, I suspect, be found more an attendant on the former and apparently opposite state than is imagined; for when diarrhœa is present, the first part of every stool is hard and dry, and the last nearly as liquid as water; and if laxative medicine is given, the stools are more natural, that is, less tenacious and less watery. The looseness, in fact, here as we every now and then see it in adult subjects, is the effect of irritation of the rectum by hardened feces higher up. Commonly the rule is a good one, to procure two stools daily for the child affected with laryngismus, or threatened with it, and to avoid carrying the purging any farther; hence, if diarrhœa should follow, a purgative, or some magnesia or oil, with a drop or two of laudanum, may be given. Laudanum or its like given with other views, such as of allaying irritation or of procuring sleep, will generally fail. In illustration of the direct action on the larynx of morbid impressions or irritants in the stomach, I may state that I have carried off at once all the symptoms of spasmodic croup by an emetic, which discharged from the stomach an apple that had been eaten and very imperfectly masticated a few hours before. I have seen, also, most of the symptoms of laryngismus brought on in a child by its having eaten stramonium seeds, the discharge of which from the stomach by an emetic, which I prescribed, was promptly followed by a removal of all the symptoms.

Some of the German practitioners (Kopp, Kirsh. &c.), recommend a more active course, to diminish and prevent, as they allege,

the recurrence of all undue congestion and nervous excitement in the heart and lungs, by low diet, large and frequent bloodlettings (every four or eight days), blisters and issues on the chest, constant powerful purgatives, &c.; also, to lessen the size of the thymus, by anti-scrofulous resolving medicines, such as mercury, iodine, &c. The difference of practice in these two outlines of the plan of cure, will depend entirely on the difference in robustness of frame and constitution of the child.

A knowledge of the predisposing and exciting causes of laryngismus stridulus will guide us in the modification or abatement of the former and removal of the latter. Of these, cold has been already mentioned as the chief one. A uniform temperature of the skin should therefore be maintained by suitable clothing, made not after the absurd requirements of fashion, but so as to protect the chest and shoulders effectually against currents of air, and the sudden transitions from a hot to a cold room, or damp entry, or the outer door. The upper garment should be of a woollen stuff or cloth, in winter, and made to fit up to the neck. A neglect of this rule by weak-minded and ignorant mothers, who are more afraid of the ridicule of their visiters at their children being dressed unfashionably, than of the imminent danger, and even prospect of death itself, of these same children, as pictured forth to them by their observant and conscientious physician, has produced incalculable mischief. That the feet should be well protected by thick shoes and warm stockings, is a point which is less contested. The notion that children, particularly those of the city, can be made hardy by partial exposure of their persons and irregular exercise in the open air, is as absurd in physiology as it is cruel and destructive in fact. Often a change of habitation, from a damp and well ventilated one to another that is dry and airy, will prevent the recurrence of laryngismus.

A predisposition most commonly met with, and necessary to be obviated if not entirely removed, is that of a strumous habit and scrofulous diathesis, sometimes associated with full and plump-bodied and well-complexioned children, and sometimes with pale, thin, and sallow ones. In both, the lymphatic glands are in a state of either unnatural development or of irritability; and in both digestion is more or less impaired. To the restoration of this function by the alternate administration of aperients and mild tonics, and the use of plain nutritive food, the attention of the physician will be therefore directed. The tepid bath, frictions of the skin, exercise in the open air, and a residence for a season in the country, will materially contribute to healthy nutrition, and an abatement of the scrofulous diathesis. With this particular view, the iodide of potassium and the iodide of iron will be usefully prescribed; and an ointment of the former should be rubbed on the enlarged glands of the neck.

The irritation from dentition will be diminished by occasional, and indeed in some cases of the present disease, by frequent cutting of the gums down to the tooth, so that the lancet shall grate on it. Disorders of the scalp, which we are told to treat with great delicacy and caution in children, ought not, however, under the influence of this on occasions, proper timidity, to be allowed to remain a source of

irritation to the child, and one of the exciting causes of laryngismus. They can best be managed at the time when the child is under the regular operation of purgative medicines; and it will be found that their removal will contribute not a little to the comfort of the patient.

Convulsions occurring during the course of the disease will require a somewhat more active treatment than that which has just been sketched; not so much, however, with a view to cure the convulsive paroxysm, which would for the most part subside of itself, but to remove the morbid condition of the parts, and notably the brain, irritation in which would endanger a return of the convulsion. In milder cases, five or six leeches applied on each side of the trachea will suffice: in more severe cases, the external jugular should be opened with a lancet, if we cannot have recourse to venesection in the arm, for the causes already mentioned. Attention should be paid to the state of the bowels, and means used for their being promptly evacuated if constipation have existed.

A troublesome attendant on this disease is free and almost continued, and consequently exhausting, perspiration, by which the chances of fresh attacks are increased on exposure to any little inequality of temperature, and especially to humid cold. The curative measures in such a case will be frequent changes of clothing; sponging the skin every morning with tepid, and after a while cold salt water, and careful rubbing of it afterwards with a moderately coarse towel; carrying the child out of doors, or if this is not advisable, having the apartments better ventilated and cooler, if they were too warm before.

One of the best means of restoration is a change of air, even from one part to another of the same city; but if the child can be taken into the country, or to the sea-shore, its prospect of recovery will be greatly increased. See, on the subject of thymic asthma and morbid states of the thymous gland, the interesting papers by Drs. Roberts and Lee, of New York, in the *American Journal of the Medical Sciences.*

LECTURE LXXXI.

DR. BELL.

CHRONIC LARYNGITIS—Its synonymes—Seat of the disease—Structural changes—Applicableness of the title, laryngeal phthisis.—Large proportion of ulcerations in the epiglottis, larynx, and trachea, in phthisical subjects—*Symptoms:* sensations, voice, aphonia, cough, breathing—Different species of chronic laryngitis, —a knowledge of, necessary for prognosis and treatment—Examination of the fauces and pharynx—To determine the state of the lungs: auscultation, percussion, and expectorated matter—Duration of the disease—*Causes:* age, sex, prior disease, vocal strain, atmospherical vicissitudes, habits.

THE disease which is the subject of the present lecture has been variously named. In addition to its technical designation of CHRONIC LARYNGITIS; LARYNGEAL PHTHISIS; LARYNGITIS WITH SECRETION OF PUS; it has received the popular ones of *Clergyman's Sore Throat; Throat Consumption*, &c.

CHRONIC LARYNGITIS may be the consequence of primary acute laryngitis and idiopathic; or it will show itself after a very brief, and by no means violent stage of acute phlogosis of the organ, and be combined with and a symptom of chronic affections of other parts, particularly of pulmonary tubercles, and occasionally of secondary syphilis. The effects of chronic irritation of the larynx vary, from a slight vascularity and thickening of the mucous membrane to changes so extensive as completely to alter and destroy the natural appearance of the canal. The successive changes in the laryngeal mucous membrane may be redness; thickening or diminished consistence; softening, partial or general; sometimes vegetations or excrescences of a considerable size. Pus may be met with on its surface; and often M. Andral has seen false membranes which, by their firm consistence and site, perfectly resemble some of the numerous varieties of the false membrane in croup. The inner surface of the epiglottis has been covered and incrusted, as it were, with a layer continuous from the larynx. The greater breadth of the larynx and *rima glottidis* in the adult than in the child, explains why the formation of false membranes is so much less alarming in the former than the latter. Participating in these alterations, the mucous follicles may become enlarged and thickened, and secrete more abundantly than common. They are often raised into small rounded spots, of a dull white or yellowish colour, and then they have been erroneously called tubercles. Ulcerations are met with, which, according as they are above or below the vocal cords, will cause impaired voice or complete aphonia: they have been chiefly met with in the epiglottis, the aryteno-epiglottidean ligaments, the vocal cords, and the base of the ventricles; and they may become so extensive as to give rise to fistulas. The number of ulcerations is generally in the inverse ratio of their size. They often extend to other tissues, and when they do, the thyro-arytenoid ligaments are the chief sufferers. The sub-mucous cellular tissue may be thickened, and appear under the form of scirrhous cords, or be distended with effused serum. In this tissue have been found purulent collections and tubercles in every stage of development.

The muscles of the larynx are, at times, reduced in size; softened, or even entirely removed; and again they are in a state of hypertrophy. The disease being protracted, the cartilages become affected; the epiglottis may be thickened, ulcerated, carious, even completely destroyed. The thyroid cartilage is less frequently changed; the cricoid is sometimes hypertrophied and carious; the arytenoid may be destroyed; and, on the other hand, all the cartilages may be ossified. In general, the ulceration begins in the mucous membrane, and extends to the cartilages. Serous cysts, and even calculous concretions have been found in the ventricles of the larynx. — (M. Andral, *Cours de Pathologie Interne.*)

The propriety of the term *laryngeal phthisis* is supposed to rest on the occurrence of the symptoms of consumption and its fatal termination, in consequence of organic changes which take place in the larynx. That such cases have been met with is not denied; but the number is very small. In a great majority of those persons who have sunk under disease whilst attacked with chronic laryngitis,

there has been found to coexist tubercles of the lungs. Sometimes these last follow, but more frequently precede the laryngeal affection. The upper portion of the air-passages chiefly suffers from ulceration in phthisis. Of one hundred and two consumptive patients noted by Louis, the trachea was found to be ulcerated in thirty-one, the larynx in twenty-two, and the epiglottis in eighteen. In the whole of his researches up to the time of making this record, he met with only seven cases of ulceration of the bronchia. Hastings gives, it is true, a larger proportion; the mucous membrane of this part having been, according to him, ulcerated in all those (leather-dressers of Worcester) who died of chronic bronchitis. Andral tells us (*Clinique Medicale*), that of the whole number of cases of phthisis which have come under his observation, in three-fourths of them there were ulcerations of the mucous membrane of the larynx.

Even though chronic laryngitis without complication should seldom be productive of consumption, the designation *phthisis laryngea* will still be applicable to those cases of tubercular pulmonary consumption in which the disease is aggravated, the symptoms in a degree characterised, and its march accelerated by the laryngeal affections.

The *symptoms* of chronic laryngitis are local and general. The local are derived from the feeling of the part, the voice, cough, expectoration, state of the respiration, and deglutition. The general symptoms are often slight, and are only manifested towards the last stage, or occasionally at the onset of the disease.

The *uneasy sensations* are chiefly confined to the larynx, and in this they are commonly in one spot only; as at the upper and lateral part, for example, of the thyroid cartilage. Sometimes there is a simple, pricking pain; at other times no complaint is made whatever, even when the larynx is the seat of extensive ulcerations. There is usually a tickling which excites cough, — sometimes a feeling as if an extraneous substance were lodged in the larynx; and again of erosion and burning, and even a lancinating pain. This pain is aggravated by coughing, speaking, and swallowing; especially if the ulcerations are above the ventricles of the larynx, and also by inspiring cold air, and by pressure on the larynx. But by far the larger number of persons with chronic and sub-acute disease of the larynx complain most of suffering, and that in some cases acutely when they swallow. So continued and decided is this symptom, that, in one case, my patient called on me, for the first time, to have an obstacle removed from his throat,—retained pieces of fish-bone, as he thought. To reassure him, I introduced once or twice a piece of sponge, tied on whalebone, into the upper part of the œsophagus. His real disease, violent sub-acute laryngitis with bronchitis, accompanied by a full, hard, and rather frequent pulse, was removed by repeated venesection, leeching the throat, cups on the chest, and free purging. The subject in this case was young, of a full habit, robust frame, and a full liver. Though not of an angelic nature, he was one of the choir in a church; and his singing talent no doubt had been often put in requisition in the social circle.

Difficulty is sometimes experienced in swallowing, and a part

of the food or drink is returned through the nose, at the same time that the patient coughs violently, and is in danger of suffocation. These symptoms are generally attributed to loss of substance of the epiglottis, or excessive rigidity through inflammation, by which it ceases to cover the larynx during deglutition. In the disease before us, there are cases in which the patients are able to swallow, although the epiglottis was far from covering the glotteal aperture; and again deglutition was almost impossible, although the epiglottis was entire; but the tongue was enormously tumefied, as was the epiglottis, which was erect and stiff at the same time.

The *voice* is almost always altered in its tone, and this change is one of the earliest symptoms of the disease. At first it is merely weak; but more frequently hoarse, and sometimes entirely extinct. The hoarseness may be continual; and at other times comes on only when the larynx is fatigued, or the patient is exposed to a temperature which differs much from that in which he habitually lives. If the individual suffer from severe hunger, the hoarseness is much increased, but disappears after a meal. Immediately before menstruation, as well as after venereal indulgences, the hoarseness becomes greater. Dividing the duration of the disease into three periods, it will be found that, during the first the hoarseness is intermittent, during the second it becomes continued, and may so remain to the end, though more frequently complete aphonia supervenes during the second stage. Inequality of the voice is a common symptom in chronic laryngitis; more, indeed, than is suspected by the patient himself. When the larynx is diseased, the volume of the emitted sound is lessened; and, in general, the emission of air is proportioned to the intensity of the voice. Hence discordant and unequal intonation is avoided. But the voice becomes discordant and squeaking in those who attempt to give it the full devolopment which it possessed before. This has been observed in several singers and pleaders, and in clergymen who persist in the performance of their clerical duties when their voice has lost its accustomed pitch.

Aphonia may be intermittent or continued. In the former case the voice is lost at night, while in the morning, or after a meal, it is merely hoarse. Continued aphonia is a bad symptom. That which comes on suddenly in an acute form of disease of the larynx, and continues when the disease has passed into the chronic form, is not nearly so alarming as that which advances progressively. That which succeeds mucous or catarrhal hoarseness is not so bad as that which follows the *stridulous;* which last is believed to depend on ulcerations or vegetations in the larynx. Alone aphonia is not of such bad import. I have had it to last some weeks in one of my patients who was subsequently restored to full health.

The *cough* is a constant accompaniment to chronic laryngitis, which cannot always be said of disease of the lower parts of the respiratory apparatus. It is hoarse, and even croupal, when there is tumefaction of the mucous membrane; and generally dry, or at most partially relieved by puriform mucus and sputa mixed with blood. Sometimes pure blood is expectorated; at other times false membrane is expelled once daily for some months, and a more than usually copious discharge has been

followed by convalescence and restoration to health. Mixed with purulent or sanguinolent mucus, are occasionally seen the remains of carious cartilages of the larynx. In those affected with aphonia or stridulous hoarseness the cough is very peculiar: it has been called eructation by MM. Trousseau and Belloc — the latest and most careful describers of the disease. The frequency of the cough is not, however, a measure of the state of the larynx; nor is it nearly so unfavourable a symptom as hoarseness and the change in the volume of the voice. Some persons in whom there was found great lesion of this part have hardly coughed at all; whilst others have been teased with an incessant cough, in whom both the lungs and the larynx were sound.

The *breathing* is not much affected in the milder forms and early stage of chronic laryngitis; that is, when there is no diminution of the common diameter of the glottis. After the second stage of the disease is reached, anhelation is marked and goes on increasing until death takes place. This anhelation may proceed from two causes; muscular debility, the result of general weakness, or narrowness of the orifice of the larynx. In the latter case it takes the following course; at first the patient feels himself liable to what he calls fits of asthma, which most frequently come on at night; at a later period the severity of the paroxysm is increased, and the oppression is permanent. The patient cannot breathe on his bed, unless supported with pillows, and then the inspiration is habitually sibilant, and the expiration loud and prolonged. Paroxysms of true orthopnœa soon supervene, during which there is extreme anxiety and threatened suffocation; and, generally, in fifteen or twenty days from this time the patient dies suffocated. These nocturnal fits of asthma in chronic laryngitis are not always of such bad import. I have found them sometimes readily relieved by tincture of belladonna and sub-carbonate of potassa, or *liquor potassæ*, in a sufficient quantity of fluid, with sugar or syrup. Of this mixture, a single dose at early bed-time will suffice to ward off the paroxysm. When there is anæmia at the same time, a mild chalybeate in the morning more effectually prevents a return of the nocturnal fit.

When the *ulcerations* are situated at the superior orifice of the larynx, deglutition is impeded, giving rise to some uneasiness and cough; but in cases in which the epiglottis is in part inflamed or removed by ulceration, there is much dysphagia with a return through the nostrils of the drinks taken in by the mouth, and a fixed pain in the superior portion of, or immediately above, the thyroid cartilage. Still, as if to prevent positive conclusions respecting the effects of evident organic lesions, we learn, from Magendie, that there have been cases in which, notwithstanding the complete destruction of the epiglottis, deglutition was performed without abnormal symptoms.

In some cases of chronic laryngitis, pressure on the larynx by grasping it between the finger and thumb produces a crepitation, which is alleged to be caused by caries of the cartilages, and by some it has been regarded as a pathognomonic sign of *phthisis laryngea*. But renewed experiments show that this occurs when the organ is perfectly sound.

Expectoration in simple laryngeal phthisis does not furnish very positive signs. It is commonly purely mucus, transparent, and not

very tenacious; but when there is ulceration, the sputa, without losing these characters, are often mixed with little puriform masses and streaks of blood, and are brought up with slight effort, as if to clear the throat.

It is important to be aware of the *different symptoms in the different species* of chronic laryngitis or laryngeal phthisis. The progress of syphilitic is not the same as that of simple laryngeal phthisis. The latter generally originates in the larynx and trachea; whereas, the former usually spreads from the pharynx and nasal fossæ. It is, we are told, of great practical importance to attend to this, because experience shows that the larynx is usually affected in the same manner with the throat. Thus, where an erythematous syphilitic affection is observed in the throat, the affection of the larynx will not be of an ulcerous nature; on the contrary, where the pharynx and *velum palati* and nasal fossæ are deeply ulcerated, we may expect to find the larynx ulcerated or eroded.

In every case of chronic laryngitis we should examine the fauces and pharynx, in order to see whether, and to what extent, their mucous membrane is affected. Frequently, there are diseases of these parts and digestive disorder associated with that of the larynx, and although we may not be able to reach this latter by topical remedies, we can exert a salutary effect on it through applications to the fauces and pharynx. I have, after careful and repeated examination, detected in this way ulceration at the lower part of the space between the pillars of the palate adjoining the upper part of the larynx; on cauterising which, the laryngeal affection was greatly relieved. Elongation of the uvula is of itself a frequently exciting cause of cough and of irritation of the glottis, and through this latter of the whole respiratory apparatus. Its excision is often necessary for a cure, and at times the operation alone will be found sufficient for this end. An inspection of the epiglottis is very desirable, since the larynx is seldom severely affected without this part participating in the disease. Sometimes by getting the patients to utter loud cries during the inspection, the epiglottis, carried forward at each expiration, may become visible. As yet, little benefit has been derived from the use of speculums invented with a view to our examining the larynx by their means; and the trials made to ascertain by the introduction of the finger the state of the epiglottis and upper part of the larynx, must be regarded as hazardous, although the practice has been recommended with some emphasis in cases of suspected œdematous laryngitis, in order to allow of our obtaining a satisfactory diagnosis.

Believing the title of laryngeal phthisis to be sufficiently comprehensive, both to express consumption which may result from simple chronic laryngitis, as well as that which has its origin in pulmonary tubercles, and to which the disease of the larynx furnishes some of the chief characteristic symptoms, I do not see the necessity of using the terms *tubercular laryngeal phthisis*. It is sufficient for us to be aware of the fact, that with organic lesions of the larynx of a chronic nature there is commonly complicated a tuberculous state of the lungs, which is, after a time, converted into true phthisis. In form-

ing, therefore, our diagnosis and prognosis of diseases of the larynx, an examination of the state of the lungs can never be omitted. On this point, the advice of Dr. Stokes should be regularly and fully acted on. — (*A Treatise on the Diagnosis and Treatment of Diseases of the Chest.* Part I.)

"The first step in the investigation will be to examine accurately into the history of the case; and in particular to determine whether the laryngeal affection was primary or supervened on an already existing state of the lung. We must examine what were the first symptoms, and whether they were referrible to the larynx or lung. We must inquire into the past and present state of the fauces, and also whether a syphilitic taint exists. Now, should it be found that the first symptoms were those of a laryngeal character, that the voice had been altered from the outset of the disease, or that a syphilitic taint did really exist, we have a good probability, not that the lungs at the time of examination are free, but that the first morbid action was exerted on the larynx. But if, on the other hand, we find that, previous to the occurrence of any hoarseness, or stridor, or dysphagia, there has been cough without the laryngeal character — particularly if it was at first dry, and afterwards followed by expectoration — if hectic has existed, although the expectoration continued mucous; if there have been hemoptysis, pain in the chest or shoulders; and lastly, if the patient was emaciated previously to the setting in of the laryngeal symptoms — we may be almost certain that tubercle exists, and that the case, so commonly called laryngeal, is in reality pulmonary phthisis; and if it appears that the patient is of a strumous habit, or has already lost brothers or sisters by tubercle, we may form our diagnosis with a melancholy certainty, even though, at the time, we can detect no certain physical sign of pulmonary tubercle."

It follows, from these premises, that we must have recourse, in our diagnosis, to the stethoscope, the nature and abundance of the expectoration, and the rapidity of the consumption. But, as Dr. Stokes has stated in the work just quoted, the sounds which would be conveyed to the ear through the stethoscope, and constitute the phenomena of respiration, are greatly obscured or masked by the state of the larynx, when this part is the seat of the disease — a difficulty also mentioned by MM. Trousseau and Belloc. Fortunately, percussion serves us here instead of auscultation, and enables us to determine which lung, and of the diseased one which part is affected. "Under any circumstances," says Dr. Stokes, "the localised dulness points out that there is something more than laryngeal disease; and we know from experience that that something more is, in the great majority of cases, tuberculisation of the lung." This present, the disease of the larynx runs its course with greater rapidity.

Between laryngitis and tracheitis, either simple as such or associated with phthisis, it is difficult to distinguish. In the former we may expect dysphagia, and the voice to be more affected — in its being muffled, hoarse, or wanting — than in the latter. Among the terminations of laryngeal phthisis one of the most severe is swelling of the margins of the glottis. The primitive laryngeal angina (*acute*

œdematous laryngitis), of which this is an accompaniment and a symptom, has been already described with requisite fulness; its inflammatory nature is contended for by the French writers just named. The consecutive is occasioned by organic lesion of the larynx and its connections, and may be either inflammatory or active, or non-inflammatory and passive.

In duration, chronic laryngitis will vary from a few months to many years. For us to augur a favourable termination, the disease should have made but little progress. When it has advanced considerably, and the system is weakened by dyspnœa, cough, prolonged abstinence, or marasmus, there is little hope of saving the patient. But as there are on record accounts of several patients in whom the disease had made great progress but who were nevertheless cured, it shows the propriety, and indeed duty, of persevering in our endeavours to save the patient, so long as there is the slightest shadow of hope.

The *causes* of chronic laryngitis are not always appreciable. Sometimes the disease originates under the influence of atmospherical changes. In such cases we find persons contract a slightly acute laryngitis, which soon passes into a chronic state and never leaves them. The inspiration of irritating particles or gases which escape in various manufacturing processes; a prolonged mercurial course; typhoid fevers, and debilitating causes in general; exanthemata; foreign bodies in the larynx, occasionally give rise to it. Of the internal causes, unmeasured and protracted exercise of the voice is one of the most frequent and evident; as we see in the cases of preachers, pleaders at the bar, and other public speakers, and in actors and singers. Even here, obvious as is the exciting cause, we find often so little proportion between its action and the occurrence of the disease, that we must look to other collateral causes, and perhaps still more to the predisposition of the parties affected, as in a tuberculous and scrofulous constitution. Belonging to this predisposition will be general debility from deficient exercise, depraved digestion and nutrition, excess in venereal indulgences, including masturbation and the depressing passions. The local predisposition may be found in a want of moderate exercise of the voice in the intervals between the formal and professional exercise and extraordinary strain on it; also, in continued irritation of dry hot air by a person habitually breathing such. Tobacco is a predisposing cause, both of general and local debility; a disturber of the functions of the lungs, stomach, larynx, and pharynx, both by perverting the secretions of the mucous membrane lining these organs, and by at first exciting and afterwards depressing their nervous power. Whatever tends to attract fluids in excess to the larynx, and to derange the circulation in its mucous membrane, as well as indirectly to weaken its muscles, which are those of the voice, by enfeebling innervation, must of course contribute to a morbid state of the organ. The use of tobacco may bring on all these derangements of function. But one would suppose from the obstinate perseverance in this filthy and eminently anti-social practice, that it placed the chance all on the side of health, rather than of that of disease and of a complica-

tion of unpleasant sensations more annoying to the sufferer than positive pain. The apparent exemption from deleterious effec s in a few persons of a robust and phlegmatic habit of body, is no argument against the general rule. The same deceptive reasoning has been attempted to show the innocuousness of free spirituous and vinous potations in general. But how small the number of exempts out of the legions of those whose health and comfort and respectability have been ruined, and their lives abbreviated by such practices. Well have these privileged exempts been called the Devil's decoys—seducers of the thoughtless crowd to their undoing. The use of ardent spirits is, particularly in conjunction with exposure to vicissitudes of weather, a powerful cause of this disease.

Age and *sex* exert a great influence over the development of chronic laryngitis. Almost all the patients whose cases are recorded by different writers were between twenty and fifty years of age; the most of them between thirty and thirty-five. It appears from the observations of Louis and Serres, that among individuals of the tubercular diathesis at least, the organic alterations in the larynx and trachea are twice as numerous among men as among women. Women are less subject to alterations of the organs of voice than men; and children, whose constitution is very analogous to that of women, participate in this immunity, attributable, also, and more especially to the relative infrequency of phthisis at this tender age.

Mention has been made already of irritation and phlogosis of the fauces and pharynx being associated with similar states of the larynx. The disease of the latter is commonly in these cases, whether syphilitic or otherwise, consecutive to that of the former. In some cases of chronic gastritis, there is morbid redness and aphthæ of the fauces and pharynx, which extend, by continuous sympathy, to the glottis and upper part of the larynx, and give rise to alteration in the voice, cough, expectoration of purulent mucus, &c. A restoration of the healthy state of the stomach, if accomplished in an early period of the disease, will bring about a removal of the laryngeal symptoms. In small-pox, we have frequent instances of this extension of inflammation from the fauces and pharynx to the air-passages, and the consequent changes in the voice and respiration, already described among the symptoms of chronic laryngitis; with this difference, that in the secondary laryngitis from small-pox, the disease runs its course with a rapidity which brings it within the stage of acute disease. A slight irritation of any part of even the buccal mucous surface, by establishing an afflux towards the throat, will develope chronic laryngitis; as, for example, a caries of one or more of the teeth. A celebrated singer, Mme. Mainville Fodor, the syren of the Italian opera, who enraptured the inhabitants of Paris in my time of study there, is said to have lost her voice in this way.

LECTURE LXXXII.

DR. BELL.

TREATMENT OF CHRONIC LARYNGITIS—Rest of the vocal apparatus—antiphlogistics—counter-irritants,—narcotics, mercurials, iodine, sarsaparilla, balsam of copaiva, blue mass and syrup of sarsaparilla, sulphurous waters—Topical remedies: inhalation of simple and stimulating vapours; caustic to the parts; attention to anginose complication—Syphilitic chronic laryngitis: mercurials, sarsaparilla: iodine—Tracheotomy, when proper—Prevention of the disease—Clergymen,—rules for their guidance—Uniform temperature of air—Jeffray's Respirator—Change of climate.

THE TREATMENT of laryngeal phthisis will vary with its stage and the predominance of certain symptoms. In the first stage of the disease, marked by slight hoarseness, a feeling of heat and dryness in the throat, and imperfect expectoration or hawking of muco-serous matter, the remedies will be the same as for common catarrh. But if the inflammation does not readily yield to the simpler means, including abstinence from all kinds of excitement, and if the hoarseness is increased, and accompanied by aphonia and the characteristic cough before described, more energetic and systematized measures are required. The first condition for restoration to health is entire rest of the vocal apparatus, as far at least as speaking above a whisper. Provided there be no effort made by the patient to render what he utters more distinct, speaking in a whisper is not attended with any evil, in the opinion of Drs. Trousseau and Belloc; but even this in conversation with a stranger, when an effort at a certain pitch is made, is sometimes more fatiguing to the patient than his speaking aloud. The indulgence of whispering is the more allowable, when we reflect on the extreme difficulty of keeping the patient silent for several months in succession. First among the class of *antiphlogistic remedies*, applicable to the more decidedly inflammatory or incipient stage of the disease, is bloodletting. The authors just named prefer greatly venesection to leeches, unless these are freely used. But if the disease have made progress, or the patient be enfeebled, leeches are to be preferred; in which case they should be applied on each side of the larynx and trachea, inside the sterno-mastoid muscles. The feeling of relief expressed by the patient after their use is often very great. Cups to the nape of the neck I have seen to be of marked benefit; although perhaps not equal to the other method of drawing blood. If there is reason to believe that the disease has arisen from suppression of the menstrual or hemorrhoidal discharge, or is greatly aggravated by such suppression, leeches ought to be applied, in the former case, to the thighs or the vulva, and in the latter to the anus. Emollients internally may soothe irritation without exerting any material influence over the disease; but their external use, in the form of warm poultices to the neck, will be injurious by increasing the afflux of fluids to the throat. Coinciding with bloodletting, and a useful substitute for this latter, is tartar emetic, given at first to vomit, and afterwards with a view to its contra-stimulating effects, in such doses, three or four

times a day, as the stomach will tolerate. In cases of sustained inflammation, the vinous tincture of colchicum may be combined with the antimony, and occasionally, when the bowels are to be acted on, with Epsom salts.

After the disease has been of some duration, *revellents* or *counter-irritants* will be found to be among the most efficacious of our remedies. They are deemed more beneficial than bloodletting by MM. Trousseau and Belloc. Blisters are advantageous, but only when kept long discharging. They ought to be applied to the nucha, because when placed in front they create too much pain and irritation, especially in men with thick beards. Setons and the potential cautery, applied to the anterior part of the neck, opposite the crico-thyroid space, are, also, very useful. In milder forms of the disease, the eruption produced by rubbing a liniment, composed of croton oil two drachms to an ounce of olive oil, at first twice, daily, will have a good effect. Next to this, and on the rising scale of activity, are the tartar emetic and the ammoniacal ointments rubbed, as in the former case, over the front and sides of the larynx and trachea, until an eruption is brought out by the former, and a rubefaction or slight vesication by the latter. The antimonial frictions should be continued even after the pustules first appear, and until they are confluent, and then renewed when the scab begins to fall; and so on at intervals of perhaps twice a month, while the disease lasts, or as long as there is any evidence of relief being obtained by the practice. I have used iodine ointment with beneficial results. The writers already quoted direct, as part of a plan of counter-irritation, and we may suppose in cases in which the frictions just specified have not been employed, a small piece of caustic potash, to be applied once a week on either side of the larynx and trachea. In this way five or six cauterised spots are made to suppurate at the same time without the necessity of inserting peas to keep them open. Less confidence is to be placed in revulsives when applied at a distance from the diseased organ, unless in the case of suppressed discharge, as of sweat from the feet, hemorrhoids, &c.

Narcotics are often of great use in assuaging the pain and cough, in chronic laryngitis. Belladonna, stramonium, and hyosciamus, have been severally recommended; the two former, in the shape of diluted or semi-fluid extracts, by friction to the anterior part of the neck. The salts of morphia, introduced by the endermic method, are, also, a valuable adjuvant to other measures. M. Cruveilhier, with a similar intention, directs the patient to smoke the leaves of stramonium, or of belladonna which had been boiled in a watery solution of opium, and afterwards dried. By calming the cough, and allaying and removing pain, these narcotic remedies abstract causes of irritation and of flux to the larynx, and contribute to the cure. The use of the extract of stramonium in a two-grain pill twice or thrice a day, will have a more uniform effect, as I have ascertained by repeated prescription of this remedy in asthma complicated with laryngeal affection.

A mercurial course, that is, the action of mercury on the mucous secretors and capillary system — but always short of ptyalism —

even in cases not syphilitic, I have found to be of manifest and permanent benefit; particularly in persons of a sanguine temperament and a rather full habit of body, or of active nutrition. In scrofulous subjects we must use mercury with more reserve, if at all; and where tubercular irritation is obvious the medicine should be carefully abstained from. In these cases, a decoction of senega with nitre; iodine — either a solution of the hydriodate of potassa, three to five grains twice a day, or Lugol's solution — iodine in water, in which the hydriodate has been previously dissolved, are applicable. In various chronic affections of the trachea and bronchial mucous membrane, as well as in the present disease, I have used the iodine with much benefit; and especially I have had occasion to be pleased with its effects, when it has been combined with the compound syrup of sarsaparilla. In cases in which the secretion is copious and mucopurulent the balsam of copaiba has done good; combined with sarsaparilla syrup, I prescribed the balsam on one occasion in what would be called tracheal phthisis, but in which the bronchia also were affected. The symptoms — consisting of expectoration, more than a quart in twenty-four hours, and accompanied by hectic, night sweats and a rapid pulse — disappeared under a treatment of which this last combination was a leading part. The iodine had also been used in the manner already mentioned.

When mercury is thought to be proper in chronic laryngitis, the preferable preparation is the blue mass, in doses of five grains every night, with about the same quantity of extract of hyosciamus, made up into pills. In the morning, if the bowels are not free, and the digestive apparatus is disordered, some mild saline, or rhubarb and magnesia, will be used. This latter difficulty obviated, and a regular and defined course determined on, the blue mass and hyosciamus are to be administered every night, and the syrup of sarsaparilla in the morning. The dose of this latter will be from half an ounce to two ounces, according as it is found to agree with the stomach and bowels, by not oppressing the former nor purging the latter. I do not recommend this treatment as at all of a specific nature, as far as regards this or any other disease, whatever may be thought of its action on particular tissues. In the morbid secretions which accompany chronic inflammations of the mucous tissue, and in ulcerations of this tissue, in the respiratory, digestive, urinary, and genital organs, I do not hesitate to regard the blue mass, iodine, and the syrup of sarsaparilla, and occasionally the balsam of copaiba, as medicines of undoubted efficacy; so far at least as I can be influenced by my own experience, which in this particular entitles me to speak with some confidence. Sulphurous mineral waters, though of secondary importance, are useful adjuvants to the mercurial and iodine course, especially in recent cases of the disease.

But without the aid of *topical means*, the best devised general remedies are inefficient for the cure of chronic laryngitis, as they are of ulcerations and puriform discharges of the throat, nose, eyes, vagina, rectum, &c. These are laid down by MM. Trousseau and Belloc, as either emollient, detergent, or irritating; so as in the latter

case sometimes to destroy the morbid surface itself. "They are either pulverulent, liquid, gaseous, in vapour, or salts." These gentlemen think that they have ascertained "a method of bringing medications in form of vapour, powder, or liquid, in contact with the mucous membrane of the larynx, without interrupting respiration."

Most frequently the *vapour of water* was employed, either simple, or charged with emollient, balsamic, or aromatic substances. Sometimes the vapours were dry, as the smoke of tar, resins, hyosciamus, tobacco, poppy, &c. The moist vapours have also been charged with *chlorine*, *iodine*, *hydro-sulphuric acid*, and different *essential oils*, and applied with some effect to the mucous membrane of the air-passages; as shown by the experience of MM. Bertin, Gannal, Cottereau, Richard, Sir C. Scudamore, and Dr. Murray, most of which is detailed in my work on *Baths and Mineral Waters*. This kind of medication has been taken up by some physicians lately, as if it were a new thing; and it has been made an affair of newspaper prescription and popularity. If, which I doubt, any physician gains by such proceedings, the good people at large are certainly sufferers by their being thus tempted to become their own doctors. Various kinds of apparatus have been made for the purpose of inhaling these vapours; but it is admitted, even by some of their inventors, that a simple teapot is as well adapted as the most complicated machine. MM. Trousseau and Belloc have also caused patients to inspire fumigations of cinnabar, sulphurous acid, &c., with various, but not recorded results. All inhalation, of whatever nature, is, however, liable to the objection that the substance inhaled is not confined to the larynx, but comes in contact with the mucous membrane of the lungs, which it may irritate. It is impossible, moreover, to limit its action, and hence the necessity of restricting ourselves to the employment of emollient, aromatic, balsamic, and narcotic vapours, and such as cannot exercise any sinister influence on the lungs. An objection, or rather a difficulty of more common occurrence, is the small proportion of these medicated vapours which pass through the glottis at all — closed as this is instinctively when any foreign substance in the air reaches it.

The *liquid medications* are much more easily applied, and without risk of injuring the trachea and bronchia. Of these, some are irritating; others simply astringent. The former are, muriatic acid, solutions of nitrate of silver, corrosive sublimate, sulphate of copper, and sub-nitrate of mercury, and the caustic solution of iodine as recommended by Lugol. The solution of the nitrate of silver would seem to be entitled to the greatest confidence, on account of its rapid action, its relative harmlessness, and its known efficacy in so many external ulcerations and other lesions of tissue. The strength of the solution will vary from half a drachm to a drachm in two drachms of water.

Various methods have been devised for applying the caustic to the larynx. The simplest is the introduction of a small conical paper bent at its end, and which has been immersed in the solution, into the throat, and down into the larynx, the mouth of course being kept open during the time by the crooked handle of a spoon. A piece of whalebone answers the same purpose, and more conveniently

reaches the part affected. When it is desired to cauterize the pharynx, the base of the tongue, and the top of the larynx at the same time, MM. Trousseau and Belloc take a piece of whalebone about a sixth of an inch in thickness, and so that it will not bend too readily: this is heated at an inch or more from one end, and when softened sufficiently it is bent at an angle of forty-five degrees. To the end of this smaller portion a spherical piece of sponge is fastened, half an inch thick, which is moistened with a solution of nitrate of silver, and introduced in the following manner. The mouth open, and the tongue depressed as before, the sponge is passed through the isthmus of the fauces, which gives rise to an effort of deglutition and a consequent elevation of the larynx, and at this moment the sponge is brought somewhat forward, and from the entrance of the œsophagus it now passes into the glottis, and by a little pressure against the latter the fluid is squeezed into the larynx. The cough which is produced at this time favours the introduction of the caustic. Vomiting is often excited by the operation.

This plan, though not painful, is, according to its proposers, very disagreeable; and many patients refuse to submit to it a second time. These gentlemen have, in such cases, another means of effecting their object. To a small silver syringe, like that of Anel, a canula, at least five inches in length, and curved at its free extremity with a very small opening, is attached. The syringe is filled three-fourths with air, and one-fourth with a solution of nitrate of silver. The canula is then introduced into the posterior fauces, opposite the larynx; and the piston being rapidly advanced, the liquid mixed with the air in the syringe falls in a fine shower on the superior part of the larynx and œsophagus. The patient is seized immediately with a convulsive cough and regurgitation, by which he throws off all the solution yet uncombined with the tissues. I have used, as more convenient, a piece of sponge sewed carefully to the end of a small sized gum-elastic catheter, with a rod in, and the end of which has the required curve given to it, so as to allow of a ready application to the opening of the larynx and borders of the epiglottis. The sponge is to be dipped in the solution as just now recommended. The patient is to be made, directly afterwards, to gargle his throat with water acidulated with muriatic acid, or salt water, which decomposes any of the free solution remaining in the pharynx.

Another mode of employing caustic solutions mentioned by Dr. Stokes, is that of Mr. Cusack. A brush of lint, of the requisite size, is sewed on the end of the finger of a glove, which is then drawn on the index finger of the right hand. The patient should be made to gargle with warm water, and the lint, being dipped in the solution, can be at once carried to any part of the pharynx, and even to the rima.

It has been appropriately observed by the two French writers from whom I have so largely borrowed for the pathology and treatment of chronic laryngitis, that one must have practised these cauterisations, or seen them performed, to have an idea of their harmlessness and of the little pain which results. We are very much alarmed at a cautery, for it is exceedingly painful when applied to

the skin or mucous opening, though scarcely felt in the pharynx, larynx, or the neck of the uterus. I know that the application of a strong solution of nitrate of silver to the epiglottis and *rima glottidis* has been followed by very little pain, and did not prevent the patient from sitting down to table and eating his meals as usual in half an hour afterwards. These gentlemen in their valuable work, a good translation of which has been made by Dr. Warder, of Cincinnati, adduce the histories of several cases in proof of the superior efficacy of this topical treatment over any other. It has succeeded after the other means had been tried in vain.

Of the probable coexistence of *angina pharyngea* with chronic laryngitis I have already spoken. Again, I would remind you of the importance of being aware of this conjunction, and, of course, of the necessity of examining carefully the lining of the fauces and pharynx, and of applying to it appropriate topical remedies; emollients, if there be inflammation; caustic solution, or pencilling it with caustic, if the affection be chronic, and manifest itself either by a relaxed tissue, or by aphthous spots or minute ulcerations. The portion of the membrane which in these cases more commonly requires to be treated in this way is that covering the tonsils and the arch of the palate. For this purpose, we should touch, two or three times a week, the part just mentioned with a pencil of nitrate of silver, or a solution of the same, or a powder composed of six or eight grains of the salt to about a drachm of powdered sugar-candy. In the same way we employ powdered alum. Sub-nitrate of bismuth may be used pure; calomel with twelve times its weight of sugar; red precipitate, sulphates of zinc and copper, with thirty-six times, alum with twice, acetate of lead with seven times, and nitrate of silver with seventy-two, thirty-six, or even twenty-four times its weight of sugar. The apothecary should be directed to prepare these powders on a porphyry slab, otherwise small crystalline asperities remain, which act as irritants, and bring on repeated fits of coughing and the expulsion of the powder.

The insufflation is best practised by the patient himself, by means of a glass tube two lines in diameter and eight or ten inches long. Three or four grains of the powder are to be put into one end of the tube, and the other is to be introduced as far back into the mouth as possible. After emptying the lungs by a strong expiration, the patient closes his lips upon the tube, and then by a quick effort of the diaphragm draws his breath rapidly. The column of air, in traversing the tube, divides and hurries along the powder towards the pharynx; but a part suspended in the air penetrates the larynx and upper part of the trachea. We are apprised of its having entered the larynx by fits of coughing, which the patient should repress as much as possible, so as to preserve the medicine in contact with the affected tissue. These inspirations will vary in number, according to the sensibility of the larynx and the strength of the powder.

A saturated solution of corrosive sublimate, or of sulphate of zinc or of copper, will fulfil the same indication as the powders before mentioned.

When chronic laryngitis has a syphilitic origin, it will be removed by mercury, and, at times, under circumstances of the most discouraging nature, as where the patient had been reduced to the last degree of emaciation, with hectic fever and night sweats. But let us not forget that this result is not certain, even in old cases of syphilitic laryngitis; and that mercury has in some of these aggravated all the symptoms. In these circumstances, the ptisan of Feltz has brought about a rapid cicatrization of the ulcers — (Cruveilhier, *Diction. de Med. et de Chir. Prat.*). The ptisan here referred to is made of a decoction of sarsaparilla, China root, and other vegetable matters of less strength, in which sulphuret of antimony has been previously put, and to which, subsequently, corrosive sublimate has been added. A neater and more pharmaceutical method is to direct a solution of the mercurial salt in water, to which some simple syrup and a little of Hoffman's anodyne have been added; and afterwards, in the course of the day, the compound syrup or a strong decoction of sarsaparilla.

In the advanced stages of syphilis, in which the mucous membrane of the mouth and throat was the seat of extensive ulcerations, I have derived excellent results from the iodine preparations already mentioned, conjoined with the syrup of sarsaparilla, in cases, too, in which mercury had either failed to relieve or had aggravated the disease.

There is, occasionally, an extreme state in this disease short of death, but which, if not relieved, ends in dissolution. I refer now to the imminent danger of suffocation in some cases: a present remedy for which is tracheotomy. But before having recourse to this last trial of our art, we should have given effect to the following appropriate remarks and suggestions of Dr. Stokes: —

"In some cases spasmodic exacerbations occur, so severe as to threaten the life of the patient. These are more frequently met with in females, and demand a careful study. The suddenness and violence of attack, the absence of corresponding fever, and of tumefaction of the epiglottis, will in general suffice for the diagnosis. I have often seen cases in which the suffering was so severe, as that, at the instant, performance of tracheotomy was advised, yet in which the breathing was restored to its ordinary condition by the following simple treatment: the feet were plunged in warm water, the body enveloped in blankets, and a draught — consisting of camphor mixture, ammonia, valerian, ether, and opium — exhibited, and repeated according to circumstances. Under this treatment symptoms will rapidly subside, which from their character and continuance would seem to demand the knife; and I would advise that, in all cases, previous to the performance of tracheotomy in chronic laryngitis, the question be carefully investigated, as to whether the urgent symptoms are the result of spasm or of organic obstruction. Let it never be forgotten that, even where organic disease and thickening of the larynx exists, spasm may supervene, and be met by appropriate treatment. We are not much attached to the doctrine of diseases being necessarily separate, but experience tells us that nothing is more common than to see spasm following organic disease, or organic disease occurring after a purely nervous lesion.

"In cases showing this liability to spasm, the belladonna or other anodyne plaster may be usefully employed."

Tracheotomy ought not to be performed except when the patient is threatened with suffocation, and all the promptly available medicinal means have been had recourse to. These conditions having been complied with, and the operation performed, the physician is freed from the fear of seeing his patient die of asphyxia and may proceed to treat the affection of the larynx in a suitable manner: when the organ is capable of performing its functions, the canula can be withdrawn, and the wound allowed to heal. Even should the disease be of such a nature that the passage of air through the natural canal is afterwards impossible, the canula may remain for an indefinite period, and the life of the patient be lengthened. A case is given by MM. Trousseau and Belloc, of an individual wearing such an instrument, made of silver, for ten years. They state their having performed tracheotomy seventy-eight times; seventy-three for croup, and five for laryngeal phthisis, with the loss in one instance only of life during the operation. They give a number of successful results from tracheotomy.

This would be the proper place for indicating the best preventive measure against so formidable, and, of late years, so frequent a disease among us as chronic laryngitis. The immediate and exciting cause in most of those members of the different learned professions, law and divinity, who have been sufferers from it, is, no doubt, undue exercise of the voice: but as we meet with the disease in persons who are not exposed in this way, and since, as I have already remarked, there is often no proportion between the repeated strain of the voice for a length of time and the frequency and violence of chronic laryngitis, we ought to look out for other causes, as well predisposing as exciting, beyond the one commonly regarded as the chief cause. We are, as yet, wanting in the requisite statistical data for a proper knowledge of the proportions of the members of different professions and callings affected with the disease. So far as medical observation and popular belief guide us in forming an opinion, clergymen are most liable to it. In their case, then, our investigation should be directed to an inquiry into — 1, the temperament which we may suppose would be most frequently met with in those whose early bias is to serious and religious reflections; 2, the bodily constitution and collegiate habits of students for the ministry; 3, the kind of labour and exposure, either voluntarily entered into by, or exacted from, these young men, after they have assumed the office and reponsibilities of the ministry. It will be found, I believe, on a review of the facts under these several heads, that a youth of a nervous temperament and feeble constitution, is exposed while at college or when pursuing his theological studies elsewhere, to the enfeebling influences of deficient exercise; confinement in illy-ventilated halls and dormitories; study beyond measure and at late hours in the night; anxiety of mind, both as respects his preparation for the solemn part which he is destined to perform, and his worldly success; and habits of sensual indulgence, such as the use

of tobacco and other means of enfeebling the nervous system. It is easy to see how badly such a person is prepared for the unremitting toil to which, partly from duty, partly from sectarian rivalry, and in no small degree also from the urgent and often unreasonable calls, exactions, in fact, by the inconsiderately zealous of his congregation, he is subjected, so soon as he accepts a call to a church. Preaching often on Sunday and not seldom during the week in close churches, and in the evening too, and in a pitch of voice beyond his natural one, would of itself bring on laryngeal disease in a person already feeble and unable to exercise any organ much without inducing phlogosis and its consequences. But when to this cause we add exposure to frequent and sudden transitions from a dry and hot to a moist and cold air, as when leaving his own home to visit the sick, and, still more, to attend and officiate bareheaded at funerals, in the midst sometimes of a storm of wind and rain, or of snow; and when he passes from a crowded church, in which he has been perspiring, to the open and chilling air of a cold night, we cease to wonder that the preacher should suffer from diseases of the lungs and air-passages, and especially of that part, the larynx, which has been enfeebled by prolonged and violent exercise, and is, in consequence, peculiarly predisposed to disease.

The prophylaxis of chronic laryngitis should consist in an early attention, on the part of the professional student, to all the agencies counteracting to those which bring on the disease. These preventive measures should be much exercise in the open air, a regular training of the vocal apparatus by both methodical speech and even song, so as to accustom the voice to every variety of pitch and intonation; and to husband its strength, if it be naturally weak, by acquiring the habit of distinct and expressive articulation and enunciation. By uniting the two kinds of gymnastic exercise — that of the muscles of the body and limbs generally, and that of the muscles of the voice — the student will be both fitted to discharge his subsequent duties and less liable to catarrhal and anginose affections. He will enter on the duties of his ministry with some bodily vigour, and with habits of exercise, which he will feel a pleasure, as it will be his duty, to continue. When prevented by inclement weather from taking exercise out of doors, he will have recourse to the use of dumb-bells and the parallel bars at home. Nor should he omit to keep his vocal organs in the proper tone during the week, in order that he may without fatigue, certainly without injury, task them on Sundays. For this purpose he will not only read aloud but declaim, and vary his tone and inflections, so as to give himself a wide range of vocal utterance, and yet retain distinctness and power within this range. Deviation from healthy digestion, and particularly if associated with uneasiness in any part of the throat, should be early attended to and corrected; and a relaxation of the tissue lining the fauces and pharynx and investing the soft palate and tonsils, removed by astringents, or even a slight cauterization in the manner already described. Among the hardening measures, is the use of the tepid bath, or sponging the surface of the body, and particularly the surface of the chest, daily, with cold salt and water. The throat should be well gargled at rising,

and after every meal, and, at any rate, the whole neck washed in the morning with cold water. No ligature, or tight cravat, or stock should be worn — nothing, in fact, which exerts a compression on the neck, or invites more blood to the part.

Many of the above hints are applicable to the members of the bar and to all public speakers who would strengthen their physical powers of utterance, and avoid disease of the vocal apparatus.

As any sudden change of temperature of the air which is inhaled is prejudicial to the invalid suffering under chronic laryngitis, he is recommended, when about to pass out from a warm room into the external air, to place a silk handkerchief, or some kind of network before his mouth and nostrils. There has lately been made in England an apparatus called "*Jeffray's Respirator*," which is preferable to a handkerchief or any similar contrivance. It consists of a number of layers of delicate wire-net, secured on each side by morocco leather, and straps or strings so as to allow of its being tied to the back of the neck, whilst the person breathes through the wire-net; inhaling an air, which, by the time it has reached his mouth and certainly his larynx, is of a suitably elevated temperature. I am acquainted with the case of a lady, who, whilst suffering under catarrh, was kept awake half the night with a troublesome cough, which was speedily arrested and she allowed to sleep undisturbed, after she had put on the respirator at her husband's suggestion. Transition from a cold to a hot air is even still more injurious than the one from hot to cold; and hence the respirator should be kept on for a while after coming in from the outer air.

A more permanent amelioration is obtained by a change of climate. With this view, a residence for a year or more in warmer latitudes, or sometimes during the winter months only, is recommended to patients with chronic laryngitis as well as to those with chronic bronchitis. Where circumstances prevent their absenting themselves from home, an artificial climate may be procured by keeping up a uniform temperature and moisture in the house; and the patient confining himself to it during the whole of the winter. But before having recourse to a change of climate, the patient should be freed from any inflammation of the air-passages under which he may be labouring at the time; for, without suitable precaution on this score, he will be more likely to be injured than benefited by leaving home, and exposed to the operation of causes in travelling which tend to aggravate the inflammation.

Another important consideration is the state of the digestive organs. There is hardly any morbid association more common than that of irritation of the bronchial and laryngeo-bronchial membrane with a similar irritation of the stomach; especially after the middle period of life. In cases of this kind, it is well remarked by Sir James Clark; "upon tracing the progress of the disease, we shall generally find that the bronchial affection, the liability 'to catch cold,' the 'spring cough,' the troublesome morning phlegm, &c., did not occur till the patient had suffered for some time, often for years, from symptoms of disordered digestive organs. When this is the case we shall make little progress in the case of laryngeal and tra-

cheal diseases until we have subdued the irritation of the digestive organs; and the hopes of the successful issue of our treatment must, therefore, rest chiefly on the facility with which this yields to our remedial measures.

This remark may be usefully extended to nearly all chronic diseases over which the stomach, in its different conditions, displays so great and, at times, extraordinary an influence, as to induce those who are not patient and attentive in diagnosis, to attribute the constitutional disturbances caused by lesions in other organs, and notably in the lungs, heart, and even brain, to gastric origin.

LECTURE LXXXIII.

DR. BELL.

BRONCHITIS—Its complications with other diseases—Catarrh, a prelude to more serious disease—Importance of early attention to it—Outlines of treatment of catarrh—The dry method of Dr. Williams.—Bronchitis,—its divisions,—The kind showing itself in young children—Asthenic variety, or peripneumonia notha—Duration of acute bronchitis—Symptoms,—appearance of the sputum—Physical signs—Percussion, indirectly useful—Touch, giving a sense of vibration—Auscultation—Modifications of sound, produced by inflamed and obstructed bronchia—Morbid anatomy of bronchitis.

BRONCHITIS — ACUTE MUCOUS CATARRH — INFLAMATORY CATARRHAL FEVER. — This disease has only been separated from inflammation of the lungs of late years. We are indebted to Dr. Badham of Glasgow for being the first to perform this service to the profession and to humanity, and for pointing out its nature and seat, in a small work published by him on bronchial inflammation. After him, Dr. Hastings, not Naphtha Hastings, has since contributed largely to fix attention on the disease, and to introduce it formally under the title of *bronchitis*. In varying degrees of intensity, inflammation of the bronchial mucous membrane is met with in neglected catarrh; or it comes on primarily after the inhalation of irritating gases or poisons; or as an occasional and always alarming complication in remittent and typhous fevers; in the exanthemata generally, and more especially in measles and small-pox; also in gout and rheumatism, and in hooping-cough, asthma, pneumonia, phthisis pulmonalis, pleurisy, and carditis. In sympathetic relation with all the membranes of the body, and more particularly with other divisions of mucous membrane, the bronchial portion is liable to inflammation, not only after laryngitis and tracheitis, but after gastritis and gastro-enteritis and diseases of the skin, both acute and chronic. Bronchitis frequently occurs in an epidemic form, under the popular title of *influenza* or *grippe*. In some situations it may be said to prevail endemically, as at the Children's Hospital in Paris. A common cough, catarrh, or cold in the breast, is a mild form of bronchitis.

All ages are subject to this disease, which may even be congenital. Children in our climate are found to be particularly liable to it, and in some seasons are its chief victims. With us, also, the complication of bronchitis with hepatic and gastro-intestinal derange-

ment is frequent; more so probably than the union of pneumonia or of pleurisy with disorder of the liver, designated as bilious pleurisy.

Bronchitis is commonly ushered in with catarrh, the precedent of which again is frequently *coryza*, or cold in the head. The first stage consists in simple irritation of the mucous surface of the eyes and nostrils, which is soon spread to the fauces, and is manifested by an increased secretion, chiefly of a serous fluid; sneezing, and some soreness of the throat. The irritation extending to the trachea and bronchia, there is a tickling cough, with an expectoration of mixed serum and mucus. At this stage the disorder sometimes ceases, and the individual is said to have soon got over his cold. But under other circumstances, there is not simply an irritation of the mucous membrane and glands of the bronchia, but a positive inflammation of these parts, and a train of associated symptoms which indicate great distress in the respiratory apparatus, as they do real danger to the life of the patient. Sometimes the affection of the bronchia shows itself without any prior irritation of the Schneiderian membrane, fauces, and tonsils; and this is more apt to be the case in delicate persons, or in those predisposed to coughs and pulmonary disease.

A few remarks on catarrh, or a common cold, as it is familiarly called, will properly precede a notice of bronchitis in its more aggravated varieties. If the commonness of a thing were to render men indifferent to its presence, the people of the East ought not to care for the plague, nor those of the West Indies for the yellow fever; but, still, these diseases are avowedly worthy of study, and serious enough to be avoided if possible. I will not say that colds are to the inhabitants of our climate what plague and yellow fever are to those of other countries; but I can aver confidently that they usher in diseases of greater complexity and mortality than these latter. The common accompaniments of a cold, viz., toothache, earache, headache, weak and watery eyes, sore throat, rheumatic pains, indigestion, and renal disorders, are quite numerous and disagreeable enough to entitle it to a very respectful notice, and much more considerate treatment than it usually receives. If to these annoyances we add the danger from bronchitis and pneumonia, which often follow in the train of a neglected cold, and from phthisis pulmonalis, the tubercular irritation of which is developed by the same cause, we surely have proof and argument enough for attention not only to the preventive means, but also to the curative ones of a disease, which, however mild in its inception, is directly or indirectly productive of such diversified and alarming results. More particularly should this lesson be impressed on those who, in consequence of prior attacks of bronchitis, or of constitutional tendency to pulmonary consumption, are in the greatest danger from every fresh cold. They, at least, can ill afford to make the hazardous experiments of nursing and sweating themselves one part of the twenty-four hours, and of exposing and chilling themselves during the remainder, as we every now and then find persons with catarrh to do.

If time be of value to him, 'who has caught a bad cold,' it is the more incumbent on him to act promptly in the premises, by his sub-

mitting at once and with a good grace, to the adoption of suitable measures for his relief. These will be, quiet in an air of an equable and rather warm temperature, abstinence from animal food and all stimulating drinks whatever, and in their stead a moderate portion of vegetable matters and simple demulcents. Under the head of medicine will come a brisk purgative, mercurial or saline, according either to the prior experience of the person himself, or to the state of his digestion and the activity of his circulation. If there be indigestion, a foul tongue and turbid urine, let him have a dose of calomel and jalap, or of calomel and rhubarb; if his habit be plethoric, he should take salts. After evacuation procured by this means, if the cough harass and is aggravated by the thin serous secretion from the trachea and bronchia, an opium pill of one to two grains, or twenty to forty drops of laudanum, or Dover's powder in five-grain doses, repeated two or three times at intervals of four hours, or laudanum with antimonal wine will come in appropriately enough, and not unfrequently relieve all the troublesome symptoms, including pains in the limbs. The headache frequently left by the opium is carried off by a dose of magnesia, or eight or ten grains of carbonate of ammonia, or a teaspoonful of spirits of hartshorn in water. When the stomach is in a healthy state and the bowels free, a full dose of opium often cuts short a cold, and will therefore arrest at once a mild bronchitis. If the cough, however, still continues after the above remedies have been used, recourse is generally had to various formulas of cough mixtures, the active basis of which is either ipecacuanha or antimony, and less frequently squills, with opium in some form or another. My own experience has taught me, that the simpler these formulas are the better; antimony (tartar emetic) entering in larger proportion, if there be a tendency to inflammatory action, — ipecacuanha if there be gastric complication, and opium if the skin is cool, or the temperature of the surface unequal and the cough is accompanied with thin expectoration, comes on in fits, and is readily excited through the nervous system alone. I can add, with great confidence also, my own testimony, in confirmation of the favourable opinion of others, to the value of the alkalies in simple catarrh, as well as in the more advanced stages of confirmed bronchitis. Wine of ipecacuanha, sub-carbonate of potassa and laudanum in suitable proportions, mixed with simple syrup and water, make a cough mixture, to which, especially in the cases of children's catarrh, I am not a little attached. In the more asthenic forms, twenty to thirty drops, for an adult, of the aromatic spirit of ammonia will be properly substituted for the carbonates of potassa and soda. The physician who has tried the alkaline remedies will join Dr. Williams in opinion, — that they quiet the cough and promote expectoration far better than the oxymels and acid linctus, or lozenges, and I would add, than the syrups of squills commonly in use, and which, however they may appear at the time to "cut the phlegm," and cleanse the throat, tend to disorder the digestive organs, and often ultimately increase the cough. Both with a view of keeping up their influence on the secretion from the bronchia, as well as to their immediate impression on the glottis and the throat, cough medicines should be taken frequently; and during the interval it is

well to sheathe the fauces against irritating secretion, and through continuous sympathy to operate on the upper portion of the air-passages, by having often, if not constantly in the mouth, a piece of gum arabic, or by sipping frequently of thin flaxseed tea, or some analogous demulcent decoction.

In a class of subjects of catarrh, who are said to be of bilious habit, and also those who are dyspeptic, opium, and the common cough mixtures into which antimony and squills enter, are often prejudicial, and increase the gastric disorder by which the cough is accompanied and not seldom sustained. For these cases other narcotics are thought to be better adapted, such as the hyosciamus and conium, &c.; which certainly less interfere with the digestive process, and, if combined with rhubarb or the compound extract of colocynth, or, better than all, the blue mass, will be found to answer the double indication of modifying beneficially the secretions both of the bronchial and the gastro-intestinal mucous membrane. The alkalies are useful adjuncts in the intervals between the times of taking these combinations or the narcotic extracts alone.

There is another plan of treating a cold, by what its author, Dr. Williams, calls *drying it up*. He first practised it on his own person. Having observed, on being attacked with one of the colds, to which in early life he had been so subject, that taking a quantity of tea or any other liquid, although very comfortable at the time, was invariably followed in the course of an hour by an increased 'stuffing in the head,' and accompanying flow of scalding, irritating humour from the nose and eyes, he determined to try and prevent such exacerbations "by cutting off the supplies — by ceasing to drink. For twenty-four hours," continues Dr. Williams, "I did not take a drop of liquid of any kind; and to my agreeable surprise, not only did I escape these occasional aggravations of the complaint, but the stuffing and discharge began to show evident signs of abatement, and the handkerchief was in less continual requisition. I persevered for twenty-four hours more, and my cold was gone; there being only now and then a little gelatinous opaque mucus collected in the nostrils and throat, without any stuffing or irritation, just as it takes place at the end of a cold. What was of still more consequence, no cough followed; the whole catarrhal disease seemed to have been destroyed." Dr. Williams has been in the habit of acting on this plan of treatment ever since (some fifteen years ago) under similar circumstances, and has recommended it to a great many friends and patients with a successful issue.

The physiological principle on which the dry method acts, is by a prompt decrease of the mass of circulating fluids, and a diminution of the partial plethora of the vessels supplying the morbid secretion from the affected membrane, which, no longer irritated by its own secretion, is soon restored to a healthy condition.

On an average, forty-eight hours of abstinence from liquids will be quite enough to effect a cure. The period may be shortened by exercise and warm clothing, or laying warm in bed, or by commencing with a purgative, or by any other dry means of increasing the natural secretions.

Bronchitis in its intense and severer forms differs from the milder kind, mainly in the greater extent of the bronchial tubes which the inflammation occupies. It has on this account been studied under the two heads of *tubular* and *vesicular*. Tubular bronchitis is inflammation of the bronchial membrane lining the larger and middle sized tubes, or wherever it lines tubes, properly so called. Vesicular or pulmonic bronchitis is that variety in which the mucous membrane lining the air-cells of the lungs is inflamed. Something, also, will depend on the intensity of the phlogosis, even on an equal surface Like all the phlegmasiæ, bronchitis exhibits an acute and a chronic form. The first again is appropriately divided into the *sthenic* and the *asthenic* varieties. Dr. Stokes treats of it under the heads of acute primary and acute secondary bronchitis.

Symptoms. — In acute sthenic bronchitis, inflammatory symptoms are evident from the commencement. After the preliminary stage of simple coryza, already mentioned, or, sometimes, without any notification of this kind, the patient suffers from pain and a feeling of tightness across the sternum, dry hard cough, without expectoration, or with the discharge in this way of glutinous mucus combined with frothy serum, sometimes coloured with blood. The chills, with which these symptoms are ushered in, soon alternate with increased heat and dryness of the skin, and are followed by quickened and somewhat laboured breathing and dyspnœa, and sometimes a dull pain at the sternum on coughing; tongue white with red borders; pulse quick and full, and at times hard; pain in the forehead, back, and limbs; constipation, and scanty, high-coloured urine. As the disease advances, the cough becomes more troublesome, and in its paroxysms causes redness of the face, watery eyes, and a feeling of pain in the hypochondria along the false ribs, in the back, and at the lower part of the sternum; in fine, in the course of all the attachments of the diaphragm manifesting extension of the inflammation to the vesicles. The cough is generally excited at each full inspiration; as, also, by speaking, or the mere act of drinking, or a simple change of posture; and it is sometimes productive of nausea and vomiting. Pain in the course of the trachea and the bronchia, as felt under the sternum, and in what is called soreness of the chest, is not a constant symptom. Sometimes it is slight, and the patient complains of a troublesome heat diffused through the chest and a tickling in the trachea.

There is an aggravation of the symptoms towards night which is generally sleepless and disturbed. The common posture is on the back; but it is often changed. If there be no relief by expectoration or perspiration, or by prompt remedial measures, bronchitis shows a change of character. Feelings of great depression are complained of; the pulse becomes weak as well as quick; the brain is disturbed in its functions, and the muscular strength is much reduced: the countenance, from being often flushed, becomes anxious and pallid, or partially livid, according to the quantity of blood in the system; the pulmonary congestion becomes evident by a slightly diminished resonance on percussion in the postero-inferior regions of the chest. The secretions are scanty and vitiated; the tongue is loaded with

a brown fur; the thirst is intense. Cerebral and abdominal congestions may also occur, and dropsical swellings are no unfrequent result. The transition from this stage to death is soon made, especially in those cases which have been neglected from the outset. A remarkable feature in the character of the worst form of bronchitis is, the rapidity with which the collapse and the symptoms of extreme prostration and debility succeed to high fever, and well marked local excitement. The whole course of these fatal cases is sometimes wonderfully rapid, death ensuing within two days from the commencement of the attack. They are commonly confounded with pneumonic inflammation, and are scarcely to be distinguished from it during life but by the physical signs. The severest form of bronchitis is, however, more formidable and rapid in its course than pneumonia itself.

Another form of bronchitis than that just described presents itself in *young children*, to whom it often proves fatal, and in whom it was caused, in many instances, by the criminal fashion of leaving the arms, shoulders, and part of the chest naked. Its beginning, says Dr. Williams, is very insidious, in its assuming the aspect of a common catarrh with coryza, but without pain, much fever, or derangement of the general health. An attentive observation, however, will discover a frequency and wheezing in the breathing which is uncommon, particularly before and after fits of coughing; and the paleness of the countenance and depression of the child's spirits indicate something more than a common cold. The cough is not always present, so that this symptom does not indicate the extent of the disease; and as children do not expectorate, the thoracic derangements may escape notice, until the coming on of dyspnœa shows the imminency of the danger. At this time the pulse becomes very quick, and the severity of the attack is evinced by the disturbance of the respiration and circulation. There may be a remission for a time, in which the child remains in a somnolent state without much cough or quickness of pulse: but if the breathing still continues quick, the dyspnœa returns after a while with increased severity, accompanied by a greatly quickened pulse; stupor comes on, the lips become livid, and in this or some similar exacerbation the child dies suffocated.

Inflammation of the bronchia may exist in newly-born infants, without producing any well marked symptoms. Billard (Dr. Stewart's Translation, 1839) states, his having in four instances seen the remote ramifications of the bronchia very red and filled with thickened mucosities in children, in whom, during life, there had not been either rhonchus or cough. In two there was pneumonia with pulmonary engorgement: in two others the lungs were healthy, and death occurred from intestinal inflammation.

When bronchitis supervenes on pneumonia (vesicular bronchitis), the smaller divisions of the bronchia are the parts inflamed. Bronchial catarrh will sometimes give rise to all the symptoms of suffocating catarrh, which are regarded as the result of an infiltration of serosity in the pulmonary tissue. In simple lobular pneumonia, the two elements, the bronchial and the parenchymatous, are equal and manifested nearly at the same time. In some cases the cough has a decidedly croupy character, although the breathing, which is hurried,

is not at all stridulous during the intervals. This state is often associated with slow and laboured dentition. Sometimes the bronchial secretions approach nearly to the membranous form.

The *asthenic* form of bronchitis bears more analogy to the variety just described than to simple acute or sthenic bronchitis. One of its earliest and characteristic symptoms is oppression of breathing, and a peculiar wheezing; but it has less of the inflammatory type than the first form. The pulse is small, quick, or irregular, and with little or no increase of heat except at night; the tongue foul and loaded; urine scanty; extremities cold; headache; exacerbations of dyspnœa so severe as to prevent the patient from lying down, and accompanied by extinction of the voice. The expectoration, at first scanty, becomes after wards very copious and frothy. These are the chief symptoms of the disease as it occurs in the persons who are most liable to its attacks, viz., the aged and infirm, and those weakened by prior diseases and excesses. The duration of this form is commonly longer than that of the other or sthenic, and it has a much greater tendency to pass into the chronic form. Persons liable to pituitous catarrh, or who have habitually a cough with copious thin expectoration, generally suffer in this way when attacked by bronchitis.

Acute sthenic bronchitis will vary in its duration from one to two weeks. In favourable cases the disease declines between the fifth and eighth days.

The appearance of the sputum, if not the chief characteristic of acute bronchitis, as some regard it, is unquestionably of such importance as to require our early and continued attention to its successive changes. In the early stage the secretion from the bronchia is either wanting, and then the cough is dry and hard, or it is scanty and consists of a sero-mucous fluid, transparent and viscid. If poured out from one vessel to another, it flows out in one mass of extreme tenacity, — drawing out sometimes like melted glass; and the degree of viscosity is a tolerably accurate measure of the degree of the existing inflammation. Upon the surface of the viscid mucus there is usually more or less froth, the quantity of it depending on the facility or the difficulty with which the sputa are brought up; becoming, as the disease advances, more opaque, more abundant, and tenacious; and at the period when the inflammatory fever ceases, and is either succeeded by an apyrexial state, or by a hectic, we observe a remarkable change in its character. It becomes thick, and has considerable consistence; or it may pass into the muco-puriform state, and exhibit masses of a greenish-yellow colour, quite opaque, and, though somewhat viscid, yet flowing altogether. For valuable specifications of the appearances and other characters of expectorated matter in bronchitis, I would refer to the comprehensive section on this disease by Dr. Stokes, in his excellent *Treatise on the Diagnosis and Treatment of Diseases of the Chest.* I will merely give now his divisions of the secretions from the bronchial mucous membrane, when in a state of irritation. These are 1, Transparent mucous secretions; 2, Opaque mucous or albuminous secretions; this again subdivided into the amorphous, and moulded to the form of the tubes; 3, Muco-puriform secretions; 4, Puriform secretions; 5, Serous secretions.

In very young children the expectoration is either entirely wanting or is very slight.

Much light is thrown on the pathology of bronchitis by the *physical signs.* They are derived, first, from percussion; second, from the touch; third, from auscultation.

As regards percussion, it is admitted, very generally, that it furnishes no direct sign in the present case; the sound on striking the chest being almost always of a natural clearness. There is but a single case in which simple bronchitis is even attended with decided dulness, and that is, one in which a vast secretion of mucus or mucopurulent fluid exists in the bronchial tubes; but, continues Dr. Stokes, who makes this remark, such a case is extremely rare, for a large proportion of the bronchial tubes may contain quantities of secretion, and yet the sound on percussion shall continue without any perceptible diminution. When, however, the disease is combined with affections which have their seat in the areolar or parenchymatous structure of the lung, such as œdema, congestion, pneumonia, or tubercle, the results are of course different, the extent and situation of dulness varying according to circumstances.

Yet, as Dr. Stokes properly remarks, although percussion gives no direct result in bronchitis, its employment is of importance in the particular diagnosis. Thus, suppose that after the existence for three or four days of fever, cough, hurried and difficult breathing, the chest still sounds well, the great probability is, that the disease is bronchitis. The patient has had an acute inflammatory affection of the lung, and but of a few days' standing: this must be either bronchitis, disease of the serous membrane, or of the parenchymatous tissue itself. Here the absence of dulness guides materially our judgment; for were the case one of pleuritic effusion, or of disease of the substance of the lung, the great probability is, that by this time a degree of dulness would be manifested; in the one case the lung would be compressed, and its place occupied by liquid effusion; in another, more or less obliteration of the air-cells would take place, from congestion, or from inflammation. *The absence, then, of dulness, with the existence of acute irritation of the lungs, which has continued for several days, forms an important argument that the case is one of uncomplicated bronchitis.*

From the knowledge of the fact, continues the able writer already quoted, that in simple bronchitis there is nothing to produce a perceptible dulness of sound, we derive a most important assistance in the diagnosis of tubercular development, whether in the acute or chronic form. The value of this will be seen when we consider the frequent similarity of symptoms between the disease of tubercular phthisis and bronchitis, a similarity easily understood, when we recollect that in most cases of tubercular development there is a coexisting catarrh. But, as will be shown hereafter, the occurrence of a partial, or general and progressive dulness, in a case presenting the symptoms of bronchial inflammation, is one of the principal circumstances on which the diagnosis of tubercle depends.

The sense of touch guides us in forming a diagnosis in bronchitis, by the transmission of a distinct vibration when the hand is laid on

the thorax. This sensation can be detected both during inspiration and expiration, but is generally more perceptible in the former than in the latter; and more in the child and female than the adult male. The vibration is much more distinct in the middle and inferior than in the upper portions of the lung: it is not met with in simple pleurisy or pneumonia. In pleurisy, however, a sensation of rubbing may occur; but it is that of two continuous, though roughened surfaces, moving one upon another; whilst the bronchial vibration gives the perception of air passing in many directions through an adhesive fluid.

The application of the *auscultation* test is happily introduced by Dr. Williams (*Cyclop. of Pract. Med.*); and the subject is more fully explained in his *Lectures on the Physiology and Diseases of the Chest* — Philadelphia Edit. We may premise, that the purring, rattling, or wheezing sound, which accompanies breathing in bronchitis, may be heard by applying the ear to the patient's mouth. Inflammation of the mucous membrane of the bronchia at first causes tumefaction, and consequently a diminution of the calibre of the tubes. This occurring in individual points so modifies the passage of the air through them, that, as in a musical instrument, a sound is produced. This sound varies according to the form of the constriction and size of the tube; but the general effect is, that on applying the ear directly to the chest, or mediately by means of the stethoscope, we find the ordinary respiratory murmur accompanied by various whistling and wheezing sounds. These occasionally present a graver tone, like the prolonged note of a violincello, or the cooing of a dove; and they indicate that some of the large bronchia are the seat of disease. To such modifications of the respiratory sound, M. Laennec gave the names of *sibilant râle* or *rhonchus*, and *sonorous râle* or *rhonchus*. These constitute the dry sounds, and are the symptoms of the earliest stage of bronchitis, and are often perceptible, especially during expiration, before the patient is aware of any suffering in the chest. They prove, moreover, the fact, supposed by Dr Badham but doubted by Dr. Hastings, that the dyspnœa of the early stage of bronchitis is caused rather by the state of the mucous membrane than by the redundancy of its secretion. Both the co-arctation of the tubes by which air is scantily admitted, and the general thickening of the membrane by which the oxygenation of the blood is interrupted, appear to be the physical or pathological causes of the symptom in question — the rhonchus. This is a generic term, applicable to all those sounds which are produced by an increased resistance to the air moving through the lungs. After a while, the inflammation of the bronchial membrane is moderated by the secretion of a fluid, which is, at first, glairy, and being mixed with bubbles of air that pass through in respiration, gives rise to the *mucous* rhonchus. The respiratory sounds, weak or for a time suppressed in the tissue corresponding to the affected tubes, are exaggerated in the adjoining ones.

Morbid Anatomy of Bronchitis. — More frequently the morbid changes in the bronchia have been found in the bodies of those who have died of other diseases, during the attack of which they had

suffered at the same time from bronchitis. In the mild and recent form of this latter, there is found some redness in a circumscribed portion of the mucous membrane, particularly at the termination of the trachea and the first divisions of the bronchia; but in the terminations of the latter, which are rather serous than mucous, this appearance is less seldom met with. If the inflammation has been more intense, the redness extends to a greater number of tubes, and more so in the smaller ramifications. Often, says M. Andral, the redness is exactly limited to the bronchia of one tube, and commonly it is the upper one which is more peculiarly disposed to inflammation. The fine injection on which the red colour depends, seems to exist simultaneously both in the mucous membrane and in the submucous cellular tissue. Sometimes the redness diminishes progressively from the large bronchia towards the small ones; at other times the reverse is met with. Often the redness presents itself in patches, constituting, as it were, so many circumscribed inflammations, between which the mucous membrane is white and healthy — a state of parts similar to that which is so frequently found in the intestines. On opening the thorax the lungs do not in general collapse, the escape of air being prevented by the obstructions of the bronchia. These in most instances contain a quantity of frothy liquid, of the quality of the matter expectorated before death. Not unfrequently it is mixed with bloody serum; but as this is not perceived in the matter expectorated, it is probably an exudation from the distended bloodvessels at the moment after death. Purulent matter is, also, sometimes observed, and mostly in very acute cases which have proved fatal within four or five days.

In children, the most common change of texture of the bronchia is dilatation, sometimes in their course, sometimes in their extremities.

When the inflammation has been chronic, the bronchial mucous membrane general loses its bright redness, and presents a livid, purple, or brownish tint. For this change of colour from a deep red or rosy hue we are prepared. But we should hardly, *à priori*, have said, that there would be cases in which the mucous membrane of the air-passages was white through its whole extent. Both Bayle and Andral, however, cite such cases; and I have witnessed such myself in persons dead of small-pox, in whom, too, the ulcerated spots were distinctly seen extending from the larynx into the bronchia, and the intermediate spaces of a white colour. These appearances were seen in the bodies of persons who had died in an advanced stage of the disease, after the third week. It should not, as M. Andral justly remarks, be inferred that inflammation did not exist, because the membrane is thus found white. Analogous appearances are presented in other inflamed tissues. Thus, serous cavities filled with pus and lined with false membranes, frequently present no change of colour, no appreciable alteration in their texture. The intestinal mucous membrane, though traversed with numerous ulcerations, often presents a remarkable paleness, either in the very place where these ulcerations exist, or in their intervals. More than once, in individuals whose urine was for a long time purulent, the mucous membrane of the calyces and pelvis of the

kidney has been found very white. In these different affections of mucous tissues an inflammatory process could not be called in question; but whether, by reason of its long standing, or in consequence of general debility, the inflammation appears to have left no other traces in the organ which was the seat of it than a change in its secretion: thence very often result new therapeutic indications. (Andral's *Clinique Medicale.*)

LECTURE LXXXIV.

DR. BELL.

TREATMENT OF ACUTE BRONCHITIS.—Venesection not to be pushed far—Purgatives—Emetics, of doubtful value in acute bronchitis—Tartar emetic, as a counter-stimulant—Rules for its use—Immediate effects various—Case—The warm bath—pediluvium—Blisters and other counter-irritants to the chest—Calomel in bronchitis complicated with abdominal disease; to which are added opium and ipecacuanha—*Second stage of bronchitis*, with symptoms of debility—Stimulating expectorants useful; carbonate of ammonia, wine whey, senega, acetate of ammonia—Calomel and a few cups, with stimulants, for congestion of a part of the lung—Diaphoresis without diaphoretics—Diuretics as antiphlogistics sometimes useful—SECONDARY OR SYMPTOMATIC BRONCHITIS—Complication of bronchitis with various diseases, especially eruptive fevers—*Treatment* by local depletion, counter-irritants, and moderate stimulation—Dr. Copland's plan of external cutaneous revulsion—Emetics—Bronchitis succeeding laryngitis,—Active depletion in.—Outlines of treatment—Bronchitis with remittent fever; in the typhoid stage.—Cooling remedies useful—Depletion and stimulation sometimes necessary at once—Inhalation of watery vapour—Change of posture—Quinia and laudanum, for excessive bronchial secretion—Dr. Graves's practice—Sugar of lead.

THE advantage of the physical signs of bronchitis, is to inform us with certainty of the first coming on of an inflammatory affection of this character. When, with the febrile state before described, whether the functional disorder be permanent or not, we find extensive rhonchi in every part of the chest, especially if they extend to the inferior parts, and there be little respiratory murmur audible, we should not hesitate to resort at once to depletory measures admissible in the individual case. These will consist of bloodletting, by venesection, or by cupping or leeching, and the exhibition of antimonials and mercurials.

In acute bronchitis, both in children over a year old, and in adults, if the pulse be hard and frequent, and the respiration deranged in the manner already described, the lancet should be had recourse to at once. The physician will remember, however, that, in inflammations of the mucous tissue generally, and the disease under consideration forms no exception to the remark, he must not expect by bloodletting to make that decided and permanent impression which he does in phlogosis of the parenchyma of an organ, or of its serous membrane. Hence, whilst he bleeds so far as to relieve decidedly the existing oppression, he will not urge it to the producing of syncope. His aim must be to bring down the inflammation to the secreting point, for expectoration, but not to sink the excitement and depress the strength of the body below this point. There is good reason to believe, also, that bronchitis will run its

course for a definite period, and therefore, as the period for active depletion is likely to be of short duration, we should be careful to employ with reserve remedies calculated to reduce the patient's strength. But, on the other hand, we ought not to be deterred from venesection or even its repetition by the symptoms of weakness—the sinking as it is called of the patient, which are the effects of incipient asphyxia, owing to the retarded and in part limited circulation of blood. The inflammation still persisting, or originally occurring in persons in advanced life, or of a weakened and cachectic habit, and the pulse exhibiting little hardness, local depletion is entitled to a preference over venesection; and that procured by cups is preferable to leeching. In severe cases, the patient should be cupped over the part which auscultation had proved to be most affected. If no selection be made on this score, the cups should be placed under the clavicles, or between the scapulæ. The opinion first clearly pointed out by Broussais, of the greater advantage from local depletion exercised over the upper than over the lower parts of the chest, must find confirmation from every observing practitioner. Even at an advanced stage of the disease, local bloodletting may be resorted to, if the expectoration have become suppressed, and there is coincident fever and irritation, and increase of dyspnœa not caused by over secretion — a point this ascertained by auscultation.

Next to the remedy just mentioned, a free evacuation of the bowels will often give the greatest relief. There is no disease of the thoracic contents in which free and early purging is so beneficial as in bronchitis. I have been most sensible of this fact in the epidemic form of the disease, or in influenza, in which, be it said, also, there is frequently a complication of gastric and intestinal disorder.

Emetics have been strongly recommended in bronchitis; and in the stage in which there is excess of secretion, and filling up of the tubes from this cause, and consequent oppression of breathing, particularly in children, they are decidedly efficacious. But in the first and more violently acute stage, in which there is no secretion, or it is sero-mucous and thin, tartar emetic in contrastimulant or sedative doses is entitled to a preference. This remedy will either follow bloodletting as an adjuvant, or take its place in cases in which, although the dyspnœa and fever be considerable, we are afraid for other considerations to abstract blood. The vomiting which follows repeated doses of the tartar emetic is more serviceable, because implying a solution, however temporary, of the disease, than that which is brought on at once by a large dose. From an eighth to a fourth of a grain, according to the age of the subject, may be administered every hour until a decided abatement of the symptoms follows. M. Girard of Marseilles recommends strongly, after considerable experience of its efficacy, a succession of emetics of the antimonial salt. This simple prescription is preferable greatly to common expectorant mixtures, which often only irritate and tease the stomach, and just serve to increase the secretion, but without either adequately abating or modifying the inflamed condition of the bronchial mucous surface. We have in the former case, that in which tartar emetic is used, a definite object to be accomplished by a *modus operandi* which we can

measure and appreciate; in the latter we wait for, we know not what, results, and with an expenditure of time, which, in acute disease, can never be afforded to doubtful measures or timid expectancy.

The considerations which should guide us in the exhibition of tartar emetic in bronchitis are well defined by Dr. Stokes, seemingly the more so to me because they correspond with my own experience, which has been considerable with this remedy in thoracic affections, ever since my visit to Italy and acquaintance with the new Italian medical doctrine of counterstimulus. Even now, after so much has been written on the subject, I may refer you to my paper, one of the first in order of time, on *Counterstimulus*, in Dr. Chapman's *Medical and Physical Journal*, vol. iii. Thus, the more robust the patient, the more acute the disease, the more bloodletting has been indicated, the better it has been borne, the more inflammatory the blood, the earlier the period at which the disease has been met by treatment, and last, though not least, the more simple and uncomplicated the affection, particularly with abdominal diseases, the greater will be the certainty of tartar emetic exerting that singularly sanative action which has justly obtained for it the name of heroic. On the other hand, where the disease has occurred in a debilitated constitution, where the pulse has not been strong, nor the skin very hot, where the teeth are coated with sordes, and the tongue red or dry and chapped, where the abdomen is swelled, and tender in the epigastric and ileo-cœcal region, where there have been diarrhœa or vomiting, and pain in the abdomen; in such a case or cases, the tartar emetic will either not be borne at all, or, if retained on the stomach, will exert comparatively little influence on the pulmonary disease, and too often increase the gastric symptoms.

Laennec recommends an aromatic and opiate to be combined with the antimony, as in the following solution: —

℞. Tart. antim. gr. vi.
Aq. cinnam., ℥vi.
Tinct. opii acet., gtt. xii. M.

Of this solution half an ounce, a table-spoonful, is to be given every hour or second hour, so that, if possible, the whole of the six grains may be consumed in the course of twenty-four hours. For many years I was in the habit of giving the tartar emetic simply in combination with cream of tartar, either in the form of powder or solution as recommended by Rasori, — with the occasional addition, as circumstances seemed to warrant, of opium or laudanum. Of late years, however, I have prescribed the medicines in question with camphor mixture, and a little laudanum.

The immediate effects of the antimonial practice are various. In a few cases, particularly where the stomach had been foul, free vomiting is produced, and, less seldom, purging: but after repeating the remedy two or three times, it fails either to vomit or purge until the morbid excitement is reduced, and then the *toleration* of the system to the medicine having ceased, nausea, vomiting, and prostration are produced, and would be perilously increased by its continuance. In a majority of cases, however, in which there is decided phlogosis

of any of the thoracic viscera, tartar emetic barely causes nausea, and then chiefly when the patients moves.

In evidence of the tolerance by the system to full and repeated doses of tartar emetic, I would refer to the case of a person labouring under bronchitis complicated with pneumonia, which was attended by the late Dr. Otto of this city and myself about five years ago. The patient became delirious, and would not take any medicine which was prescribed for him. Both on account, therefore, of its relative want of taste, and of its being adapted to the stage, which was the second one of the disease, we prescribed tartar emetic dissolved in some simple drink slightly sweetened. The dose of the medicine was increased from half a grain to two grains every two hours, so that in one twenty-four hours more than twenty grains were taken. This practice was continued for four or five days, gradually reducing the dose of tartar emetic, and with the best effects: the delirium was removed, the expectoration became loose and free, the matter being thick and opaque, and the pulse was abated of its great frequency. In some instances so little apparent effect is produced, so far as regards its action on the stomach, bowels, skin, and kidneys, that the remedy might be considered as inert, were it not for the disappearance of the symptoms and signs of pulmonary disease. Dr. Stokes relates his having frequently seen patients who were using from six to ten grains of tartar emetic daily, yet who had a good appetite for their food. An advantage is attributed by this gentleman to the use of tartar emetic, even when it fails to bring about the restoration of the disease. It is this; stimulants and tonics will have now a better effect after we desist from the use of the medicine in question. This advantage occurs in all cases in which depletion has been freely and timely practised. Stimulating remedies, which, even in the second stage of this disease, have only increased the indirect debility caused by continued and unchecked excitement, will now kindly restore the feeble powers of life and reanimate the exhausted functions.

After the employment of the tartar emetic, or in conjunction with it, the hot bath will frequently be of decided benefit, but it should be confined to the lower limbs, or the lower portion of the body at most, by immersion of the pelvis and legs. In this way a salutary derivative effect may be obtained. The heat of the water when this half bath is used should be from 98° to 102°; and the time of immersion about ten minutes.

The period of inflammatory excitement having passed, and the respiratory distress, with the diffused rhonchus still continuing, counter-irritants should be had recourse to. A blister is to be applied so as to cover the anterior part of the chest; or, that which is preferred by some practitioners, tartar emetic is to be rubbed on until a free eruption is induced. To insure its prompt action, the chest should be first well rubbed with a brush or piece of coarse flannel; or the skin may be still farther excited by applying a warm hand wetted with camphorated spirits, or by the short application of a mustard poultice. The tartar emetic should then be immediately rubbed in, either in the form of a warm saturated solution, or an oint-

ment composed of one part of tartar emetic to two of spermaceti ointment. With these precautions, adds Dr. Williams, who gives this formula, we shall rarely fail to excite a full pustular inflammation in as short a time as that required for the rising of a blister, with far less irritation to the system, and with decided relief to the pectoral symptoms. Partial as I am to the use of tartar emetic in this way in many diseases, I still prefer a blister in the one now under consideration: the counter-irritation produced by it, in the capillary injection and inflammation, and in the effusion of serum on the cutis, is more complete than that caused by tartar emetic; and the subsequent pain is, judging from my own feelings, certainly less than that from the latter. A blister should not be allowed to remain on a child for more than three or four hours, or until its action has been distinctly felt by the patient. It is to be then taken off, and the part dressed; after which vesication takes place. It is advisable, also, as recommended by Bretonneau, to cover the blister with a leaf of fine paper, or gauze muslin. An emollient poultice, applied after the venesection is induced, I have often found to be of great service.

In the cases in which disease of the abdominal viscera is complicated with bronchitis, and in subjects not robust and easily depressed by remedies, and in whom there is more evidence of congestion than of excitement of the circulation, calomel combined with ipecacuanha will be preferred to the tartar emetic. I have, every now and then, seen ipecacuanha, in small doses particularly, to have rather an irritating effect than otherwise in inflammatory affections, and certainly, except in coughs of gastric origin, it has no beneficial one that I have witnessed. Hence, if the combination just mentioned does not soon relieve the bronchial distress, or apparently increases it, we must not give up the calomel, but administer it alone, or with very minute doses of Dover's powder, in which the opium is the active ingredient. In more than one epidemic bronchitis among children, I have found, in common with others of my professional brethren, calomel to be the remedy of the greatest efficacy, given with a freedom too which at other times would be hazardous. Should the bowels be irritable, a few grains of prepared chalk may be usefully added to the calomel.

The plan of treatment now laid down will often suffice to arrest bronchitis, and bring it to a satisfactory termination. But if they fail to do so, the disease passes into a second stage, which I will not qualify with the epithet of collapse, as some writers have done. It is one in which general debility predominates, whilst the morbid local action is still going on. The skin is cold, it may be clammy; the pulse small and frequent, or soft and compressible; tongue foul and moist; renal secretion small; whilst the accumulation of mucus in the bronchia is increasing, with evidently less power of throwing it off by expectoration. An emetic will often give relief at this time; it should be of ipecacuanha, since our object is merely to evacuate, by a moderate effort, the bronchia, without depressing the general system. For this reason, in asthenic bronchitis, as a general rule, ipecacuanha is preferable to tartar emetic as a vomit.

It is now that the class of expectorants, which in the first stage would have been for the most part mischievous, may be advantageously enlisted in the treatment; those of the stimulating class being preferred. At this time, also, the alkalies may be had recourse to, united with some stimulant. Carbonate of ammonia, assafœtida mixture, answer admirably, and enable the child or the old person to throw off the mucus with comparative ease. Aiding to the same end, a tea-spoonful of wine-whey now and then for a child; and in proportionately large doses for an adult should be tried; its continuance to be regulated, of course, by the pulse and the state of the skin. So long as the first is weak and the latter cold, we may persevere with good effect. Preferable still to the remedies just mentioned in the minds of many practitioners, is a decoction of the polygala senega, with the addition of the liquor ammoniæ acetatis, or the carbonate of ammonia. If, apart from the symptoms of general debility and difficult expectoration, we find evidence of congestion or inflammatory engorgement of portion of a lung, the use of calomel in minute doses may still be continued, during the period in which stimulants are administered. Even a scarifying cup or two over the diseased portion is sometimes admissible.

Of diaphoresis I have said nothing, believing that remedies specially given with a view to produce it will either be misplaced by their character or by their interference with others already mentioned. Tepid drinks, moderately warm bed-clothes, an equable air of the chamber, and the occasional use of the warm semicupium or half-bath, will generally keep up a moist state of the skin, whilst they contribute to give effect to the more active plan of treatment already indicated.

I would dismiss diuretics in as summary a manner as diaphoretics, if the former could only be administered with sole reference to their action on the kidneys, and not in harmony with the state of the circulation, in bronchitis. But there are certain remedies, such as nitre, digitalis, and colchicum, which are both sedatives and diuretics, and all of which have been recommended in the disease under notice, especially with a view to prevent effusion. Without pretending to specify the precise time when they ought to be had recourse to, we can very well infer, from a knowledge of their general effects on the animal economy, that they will prove most useful in the early stage of the disease: they assist to keep down febrile excitement, and relieve the inflammation of the bronchia, by means of derivation through the kidneys. When given with a view to their antiphlogistic operation, tartar emetic is combined with one or other. If you prescribe such a combination, you should be aware that it is one of the most active in the materia medica, and you will be required in consequence to watch vigilantly the first evidences of sedative operation, and either to desist from the medicine, or to diminish the dose, or prolong its administration, before prostration is induced, which, as in certain cases in children and in old persons, cannot be supported nor always readily recovered from.

Secondary or Symptomatic Acute Bronchitis. — Our treatment of various diseases will be readily modified by the extent to

which bronchitis is associated with them, either as a primary symptom or one of secondary occurrence. In measles, the chief danger, both in the first or acute stage, as well as after the disappearance of the eruption, is from bronchitis, the degree of intensity of which will guide us very much in the use of the lancet or analogous depletory agents. We must be prepared, however, at the same time, to see a complication, in the case of eruptive fevers generally, of asthenia with inflammation, which will prevent our carrying out in all its simplicity the antiphlogistic treatment. More especially is this caution requisite in bronchitis with scarlatina. Now and then the complication is increased by the addition of cerebral disease. In such cases our reliance will be on local depletion, at the same time that we husband the strength of the general system, and even administer camphor and ammonia in alternation with calomel and ipecacuanha, and apply revulsives to the skin. Bronchitis is a frequent secondary occurrence in small-pox. During the epidemic visitation of this disease in 1823 and 1824, I frequently found my patients, more especially those in the hospital, sink under bronchitis and pleuropneumony after the eruptive febrile stage had been gone through, and the desquamation of the skin nearly completed. In some instances the bronchial disease was coeval with the pustular eruption, which appeared on the trachea and its ramifications at the same time with that on the skin; in others we had reason to believe that the inflammation of the bronchia was secondary, and consequent on the morbid impression of cold on an exquisitely sensitive skin not yet furnished with a new epidermis.

In the regular secondary bronchitis of small-pox and scarlet fever, accompanied with accumulated mucus in the bronchia, which oppresses respiration and interferes with the decarbonization of the blood, emetics should be had recourse to. In some extreme cases of depression and stuffing up of the bronchia, Dr. Copland recommends the following process, which, he says, he has employed with marked benefit. It consists in applying, over the epigastrium and lower part of the chest, a flannel wrung out of hot water and immediately afterwards soaked in spirits of turpentine, and allowing it to remain on until severe burning heat of the skin is produced by it. Internally, camphor and ammonia, together with a hot decoction of the polygala senega should be used at the same time. Small doses of ol. terebinth. also might be given by the mouth, or in alternation with the remedies last mentioned.

As a general rule, emetics are useful in those cases of bronchitis, complicated with scarlet fever, measles, and small-pox, in which a state analogous to diphtheritis is apt to occur. If sore throat and dysphagia be complained of, purgatives in full doses ought to be administered.

Bronchitis succeeding to acute laryngitis or tracheitis requires full and active depletion, in the manner already pointed out when speaking of laryngitis.

It is quite common for remittent fever, especially the autumnal, to be ushered in with, among other symptoms, a slight bronchitis, which, as the fever advances, may either disappear, or, a no unusual

thing, be augmented, and thus complicate not a little the disease. In addition to the other phenomena of fever, we find the patient exhibits lividity of countenance, cough, hurried breathing, and expectoration. If, at the beginning, under the impression that, as we have to deal with both inflammatory irritation, perhaps positive inflammation in the chest, and a similar state in the abdomen, as in gastro-enteritis, or gastro-hepatitis, we bleed freely, we shall give the patient the best chance in our power, by abating the febrile disturbances and concomitant phlegmasiæ and by keeping up the susceptibility of the system to other remedies, of whatever class they may be. But if, dissatisfied at the bronchial irritation still remaining, and the abdomen still continuing tender, with a show of gastro-enteritis, we bleed again, we do wrong; the more so, too, if we bleed largely, and with the expectation that we can strangle, as it were, the disease. We can do no such thing, but we may greatly and dangerously weaken the patient. It must be our aim now to ascertain the hold which the associated bronchitis still has on the system, and having done this, to try and remove it by local depletion and purgatives, provided these latter be not contra-indicated by the state of the stomach at the time. The disease in some instances predominates in the respiratory, in others in the digestive system; and we can, not unfrequently, observe a remarkable alternation of this predominance, now in the thoracic and then in the abdominal viscera. More commonly, if there be disease of the respiratory mucous surface, there is an associated disease of that of the gastro-intestinal: the reverse does not prevail with the same frequency. But as it is not my intention here to discuss the pathology and treatment of remittent fever, except in connection with bronchitis, I shall pass on to another and more advanced stage of the fever, in which it has assumed a typhoid form. We are now pretty well assured that the morbid condition of the mucous surface of the gums and tongue, by which they become incrusted with sordes and dark matter, prevails lower down, and has even extended to the bronchia, so as obviously to interfere with the regularity and completeness of respiration. The blood is not changed as completely as it ought to be in its passage from the pulmonary artery to the pulmonary vein, owing to the inspired air not being able to reach it through the secreted coat of mucus which covers the bronchial mucous membrane. What shall we do at this juncture, when probably the brain is disordered at the same time, either in consequence of inflammation of its arachnoid membrane, or of the flow into it of the carbonated blood, which has not been purified in the lungs before it reached the left side of the heart. If this collection of symptoms, of which the stomach and intestines furnish a full share, but which I do not now enumerate, have followed or been originally associated with bronchitis, we can have the less difficulty in framing our treatment, with a view to its probable persistence at this time, even though we should not make our diagnosis clearer by percussion and auscultation. The brain, the pulmonary apparatus, and the abdominal viscera, are now all suffering, perhaps more or less phlogosed; but the organ, the partially suspended function of which is most prejudicial, is the lungs. It is now no longer a ques-

tion, however, whether venesection is to be practised or not. This might have been debated during the first stage. All that is left for us is, to discuss the propriety of local depletion. Were we to be influenced by the general symptoms, even this would seem to be inadmissible; but morbid anatomy has revealed to us the condition of the bronchial mucous membrane at this period. It is red almost universally, and the bronchia are filled with mucus. We attempt, therefore, the relief of this morbid state of the bronchia by cupping between the shoulders or on both sides of the chest; and the depletions are afterwards repeated in different situations, according to the stethoscopic signs of predominance of disease. The respiration will also be greatly relieved by the use of terebinthinate and assafœtida enemata. Following the cups come blisters, which long experience declares should be between the shoulders rather than in front of the chest; and if this be difficult, on account of the posture, on the back, and extreme prostration, they should be applied to the sides of the thorax. Contradictory as it may seem, there are cases in which, while we deplete to relieve the congested lung, nutritive and diffusible stimulants are called for to keep up the general strength, unless we are prohibited from using them by excessive tenderness of the stomach, morbid heat of the epigastrium, and a dry, red, and shining tongue, and compelled to be spectators, waiting and watching anxiously for every fair indication to act. One of these is to apply a few leeches over the epigastrium.

Whilst we attend to the state of the skin and endeavour to preserve it of an equable warmth, by directing flannel to be worn, and thus to promote insensible perspiration, we are not, I think, precluded from the admission of cool as well as fresh air into the apartment of the patient. I have known patients to be tossing about from side to side, complaining of a sense of heat and oppression at the chest, and unable to sleep, who, on the introduction of fresh and cool air into the room by the opening of a window, became composed, and soon fell into a tranquil and refreshing slumber. The inflamed state of the bronchia, the impediment to the access of air to them, and the consequent imperfect hematosis, would all seem to indicate the advantage of the freest supply of air to the lungs, at the very time that we envelop the skin in warm clothing.

Dr. Armstrong was fully impressed with, perhaps even somewhat exaggerated, the dangers from the bronchitis secondary to typhous fever, or, as he called it, special bronchitis. While in the primary and common form of the disease, the danger is chiefly from the quantity of mucus secreted exceeding that which is expectorated, our apprehensions are excited in the secondary form by the quality of the secretion. It is, in this latter, more sticky, like varnish smeared over the bronchial lining, so as far more effectually to exclude the air from contact with the blood, than is the case with the less sticky but more copious secretion in common bronchitis. And all those fevers, continues Dr. A. (*Lectures on the Morbid Anatomy and Treatment of Diseases*), which are called typhous, typhoid, putrid, low, or malignant fevers, owe their characters to this special bronchitis.

If, without too much fatiguing the patient, he could be made to

inhale the simple vapour of water, alternately with one of the more stimulating gases, as chlorine, the effect would probably be useful towards a solution of this varnish and adherent mucus; and produce a not ill-timed excitement of the bronchial vessels, to enable them to throw out a modified and more fluid secretion.

Change of posture is desirable in this variety of secondary bronchitis, as it is in every form of congestion of the lungs. The patient should be turned on one or other side, or at least made to incline in that direction, by being propped with soft pads or air-cushions to his back. A decided predominance of disease in either lung will be an indication of the necessity of his lying or being turned on the one opposite to that affected.

In the very last stage of this secondary bronchitis, or that with typhoid fever, when hope is on the point of forsaking us, the patient lying on his back nearly insensible, the mucus having choked up the bronchia, with its rattle in his throat, temporary, but immediate, and even sometimes, though more rarely, permanent relief, has been procured by an emetic, to be repeated at intervals, if a renewal of the symptoms calls for it.

Dr. Graves has recommended a new, and, in his hands, successful means of arresting the excessive bronchial secretion, the continuance of which to this extent is always harassing to the patient, and often hazards his life. This gentleman proposed the employment of a combination of quinine ten grains, and of laudanum twenty drops, in the form of enema. He gives the details of three cases in which the patients were moribund, but in whom life was clearly saved by this treatment. Justice to the author requires that we should give his own ideas as to the discernment to be exercised by the practitioner in the selection of cases for the administration of the above remedies. "An accumulation of mucous secretions in the air-passages," remarks Dr. Graves, "producing the rattles, forms the closing scene of almost all diseases however different in their nature. To exhibit remedies for this would be ridiculous: it is only when this accumulation is the direct consequence of actual disease attacking the air-passages themselves, that we can hope for its removal. In such cases, we must try everything that experience has proved to be even occasionally useful, and must carefully watch the effect of each new medicine; for it must not be concealed, that very different results are obtained from the same remedies under circumstances apparently similar. The injection of sulphate of quinine and laudanum possesses, as appears from the cases I have detailed, very great powers, and for that very reason must be used with circumspection; for if exhibited at an improper period of the disease, or in cases where expectoration is at all scanty and difficult, it may produce dangerous consequences."

Sugar of lead has been given under these circumstances of disease with a very happy effect.

LECTURE LXXXV.

DR. BELL.

CHRONIC BRONCHITIS—Description of--Expectorated matter—pus with hectic fever —Difficulty of diagnosis of chronic bronchitis with purulent expectoration—Ulcerations of bronchia are rare—*Causes*,—primary irritation of the lungs,—and secondary in other diseases—Bronchitis after gastric irritation—Stomachic cough —Its diagnosis—Bronchitis with intestinal irritation,—with other morbid states,—gout, syphilis, &c.—*Treatment*, modified by cause—Venesection not often required—Local bloodletting preferable—Purgatives,—Antimonials—Calomel or blue mass, with ipecacuanha and hyosciamus—Colchicum and digitalis—Hydriodate of potassa—Tonics with the balsams—Compound syrup of sarsaparilla with iodine or iodide of iron—Counter-irritants to the chest—Inhalation of various vapours—Modification of treatment in complicated chronic bronchitis—Visits to mineral springs—Change of air and climate—*Prevention* of chronic bronchitis.

CHRONIC BRONCHITIS.—It has been well said, and the remark is one of great practical value, that chronic bronchitis is not separated by any distinct line from the acute form of the disease. The two pass by insensible gradations into each other, and are often conjoined, for, although acute bronchitis frequently exists alone, chronic bronchitis is rarely free from occasional admixture of acute inflammation supervening on it, in consequence of the exposure of the invalid who is labouring under the former to the causes which brought on the disease primarily, such as sudden mutations of temperature, or errors in clothing, &c. If we would be sure that we have to do with a chronic inflammation, the knowledge must be acquired by an observation of the symptoms derived from the pathology of the mucous membrane itself, and not simply from the duration of the disease. We every now and then see acute bronchitis in which attack succeeds to attack during many weeks, with a retention, all the time, of its original character. So long as the expectorated matter remains glairy and viscid, uniting in mass and without opacity, the inflammation is acute. Towards the termination of an attack of this kind the sputa become opaque and expectorated in distinct masses, which, although consistent, are not very adhesive or glutinous. Sometimes, instead of being diminished and more consistent, as when the disease is about to terminate, they remain in this state, or increase and become diffluent and heterogeneous in quality without sensible increase of fever, and they then indicate inflammation of the chronic kind.

Doctor Williams describes the disease with such clearness, that I shall adopt his language. Chronic bronchitis in its slightest form manifests itself only by habitual cough and expectoration, which are increased by certain changes of weather, and generally prevail most in winter and spring. It is more common in advanced life, and, in fact, very few old persons are perfectly free from it. In its severe forms it is accompanied with dyspnœa, occasional pain in the chest and about the præcordia, and some febrile symptoms, especially towards evening, palpitation, and disorder of the digestive functions. The cough is sometimes very severe, especially at night, and the expectoration copious; and if these persist long, they seldom fail to waste the body and reduce the strength.

To this description it may be added, that even with considerable

emaciation the appetite is often good, and the digestion regular. Chronic bronchitis will, if not restrained, end fatally; but more generally when this result takes place the disease is complicated with tubercular phthisis, which on these occasions it would seem to have developed.

The appearance of the expectorated matter in chronic bronchitis is various. Sometimes it is precisely similar to that in the latter stage of the acute form; but most commonly it is less glutinous, more opaque, and nearly puriform. Occasionally, it is of a dirty-grayish or greenish hue, from, as Laennec thinks, an admixture of the pulmonary matter; and in this state it cannot be distinguished from the expectoration of phthisis. In some cases it is real pus, and presents all the varieties that are seen in pus from other sources; in its being inodorous, as from a recent wound, or, again, having the strong odour of the contents of a large abscess, and occasionally approaching the gangrenous fetor. After a period, this bad smell disappears, but it may return perhaps several times in the course of the year. When the secretion is obviously of pus, there are not unfrequently a quick pulse and signs of hectic, and a tendency of the disease to a fatal termination, with night sweats, emaciation, diarrhœa, and all the common symptoms of pulmonary consumption. The following case, related by M. Andral (*Clinique Medicale*), is an example of this variety of chronic bronchitis, in which also the tracheo-bronchial mucous membrane was white.

A locksmith, twenty-seven years of age, entered La Charité Hospital during the month of December, 1821. For the two years preceding, this man had been tormented with a constant cough: he had never spit blood. When we saw him, he was in a state of marasmus: he expectorated sputa, formed of greenish, round patches, separated from each other, and floating in an abundant serum: these sputa were inodorous, and appeared to the patient to have a saccharine taste. The respiration was a little short; he could lie down in all postures; the chest when percussed resounded equally well in all parts; some mucous *râle* was heard in different points; there was no appearance of pectoriloquy; the pulse was not frequent in the morning, but became so towards evening; every night the patient perspired a little. The digestive functions presented nothing remarkable.

What diagnosis, continues M. Andral, could be given here? Auscultation informed us, to be sure, that there was no tubercular cavity; but the aggregate of the other symptoms seemed to announce, that numerous tubercles, beginning to soften, existed in the lungs.

The marasmus and debility increasing, and diarrhœa also supervening, together with disturbance of the intellect, the patient died in a half comatose state.

Post-mortem examination revealed the following particulars: — A sero-purulent infiltration of the sub-arachnoid cellular tissue of the convexity of the hemispheres; lateral ventricles distended with turbid serum. Pulmonary parenchyma sound, but slightly engorged. The internal surface of the larynx, trachea, and bronchia, traced as

far as their smaller divisions, presented everywhere great paleness; the mucous membrane (of the air-passages) exhibited no other appreciable alteration; white fibrinous concretions distended the right cavities of the heart. The digestive canal, opened to its entire extent, presented no other lesion but a bright redness, scattered in patches over the great intestines.

Here we have a case which presented all the rational symptoms of phthisis, although the lungs were sound, and evidences of decided lesion of the bronchial mucous membrane, which, notwithstanding, was in a state that would have been declared sound, had we been ignorant of the patient's condition before death. This case serves also to apprise us of the difficulty of distinguishing a simple chronic bronchitis from a tubercular degenerescence of the lungs. What, as M. Andral asks, can auscultation tell us in this case, except that there are no cavities? Let us, he continues, draw from it this conclusion; that so long as the existence of tubercles shall not be ascertained by the stethoscope, the return to health should not be deemed impossible, by the cessation of the bronchitis, which occasioned all the symptoms. It is against such an inflammation of the mucous membrane of the air-passages, that a great number of hygienic and therapeutic means have often succeeded, which, if directed against real phthisis, would certainly have failed, or at most would merely have retarded for a little the progress of the evil.

Much stress is sometimes laid, but without reason, on the large quantity of expectorated matter in a doubtful disease of the pulmonary organs. The quantity in chronic bronchitis varies from day to day, but it is almost always greater in the acute disease; not unfrequently amounting to one or two pints in the twenty-four hours. It is increased by every attack of cold; or rather the mucous secretion is at first less, with more watery discharge; and then, after a few days, becomes more copious. In some rare cases it becomes all at once, and usually without obvious cause, so very abundant and puriform, as to lead to the suspicion of a vomica being opened into the bronchia; a mistake which is more likely to happen on account of the oppression which usually precedes and accompanies this state. The oppression, however, is owing merely to a great increase of the morbid secretion, — which may itself accumulate to such a degree in a weakened subject as to cause suffocation and death. A remarkable case (No. 17) of this nature is given by M. Andral in his work frequently quoted by me in this lecture. It is headed—*Acute bronchial flux producing death by asphyxia in an individual affected with pneumonia and chronic bronchitis.*

Ulcerations of the bronchia are rare, as are softening of their mucous membranes. The frequency of ulcerations decreases from above downwards in the different portions of the mucous membrane of the air-passages. Thus, in chronic laryngitis they are common enough. It is not rare to find a part of the chordæ vocales stripped of mucous membrane, the thyro-arytenoid muscles and the cartilages exposed to a greater or less extent, in persons who, affected with simple chronic bronchitis or pulmonary tubercles, had

their voice for a long time hoarse or entirely destroyed. The remarkable feature in such cases is, that in a great majority of them, these ulcerations exist only when there is at the same time inflammation of the lower parts of the mucous membrane of the air-passages.

In the trachea, ulcerations become less frequent than in the larynx: they are generally small, and are not at all numerous — seldom extending beyond the mucous tissue proper.

Auscultation, although it cannot apprise us positively of the exact condition of the bronchia in all their morbid changes, is still a valuable adjunct towards our obtaining a correct diagnosis in chronic as it was shown to be in acute bronchitis. The respiration and cough are heard with various rhonchi — mucous, sonorous, sibilant, and clicking, which are continually shifting and changing. There is no bronchial or cavernous respiration, and, it is added by writers commonly, there is no permanent absence of respiration in a part, no unusual resonance of the voice: and in spite of the continuance of the copious and puriform respiration, on listening, day after day, we still find no signs of a cavity, no cavernous rhonchus, or pectoriloquy. But the assertion, that there is no permanent absence of respiration in a part, must be received with some qualification, as we every now and then find a case like that (No. 2) recorded by M. Andral, headed — *Chronic bronchitis — narrowing of the principal branches of the upper lobe of the right lung; and almost entire absence of the respiratory murmur in this lobe.*

Chronic bronchitis is often a very obstinate, as it is a harassing and fatal disease, especially to those of weakly frames. Death results either from the disease itself, or the complications to which it gives rise in the altered structure of the bronchial tubes and of the lungs.

The *causes* of chronic bronchitis are the same with those of the acute form, except that the secondary chronic, or that supervening on other diseases, more commonly follows these than appears, like the acute, either simultaneously with them or soon after their inception. The habitual inhalation of dust or fine metallic particles, detached in various processes on the arts, is a cause of a distinct variety of chronic bronchitis.

Stone-cutters, needle-pointers, they who powder and sift the materials for making china, and leather-dressers, are particularly liable to the disease. The first and most marked symptom in these cases is dyspnœa, which may continue, however, for a considerable time without the disease declaring itself. But in the course of a few months the dyspnœa is increased, and is accompanied by severe cough and a copious expectoration, sometimes mixed with pus and blood. Not unfrequently the cough brings on a profuse hemoptysis. At this time the constitution generally suffers much, — the pulse becomes quick; thirst and fever attend; the tongue is loaded; and the aggravation of dyspnœa occasions lividity of the countenance. Unless, continues Dr. Williams, whose description I am now repeating, these symptoms are relieved by remedies, and a total abandonment of the unhealthy occupation, they become worse; the expec-

toration increases to a great extent, and becomes more purulent; hectic with night sweats succeeds; and the patient dies with most of the symptoms of tubercular phthisis.

In early life, chronic, which in such cases might be called also *secondary bronchitis*, occurs after hooping-cough, measles, small-pox, or some cutaneous eruption.

Farther examples of the occurrence of secondary bronchitis are furnished in the irritation of the lung supervening on abdominal disease, and particularly on irritation of the stomach, constituting what is often called sympathetic or gastric cough. The following are the symptoms, as given by Broussais in his *Phlegmasies Chroniques* (translated by Drs. Griffith and Hays). It comes on with violent shocks, which occur at each inspiration, but without swelling and lividity of the countenance, as in hooping-cough. The expectoration will be proportionate to the degree of bronchial irritation sometimes it is wanting, at other times present; but the excretion may be suspended by means calculated to relieve gastritis, and this suspension is favourable to the patient. This secondary or stomachic cough is no new discovery; it is associated with either acute or chronic disease of the gastro-intestinal mucous surface; being in the first case marked by more violence, and more likely from the existence of fever to become complicated with pulmonary inflammation. In reference to an accurate discrimination of these kind of cases from primary chronic bronchitis, we may say that when there is a want of proportion between the physical signs and functional derangement, we are led at once to the correct principle of diagnosis. This is laid down by Dr. Stokes to be — *That when distressing pectoral symptoms exist, the morbid physical signs being either absent, or, if present, yet revealing an amount of disease too slight to account for the symptoms, we may make the diagnosis of sympathetic irritation.* If a patient has had fever, cough, and hurried breathing, for three or four days, and no commensurate signs exist, we may be tolerably sure that there is no actual or progressive inflammation; for, if there were, it would have by that time fully manifested itself.

I the more willingly introduce here the valuable details on this head furnished by Dr. Stokes, because the diagnosis is of great practical moment in a complication of maladies, which is, I know, of frequent occurrence, and the treatment of which is subject to fluctuations injurious if not perilous to the patient. Thus, persons labouring under gastritis, or gastro-enteritis, have been largely bled, and thrown into a typhoid state; or the abdominal inflammation has been exasperated by the use of remedies intended to relieve the pulmonary irritation.

In making this diagnosis, the following are the principal points which must be attended to in order to avoid error:—

First. Whether the symptoms or signs of incipient tubercle are absent.

Second. Whether there is reason to suspect disease of the larynx or trachea.

Third. Whether the uvula be or be not relaxed.

Fourth. Whether the patient (if a female) be subject to hysteria

If the result of an investigation is against the existence of any of these causes, we may safely infer the abdominal origin of the cough; and it will not be difficult to decide between gastritis and worms. Thus enlightened, we shall succeed in curing readily protracted gastric cough, which had proved intractable to general depletion on the one hand, and various stimulating expectorants on the other, simply by a removal of the gastritis. For this purpose, leeches to the epigastrium, iced water, and a bland diet, will often suffice.

The association of bronchial with intestinal irritation, though of less frequent occurrence than bronchitis with gastritis, merits notice here. Without considerable attention to the diagnosis, a physician may be so far deceived as to take, for remittent pulmonary irritation of the lung, a case of intestinal worms with sympathetic cough and fever. I had, several years ago, a case of this kind occurring in a young girl about seven years of age, in which the pulmonary symptoms with remittent fever were well marked: but the state of the abdomen, the appearance of the tongue, and the commemorative history, persuaded me that the patient laboured under worms. By prescribing accordingly, she was entirely relieved after a week's suffering, during which the cough was frequent and harassing. I did not avail to the full extent of the signs furnished by auscultation, but I was not a little influenced in my opinion by the entire remission from day to day of the bronchial irritation.

There are other varieties of chronic bronchitis, also of a secondary nature, but depending on slower constitutional diseases than those mentioned. It would be more correct language were we to say, that in the progress of certain chronic diseases the bronchial mucous membrane is sometimes violently affected, and that this bronchitis is cured by the same class of remedies which are adapted to and successful in the original disease. I cannot concur in the ideas conveyed by the expression, "that the gouty, scrofulous, syphilitic, and scorbutic contaminations, may, and no doubt do, produce their specific forms of bronchial inflammation." The fact of bronchitis preceding, alternating with, or following an attack of the gout, is not to my mind evidence of the specific or arthritic character of the former. A more enlarged view and experience of the operation on the different organic systems of different active medicines, will show that the cure of a particular affection by a remedy which has been successful in gout, for example, cannot be received as evidence that the former was also a modification of gout. This kind of argument was at one time common; as, for example, when a cough or a pain in the head was removed by colchicum, it was forthwith inferred that these disorders were of an arthritic character. Now, we know, from extended trials with this remedy, that it is adapted to a great variety of diseases which, in the nosological catalogue, have no affinity to each other. I have frequently prescribed it in bronchitis with manifestly good effect, in cases, including my own, in which no suspicion of gout could be entertained.

These remarks are not meant to apply to another variety of chronic bronchitis consequent upon syphilitic irritation. Syphilis, unlike gout, attacks, in its successive stages, a certain order of parts, viz.,

the sero-mucous membranes, skin, fibrous membranes, and bones. That in its progress the respiratory mucous membranes and the digestive ones should suffer, is not incompatible with our existing knowledge of its organic seats. The upper part of the digestive canal, or the palate, tonsils, and pharynx, are commonly enough assailed by secondary syphilis, as is the larynx or upper part of the air-passages. Participation of the bronchia in this modification of laryngeal disease, or independent syphilitic bronchitis, has not probably engaged attention so much as it deserves. In this country happily, a satisfactory reason exists, in our seldom seeing bad and protracted cases of syphilis out of the hospitals.

The bronchial disease of syphilitic origin is spoken of by Dr. Stokes, as either an acute or a chronic affection. In the first, he thinks it analogous to the bronchial irritations of the exanthemata, of which he has seen a few interesting examples; whilst in the second, there is a chronic irritation which, when combined with the syphilitic hectic and with periostosis of the chest, closely resembles true pulmonary phthisis. In the first of these cases he has observed that, after a period of time from the first contamination, the duration of which has not been determined, the patient falls into a feverish state, and presents the symptoms and signs of an irritation of the bronchial mucous membrane. These having continued for a few days, a copious eruption, of a brownish-red colour, makes its appearance on the skin, and the internal affection either altogether subsides, or becomes singularly lessened. Dr. Byrne, physician to the Lock Hospital in Dublin, is quoted by Dr. S. as corroborating by his experience these views. The former gentleman states that he has in many instances seen patients who had been formerly diseased, and who had come into the hospital either on account of new sores or of gonorrhœa, attacked with intense bronchitis and fever. The attack would come on suddenly and the distress was so great that bleeding had to be performed, the effect of which was that, soon after, a copious eruption, often combining the lichenous and squamous forms, made its appearance with complete relief of the chest. In some of these patients, on the day before the eruption, the stethoscopic signs had been those of the most intense mucous irritation; and yet, when the skin disease appeared, the respiration became either perfectly pure, or only mixed with an occasional rhonchus in the large tubes. The same gentleman has observed the reverse of this; as when a syphilitic eruption has been repressed, the bronchial membrane became much affected, and the patient suffered from general febrile symptoms. These phenomena subsided after bleeding and mild diaphoretics, which had the effect of restoring the cutaneous eruption.

The more chronic form of syphilitic bronchitis with which pneumonia is sometimes combined has been more fully described by Dr. Graves. Debility, night sweats, emaciation, nervous irritability, and cough and broken rest at night, associated with syphilitic disease, such as periostosis, sore throat, and eruption on the skin, indicate that the patient is labouring under a syphilitic cachexy affecting the lungs as well as other parts. A cautious use of mercury in such

cases will improve the patient, whose amended looks are ultimately followed by a removal of lues, the cough, and pectoral affection at the same time. We cannot, however, be too careful in our attempts to establish a correct diagnosis before we begin this mercurial course, remembering, as we must, how prejudicial this treatment would be in a scrofulous habit with tuberculous predisposition or incipient irritation of pulmonary tubercles.

Treatment.—The preceding description of the causes of chronic bronchitis, which to some may seem to be rather prolix, will serve not a little to guide us in our views of the proper treatment of this disease. This, it must be obvious, will vary with the nature of the case, as modified by cause, duration, and intensity of the symptoms. If these latter indicate that acute has supervened on chronic bronchitis, recourse must be had at once to the remedies called for, and already specified as applicable to the former. Commonly, however, venesection is not required in the chronic form of bronchitis, unless the patient be of a full and robust habit, and greatly jarred by the cough. Nor is local bloodletting, although a safer remedy than general in most chronic local maladies, necessarily required, unless to relieve a temporary but distressing exacerbation or evident congestion. When called for, it is best done by leeches under the clavicles, or cups between the shoulders. In case of doubt, I consider it the safest practice to draw blood rather than to abstain. — There are cases, of course, such as of delicate lymphatic women, and puny children of scrofulous habit, who are frequently subject to bronchitis, whom it would be clearly improper to bleed. But that other large class, viz., of labouring men in town and country, who have had abundant nutriment and used spirituous and malt liquors, and of young persons of both sexes 'who have neglected their colds,' will be materially benefited by the abstraction of blood in the manner last prescribed; or if the means for this are not at hand, by a small bleeding from the arm. The circulation is thereby equalized by the abatement, if not removal, of the congestion, and the susceptibility to the other remedies is thus more completely awakened. These are, in the first place, purgatives, and then antimony or mercury with opium, according to the degree of excitement. Chronic bronchitis is so often associated, at least in our climate, with gastro-hepatic derangement, and a torpid or irregular state of the large bowels, that purging may well precede the alterative and tonic course with which, in conjunction with counter-irritants, the treatment is usually completed. Calomel and jalap, or calomel followed by the compound powder of jalap; pills of the compound extract of colycynth and calomel, sulphate of magnesia with wine of colchicum, will represent the purgatives more immediately required. After this, I have been in the habit commonly of prescribing the blue mass with hyosciamus or with ipecacuanha, in pills twice or thrice a day, according to the trouble which the cough gives —attention being paid to keep the bowels open, and to suspend the prescription if there is any evidence of the mouth becoming touched. I have seldom seen benefit from salivation, or any approach to it in chronic bronchitis, except in one, and that a somewhat peculiar case,

in which *three* grains of the blue mass, united to hyosciamus, caused copious salivation and cured the patient. She had given me notice of the peculiar liability to the sialogogue operation of mercury. In milder cases, a single pill of the blue mass, three grains with half a grain or a grain of ipecacuanha at night, and a teaspoonful of salts in the morning, will exert a salutary effect in removing the cough, and giving the secretion a healthy character.

Where the disease is more paroxysmal, the fits of coughing being violent, and febrile irritation manifesting itself every evening, calomel and tartar emetic, one or two grains of the former and a sixth of the latter three times a day, with the addition of opium if the bowels are loose or irritable, will sometimes be required. If relief is not procured in a few days by this course, we must substitute for it the use of colchicum and digitalis, provided that the disease be still accompanied with febrile symptoms, and a feeling of tightness of the chest and difficult expectoration. Camphor will form a convenient and appropriate medium for the administration of the colchicum wine, which will be given in doses of half a drachm to an adult twice a day; or thirty drops, if combined with tincture of digitalis, in a dose of four drops given at the same time. In walking cases, wine of colchicum seeds, in doses of ten to twenty drops, three times a day, with, in the evening, five to ten drops of laudanum, is one of the best remedies with which I am acquainted. It serves, in addition to its direct effects on the bronchia, to relieve these indirectly by keeping the bowels in a soluble state. After the regulation of the digestive system, our attention should be directed to the renal secretion, which is at all times not a little influenced by the function of the lungs, as it, in its turn, modifies this latter. I have found a three-grain pill of the blue mass at night, and a moderate dose of the vinous tincture of colchicum on the following morning, and both repeated for some days, to have a very good effect. Where we anticipate a salutary operation through the kidneys, the iodide of potassium will be serviceable, and should the more readily be enlisted in the treatment, if the habit of the body of the patient be strumous, and he exhibit any evidence of tubercular predisposition, which should indispose us from prescribing mercury.

If, in despite of these remedies, the disease still persists, with an absence of all the remains of acute disease or of febrile irritation, and exhibits a purely chronic character, with profuse perspiration, cool skin, soft and rather feeble pulse, and a moist or slightly loaded tongue, the treatment should be changed to one of a tonic kind, and the use of the balsams. Calumba and cascarilla, with nitric acid or sulphate of quinia, sarsaparilla, and taraxacum extract, are useful. The balsam of copaiba is recommended by Dr. Armstrong, in very warm terms, in those cases of profuse expectoration without much vascular excitement. Other practitioners and writers of authority and experience do not sanction his praises. Like my friend, Dr. La Roche (*North American Med. and Surg. Journ.*), I have found it in some instances of marked efficacy. In others it offends the stomach, and has little or no influence. It is best given with spirits of nitre and occasionally I add the carbonate of soda, or sub-carbonate of

potassa. From my own experience, I would recommend, as when I spoke of their use in chronic laryngitis, the farther addition of compound syrup of sarsaparilla and a minute portion of iodide of potassium. In purely asthenic cases, in which there is a languor of the functions of digestion and circulation, the iodide of iron serves a good purpose.

But at the very outset, or at least after bloodletting, if this be thought advisable, and purging, counter-irritants should be employed in conjunction with the remedies already indicated. It may happen, in fact, that, owing to a weakness of stomach and intolerance of almost any kind of internal medicine, or to the peculiar circumstances in regard to the occupation of the patient, or tender age as in children our main reliance must be on external remedies, or counter-irritation, to the skin. To carry this out successfully, we may direct friction of the chest with an oily liniment, containing various proportions of tartar emetic, tincture of cantharides, the essential oils, ammonia, acetic acid, or a diluted mineral acid, according to the degree of effect desired. This combination will represent the liniments which quack physicians and medical quacks laud in books and newspapers as their own discovery, and as endowed with peculiar and specific powers. A succession of small blisters applied in the French fashion, or as flying blisters, may be substituted for the liniment. In milder cases, again, a warming plaster, composed of pitch sprinkled over with a little powdered cantharides, or even a mercurial plaster will answer.

Auxiliary to other treatment is the inhalation of various vapours, simple and medicated, and of gases, in chronic bronchitis. Having ascertained that the larynx and glottis are free from inflammatory irritation, it may be occasionally worth while to have recourse to the inhalation of balsamic and stimulating vapours, in cases particularly of a phlegmatic habit, and in which the bronchial profluvia is considerable. Gases, and substances of a more decidedly irritating nature, are better diffused with watery vapour through the air of an apartment, or small closet even used for the purpose. In this way iodine and also chlorine might be used with benefit; a few grains of the former, or a solution of the chloride of soda or of lime being placed on a saucer floating on hot water. As relates to all the kinds of vapour and modes of applying it, the physician will watch if there be increase of cough or acceleration of pulse in consequence, and regulate the continuance of the remedy accordingly. I may refer to my remarks on this subject in a preceding lecture on chronic laryngitis, and to my work on *Baths and Mineral Waters*.

A knowledge of the peculiar circumstances under which chronic bronchitis has come on, will of course modify our treatment; as where it has a syphilitic origin, or appears in a gouty diathesis, or is associated with chronic gastritis. Of this conjunction I have already spoken in such a way as to indicate the appropriate remedies. If bronchitis be one of the sequences of syphilis, we may shape our treatment accordingly, even though we have not recourse to mercury. In cases in which the habit of the patient is scrofulous, and the predisposition to pulmonary tubercles obvious, iodine, and sarsaparilla, and the narcotics, should take the place of mercury. The simple bitters and quinia, or some chalybeate, will advanta-

geously complete the remedial course, part of which should consist of the tepid and warm bath, according to the degree of excitement prevailing at the time.

The diet in chronic bronchitis will be regulated very much by the state of the stomach. If this organ is in a state of irritation, or of actual phlogosis, the food will be of the simplest and blandest kind. On the other hand, where the tongue is moist, the stomach free from disease and the bronchia from congestion, the cough will not forbid a stronger diet — particularly in old persons, whose powers of digestion may be habitually good. There are instances in which a moderate repast of solid food has allayed the cough, which had been aggravated by an empty stomach. In the case of infants, it is desirable that they should be able to procure at once milk from the breast, either of the mother or a good wet nurse. Farinaceous and milky food, commonly recommended to adults in the chronic stage of pectoral affections, is not equally well adapted to all. There are some whose stomach is so constituted that they cannot, without much inconvenience, indicated by weight at the epigastrium, foul and white tongue, and headache, use a milk diet. Others with whom it agrees, and by whom it is readily digested, are with difficulty persuaded that, in conjunction with farinaceous matters and vegetables, it can furnish ample nutriment to their frame. Such persons regard milk in the light of a ptisan, perhaps a panacea, which is to eradicate their disease; and at table as meant to be an introduction to more substantial and sapid food, of the animal kind. They obey the doctor's injunction, to take milk *at* breakfast and *at* dinner; but they do not understand him to mean *for* breakfast and *for* dinner; and hence they contrive to finish off with coffee, and hot bread and butter, perhaps cakes also, at the former meal; and fish with wine sauce, calves head, and other made dishes, at dinner. I do not now sketch from fancy, but from sober observation. The inference to be drawn for our immediate instruction is, that, in every case, the dietetic directions should be precise and definite, so as to leave nothing to conjecture and misinterpretation.

Often by a review of the food taken at the preceding meal, aggravated cough some hours afterwards will be prevented for the next day. The origin of an evening paroxysm is often of this nature. At all times it will be found that a patient who wishes to pass a tranquil night, must avoid either a heavy or a late, even though the latter be a light, supper. There are some persons so constituted that the common functional excitement of digestion will affect the bronchia, and give rise to a sensation of heat and altered secretion with cough: they ought, consequently, to have chymosis at least completed before they retire to rest for the night.

Completeness and regularity of the digestion demand our attention in chronic bronchis, and hence the function of the lower bowels must be carefully watched. In fact, from the beginning of the treatment of the acute form of the disease to the termination of the chronic, and during convalescence, this is one of the prime indications of cure and health. If the bowels are tardy in their peristaltic action in this latter period, we endeavour to quicken and give tone

to them by the combination of purgatives and bitters; one of the best and most convenient of which is aloes and quinia; or extract of gentian and rhubarb. Ripe and dried fruits often answer the double purpose of affording, in conjunction with bread, a light and wholesome nutriment, and of keeping the bowels in a soluble state. The *cure de raisins*, ripe grapes eaten in considerable quantity for several weeks together with good wheat bread, and nearly the sole diet, is a popular remedy on the continent of Europe in many disorders. To the one before us it is well adapted, particularly in patients who labour under a slight febrile excitement or an irritability which precludes as yet either tonics or stimulating food.

The more protracted and obstinate cases of bronchial inflammation will often be either entirely cured or materially relieved by the use of certain mineral waters — a selection of the kind of which will depend very much on the complications of the diseases of other organs with those of the bronchia. If the skin has been long affected, and the irritation has disappeared, or the eruption dried up; if the liver and bowels have been torpid, the stronger sulphur water will be preferred — such as the White Sulphur Spring of Virginia. Dr. Graves speaks in high terms of sulphur in chronic bronchitis. (*Graves and Gerhard's Clinical Lectures*, 1842.) Mere acidity and irritation of the stomach being the accompaniments, the water of the Sweet Spring will suffice. Cough, with febrile excitement, evening paroxysms and a greatly accelerated pulse, have been often completely and speedily removed by a course of the waters of the Salt Sulphur. Drinking one or other of these waters, the use of the tepid or warm bath, and inhaling the pure mountain air of the region of Virginia in which they are situated, have restored many invalids in the advanced stages of bronchitis, whose cases were supposed to be of pulmonary consumption. (Bell, *op. cit.*)

In mentioning pure mountain air as one of the restorative agents in chronic bronchitis, I would not be understood to recommend it in all cases. So far from such a recommendation holding good, there are varieties of the dieease in which a *reduced* air, such as that of low grounds, and charged with moisture, is of paramount importance as a curative agent. In the dry tracheal and bronchial affections this kind of air is most serviceable; and to breathe it habitually invalids resort, as a winter residence, to Pisa and Rome in Italy; or to Norfolk, Savannah, and Augusta, in our own country. Those patients who are annoyed by copious expectoration, and whose system is rather torpid than otherwise, will be told to give Naples and Nice, in the old world, and St. Augustine, in the new, the preference. But although different in the hygrometric states of the air, there must be a general resemblance on the score of temperature among the chosen locations for the winter residence of the invalid who suffers from irritation and other diseases of the air-passages. Although cold is most to be deprecated, yet a very high heat is also injurious. Temporary exposure to a cold, or to a cold and moist air, or to currents of air should be sedulously avoided. With this view, as well with that of procuring a uniform temperature and moisture of the air, neither of

which can be done in our houses heated by fires after the common fashion, it has been proposed to keep the patient, with chronic bronchitis or incipient phthisis pulmonalis, in apartments warmed by heated air conducted through flues. It is easy, by having large vessels of water in the hot air-chamber, to preserve the requisite moisture of the air which is sent up after being heated by the furnace below, into the rooms above. I am very sure that many persons who are habitual sufferers from catarrhal affections of various degrees for nearly half the year, might entirely escape them by having their houses warmed in the manner just stated. Neither they, nor the more formally recognised and treated invalid, would be precluded from the advantage and enjoyment of exercise in the open air during the winter months; only in the case of the latter this should be taken with a nicer selection of sunny days and noontide hours, and when a southerly wind prevails.

The *prevention* of chronic bronchitis will consist in giving the requisite tone to the skin, in the avoidance of great vicissitudes of temperature, particularly when the body is perspiring freely, and in maintaining a regular digestion. The skin is rendered much less impressible from sudden atmospherical extremes, by sponging the surface daily with salt and water, and friction for some time afterwards with dry towels. A more circumscribed ablution even, as by sponging the chest and neck every morning with vinegar and water, or salt and water, has been found to be a capital preventive, especially when followed by dry rubbing for some time. The undue sensibility of the cutaneous function, by which, in one person, bronchitis, in another rheumatism, is brought on, is greatly diminished by sea-bathing. The precautions and the associated circumstances to be attended to in visiting the sea-shore with this view have been detailed in my work on *Baths and Mineral Waters*. At all times the skin should be guarded by an inner garment, of such a texture that it is at the same time a bad conductor of caloric and an absorber of the fluid perspiration. On this account flannel or woollen wove, or silk-jackets, should be worn in winter, and domestic muslin or cotton flannel in summer. There are many individuals whose liability to fluxions of the bronchia or bowels, or to rheumatism, is such that they cannot at any season dispense with flannel. In all cases, the inner garment ought to be changed night and morning; and the invalid, before putting it on, should use the flesh-brush, or some analogous means of active friction of the skin.

In directing the prophylaxis for the benefit of children, when we see the fashion of the dress of these little beings, we cannot but deplore the exceeding blindness of parents to consequences, and the too general indifference of physicians to the physiological law respecting the evolution of animal heat. They who have less ability to create animal heat, and whose bodies in consequence are less able than adults to resist the morbid impressions of cold and moisture, are cruelly exposed to attacks of croup and bronchitis by their breasts and shoulders and the greater part of their arms being deprived of all covering in-doors, and often not properly protected when in the open air. But the chief mischief is in the house, — between the different rooms of which there is often as

great a contrast in temperature as between summer and winter. Add to exposure, by transitions of this kind, that in entries, and the occasional detention of children at open doors in the arms of nurses and mothers, during all which time the skin of the chest in front, and between the upper part of the shoulders behind, and even of the armpits, is acted on by cold and by cold and moisture, and we find a cause, the chief cause, of so many attacks of croup and bronchitis. We need hardly inquire for the often additional ones of cold and damp feet, and chill by detention in the open air, without active locomotion.

LECTURE LXXXVI.

DR. BELL.

EFFECTS OF BRONCHITIS.—*Narrowing and Obliteration of the Bronchia.*—*Dilatation of the Bronchia.*—Organic changes in the tubes and air-cells—Thickening, the first change—*Symptoms*—Difficulty of inspiration—Obliteration of the bronchia with shrunken pulmonary tissue—Dilatation of the bronchia may occur very early in life—Causes, prior diseases—Symptoms analogous often to those of phthisis pulmonalis—Diagnosis between these two diseases—Its great difficulty.—*Treatment*,—nearly the same as for chronic bronchitis.—*Ulcers of the bronchia.*—DILATATION OF THE AIR-CELLS.—PULMONARY OR VESICULAR EMPHYSEMA.—Dilatation and rupture of the air-cells—Symptoms equivocal—Disease often begins in early life,—Constitutes a variety of asthma.—INFLUENZA—EPIDEMIC CATARRH—EPIDEMIC BRONCHITIS—Closely resembles common bronchitis—Exhibits the same features, complications, and alterations—Seasons for its appearance—Is met with at all seasons—Its reputed terrestrial origin—Supposed to depend on a particular poison—Objections to this view—*Treatment*—Regulated by the same principles and consisting of the same remedies as common bronchitis of the season.

THERE are other changes in the bronchia resulting from inflammation than those which occur in the mucous membrane. These are attended with opposite symptoms in different cases. As chiefly referrible to chronic inflammation of the bronchia, they might have been described under this latter head, but for the suspension which some of you may think has been already too great by pathological inquiries before I reached the subject of treatment.

Considered in relation to bronchitis, the organic changes in the tubes and air-cells are enumerated, by Dr. Stokes, as follows: —

1. Narrowing of the calibre; obliteration.
2. Dilatation of the tubes.
3. Ulceration destructive of the tubes.
4. Enlargement of the air-cells.
5. Atrophy of the lung.

I shall not follow this author in the details under these specifications which you will find in his Treatise, but content myself with a brief summary from various sources.

The most simple change of structure of the bronchial tubes is a mere thickening of the mucous and the sub-mucous membranes, which generally in some degree accompanies acute inflammation. This is accomplished by an increased secretion of soft lymph, which, as the inflammation subsides, is eliminated and expectorated with the mucus of the membrane; or if it have been effused in the cellular

and parenchymatous tissue, it is after a while absorbed. But it is otherwise when the inflammation recurs frequently, or is of long duration; for it then causes an effusion of a less absorbable nature, involves the less vital structures, and as the changes induced are slow, so they are more permanent, because they become identified with the nutritive or reparative functions of these tissues. There will then be produced a degree of hypertrophy of some or all of the various tissues composing the tubes. Nothing, says Dr. Williams, is more common than to see the air-tubes of persons who have long suffered from bronchitis presenting an undue development of the longitudinal elastic fibres; whilst in other cases the outer cellular coat of the larger bronchia is thick and indurated, and their cartilages are sometimes partially ossified. Any of these changes has the effect of rendering the lungs less easily expansible in respiration; the first in particular is a common cause of the short breath, which persons frequently affected with bronchitis generally manifest; and although not often serious in itself, yet it may so abridge the sphere of the function of respiration as to make its increased exertion on bodily exercise a matter of difficulty and disorder, and to render it illy able to bear any other attacks of disease, to which the lungs can in general adapt themselves by supplementary effort. Thus, when one portion of a healthy lung is attacked with pneumonia, or compressed by pleuritic effusion, its function is supplied by the increased and quickened movements of the other portions, which, in their natural state, are equal to this augmented task; but if their pliant elasticity be impaired, and their size more fixed by an increased stiffness, they will also be, in proportion, less available for additional exertion, and the body will suffer the more from the crippled state of the function.

The chief symptom of hypertrophy of the longitudinal fibres, and of increased rigidity of the tubes generally, is *difficulty of inspiration*, which is short, quick, and performed with an effort, especially on making any exertion; whilst the expiration is comparatively easy; but both acts are often accompanied by wheezing sounds, from irregularities in the calibre of some of the tubes, and frequently from partial congestions or inflammation, from which tubes thus diseased are rarely free. The vesicular murmur is impaired, and the expansion of the whole chest is perceptibly limited. These symptoms resemble those of spasmodic asthma, except that they are permanent, and are not removed as the latter may be for an instant on breathing after holding the breath. As the bronchia cannot be narrowed without the sound caused by the entrance of air into these tubes being also changed, there results a peculiar rhonchus or rattle, on auscultation, which, in consequence of its seat and nature, is called by M. Andral the dry bronchial rattle or *râle*, the two principal varieties of which were denominated by Laennec sibilant and sonorous. This *râle* is evidently owing to the air in its way to the pulmonary vesicles, traversing tubes which are narrower than those which usually give passage to it. In its exit from the vesicles, the air again finds the same obstacles to its free passage, which causes, during expiration, the *râles* or rhonchi already mentioned. Sometimes they are only heard during expiration.

In reference to *obliteration of the bronchia*, the following considerations merit notice. If we follow the bronchial ramifications from their origin to the pleura, we shall observe an approach to transformation from mucous to serous membrane, or at least a decided tendency to it, which increases as we approach their terminations. In the larger tubes we find a vascular mucous membrane endowed with villosities and glands, but, as we advance into the substance of the lung, this tissue gradually loses its original characters, until, at its ultimate point, if it be not completely serous membrane, it closely approaches to it in appearance and function. It has been remarked by M. Reynaud, as quoted by Dr. Stokes, that we may expect to see the plastic inflammation the more the affected tissue approaches to the white structure; and here is a cause of the greater liability of the minute tubes to obliteration.

In all cases except where the tube was extremely minute, it has been found, that, just at the commencement of the obliteration a *cul-de-sac* existed, beyond which the tube was converted into a solid fibrous cord, furnishing also ramifications which answered to the originally pervious tubes.

As might be expected, those parts of the lung to which the obliterated tubes extend, have been found to present a shrunken appearance. In the neighbourhood of the obliterated canals, however, the air-cells were frequently found dilated, while in other instances the tissue was dense and impermeable.

Obliteration of the bronchia has been met with as a chronic or an acute affection. As a chronic disease it will be frequently found in connexion with tubercle. It is, continues Dr. Stokes, an interesting fact, that it occurs much more frequently in the upper than in the inferior portions of the lung, and its connexion with the development and phenomena of tubercle is too obvious to be overlooked. Nor can we doubt that, in many cases of pulmonary disease, the pent-up secretions of the air-cells represent, in some cases, the acute granular tubercle, and in others, where the affection is more general, the suppurative pneumonia.

Although we should admit that the minute bronchial tubes or excretory ducts might be plugged up by secretions of the cells, independently of inflammation in the parietes of the tubes or cells, yet we cannot help looking on the obliteration as principally the result of an inflammatory process.

Dilatation of the Bronchia. — This state of the bronchial tubes deserves attention, not only on its own account, but also because it sometimes produces physical signs similar to those of phthisis; such, for example, as the mucous rattle or *râle*, and the gurgling sound similar to those from tuberculous cavities. Auscultation, also, apprises us of pectoriloquy. For the better exhibition of the bronchia in autopsic examinations they should be laid open, from their large to their small branches, with a pair of scissors. Sometimes the dilatations are pretty uniform through some length of a tube. In other cases they form irregular roundish cells or pouches, freely communicating with each other, and from which tubes of unchanged size here and there arise. The tissues composing the tubes are, generally, at the time, more or less altered. They are least so in the tubular form

of dilatation, in which the coats are often quite thin, and the longitudinal fibres are distinct, although occasionally enlarged. But in the more globular dilatations, the walls of the tubes are generally much altered. They are irregularly thickened; the thickening being formed in part by hypertrophy of the mucous or sub-mucous tissues lining the cells, which sometimes forms folds of wrinkles around the tubes, and partly by a dense tissue on their outsides, probably consisting of the parenchyma of the lung compressed by the encroaching tube. There is little or no trace of the longitudinal or circular fibres in this form of dilatation, and the lining membrane is generally in a softened state, and of a red colour, whilst there may be considerable rigidity in some parts of the tubes. For detailed views of the pathology of dilatation of the bronchia, I must refer to Dr. Williams's and Dr. Stokes's works already so often quoted.

This disease may occur at all ages, from two months and upwards; and, indeed, there is reason to believe that it is sometimes congenital and a predisposing cause of pulmonary disease. As respects its duration, we may regard it under three different aspects. First, a dilatation may occur to a great extent in a comparatively short time. This has been chiefly observed in young children affected with hooping-cough, in whom the period of two or three months is sufficient to produce the fullest development of the disease. In the next class are those cases in which a bronchial irritation has continued for many years in certain cases, indeed for the greater part of the life of the individual, during periods varying from four, five, and six, to twenty, forty-one, and fifty years. Finally, we have this organic change as a common accompaniment of the tuberculous disease of the lung; and of course the period of its duration is various. Dr. Williams describes one manner, among others, in which the bronchia become dilated. In the disease called pleuropneumonia the lung is inflamed, and at the same time compressed by an effusion in the sac of the pleura. Now, if it remain long in this state, the smaller air-tubes and cells become obliterated by the adhesion of their sides, so that when the liquid is removed from the pleura they will not expand again with the enlargement of the chest: but the large and middle-sized bronchia are not obliterated; they bear the whole force of the inspired air, and become consequently dilated by it. This kind of dilatation is usually conjoined with contraction of the affected side.

The *symptoms* produced by dilatations of the bronchia will be according to the extent of the lesion. Slight degrees of it are met with in the lungs of persons who had not during life manifested any prominent disorder of the respiration; and its simpler forms may exist to a greater extent without producing any other effect than a liability to attacks of bronchitis. But where it affects many tubes, has modified their structure, and has enlarged them to such a degree that they press on and obliterate a considerable extent of the pulmonary parenchyma, it then causes habitual dyspnœa, with more or less cough and muco-purulent expectoration, which is often remarkable for its fetor. There are, generally, present also the ordinary symptoms of severe chronic bronchitis, from which some parts

of the affected tubes are scarcely ever free; and the permanency of these symptoms, together with a degree of lividity, dropsical effusions, and cachectic condition, often induced by the crippled condition of the lungs, forms the usual general character of the aggravated forms of dilated bronchia.

Now, you may say, continues Dr. Williams, whose language I have just been repeating, that these symptoms look very like those of consumptive disease: and so they well may; for there is injury to the function of respiration, profuse expectoration, hectic fever, and the patient is often slowly wasted away. In their aggravated forms, dilated bronchia are not more tractable than tubercular consumption itself; but their tendencies and constitutional effects are different, and merit as much of a distinction as our means of diagnosis can find for them. Unfortunately this is not one of a very marked kind; in fact it is to be made only by those much experienced in diagnosis; and even they will give it in terms rather of probability than of certainty. Dr. Williams thinks that the situation of the part from which the sounds in auscultation are perceived, will help to guide us in our opinion: in phthisis it is chiefly in the superior parts, but in dilated bronchia in the middle regions of the chest. The character of the sounds in relation to time is of value also; those in phthisis tending to increase and spread as the excavations proceed, while those of dilated bronchia remain nearly stationary for weeks and months. In the former disease the sound on percussion is more extensively dull, especially under the clavicles; whereas in the latter, if any dulness exists, it is generally in the mammary, lateral, or scapular regions of the chest, and is often accompanied by a sound of a peculiar kind. This is hollow and tube-like, and from its resemblance to that produced by mediate percussion on the trachea, or by tapping with the finger on the mouth of a small vial, Dr. Williams has given it the name of *tracheal* or *amphoric*. A notion of it may be conveyed by filliping on a finger pressed on the larynx or trachea, or on the cheek, when the mouth is opened in the manner of sounding the letter O. This sound depends, not essentially on the vibration of the walls, as in the case of the ordinary sounds of striking the chest, but on that of the air in the tubes or cavities, which give a note, according to their length and size, precisely in the manner of a pan-pipe, or of an India rubber bottle.

Where the diagnosis is so important as that between phthisis and any other disease, I have no hesitation in repeating the very luminous summing up of this subject in the words of Dr. Williams.

Finally, says this gentleman, you will be better able to distinguish dilated bronchia from phthisical cavities, when you become fully acquainted with the signs and general symptoms of the latter; and I shall now only add, by way of recapitulation, when you meet with a case in which long continued cough, with purulent expectoration, dyspnœa, loss of flesh and strength, hectic fever, even with some of the physical signs of cavities in the lungs, beware of pronouncing it to be tubercular, if qualified by all or most of the following conditions:—If no proofs of a scrofulous habit can be traced; if the com-

plaint have originated in a long-continued and violent cough, or in an attack of pleuropneumonia, and, considering its duration, emaciation have not proceeded very far; if the purulent expectoration have been fetid and sanious rather than flocculent or caseous; if the bronchial or cavernous respiration, voice, or gurgling, be heard rather in the middle than in the upper portions of the chest, and be there spread over a considerable extent of surface; if these middle portions chiefly sound differently on percussion, being dull when the rest of that side sounds pretty well, or amphoric when the side is generally dull and contracted; and if, although the cough and expectoration continue undiminished, these signs remain stationary for many weeks together.

After all, however, some of the most skilful auscultators are at a loss what diagnosis to form in certain cases of dilated bronchia. M. Andral presents the outlines of a case of *chronic bronchitis with dilatation of several bronchia, pectoriloquy, and ulceration of the stomach*, in which the diagnosis, according to Laennec, under whose care the patient came, was beyond doubt that of pulmonary phthisis. The nature of the sputa and the pectoriloquy seemed to indicate that cavities were already formed.

In general terms we may say, with Dr. Stokes, that *in phthisis we have first dulness, and then cavity; while in dilated tubes we have first cavity, and then dulness.* But, he adds, the bronchial tubes may be sufficiently dilated to give pectoriloquy and bronchophonia without any dulness; proof of which he gives in a case furnished by M. Louis, who supposed his patient to labour under an organic disease of the abdomen, and a chronic and circumscribed phthisis; whereas, in fact, the organic lesions were dilated bronchial tubes in both sides, resembling a series of cysts.

Of the *treatment* of dilatation of the bronchial tubes little can be said. We have no remedies of admitted efficacy to control this morbid condition. A useful lesson is derived, however, from this disease, in favour of early and active measures for its prevention. They will be the same as those already indicated for chronic bronchitis, of which dilated bronchial tubes is sometimes one of the effects, and occasionally one of the associated symptoms also. Hence we must go a step farther back, and endeavour to arrest the first inflammatory attacks, which, if neglected, will end in chronic bronchitis and dilated bronchia.

Ulcers of the bronchia seldom occur but in connexion with some peculiar cause which tends to fix inflammation on the bronchial mucous membrane, such as the habitual inhalation of irritating particles of dust, in various trades; the continued passage of tuberculous matter in phthisis, and occasionally the specific influence of measles, small-pox, and syphilis. We are ignorant of any symptom by which the presence of ulcers in the bronchia can be distinguished. It is worthy of remark, however, that they rarely exist without a similar affection of the larynx; in which case the voice is impaired, or lost; but then, again, this happens commonly when the bronchia are not ulcerated, or only so far as to give vent to the matter of vomicæ in phthisis.

DILATATION OF THE AIR-CELLS.—PULMONARY OR VESICULAR EM-

PHYSEMA.—The former of these titles is that given by Dr. Stokes, the latter by M. Laennec, to a morbid state of the air cells of the lungs, accompanied with enlargement of the viscus and increased quantity of air in the thorax. The anatomical characters of the disease are, according to Laennec, augmentation of size and less uniformity of the air-vesicles. The greater number equal or exceed the size of a millet-seed, while some attain the magnitude of hemp-seed, cherry-stones, or even French beans. The latter are probably produced by the reunion of several of the air-cells through rupture of the intermediate partitions; sometimes, however, they appear to arise from the simple enlargement of a single vesicle. The largest of these dilated cells are often, in no respect, prominent on the surface of the lung; sometimes they form a slight projection. The dilatation is greatest at the base of the lungs and upon the internal surface.

So far the air is contained in its proper cavities, which are excessively, permanently, and unnaturally distended; but if the distension becomes still greater, the air-cells are ruptured in certain points, and we have that other variety of pulmonary emphysema in which the surrounding cellular tissue of the lung is infiltrated with air. The surface of the pulmonary vesicles is in such cases of an irregular form, which is made to vary by pressure on them with the finger. Louis believes the vesicles to be hypertrophied.

Sometimes, but comparatively seldom, there is a combination of this last state with a true emphysema of the inter-lobular cellular tissue; but this is generally very slight.

In its acute form, as it presents itself in children particularly, dilatation of the air-cells is consecutive to bronchitis and pneumonia, and disappears with these diseases. In the adult we must look to other causes which are not readily appreciated. According to Louis, we uniformly find that the extent and degree of the emphysema are always in direct proportion to the age of the patients; or, to what, in an extremely chronic complaint is the same thing, the duration of the disease. Nearly all the subjects of the modification of asthma which Laennec calls dry catarrh, exhibited, on examination after death, a greater or less dilatation of some of the bronchial cells. An occasional cause is worthy of notice: it is a long retention of the breath, as in the case of players on wind instruments, and those who have to overcome unusual resistance by great bodily effort, as in lifting, pushing, and pulling.

Both the general and local symptoms of this disease are rather equivocal, at any rate in its slighter forms. Patients labouring under this disease are affected with an habitual dyspnœa, which, in the earlier periods, is often mitigated in summer, to return with violence during the winter: they are, also, liable to repeated attacks of what may be termed *congestive* bronchitis, during which the difficulty of breathing becomes extreme. The secretions are more frequently scanty, viscid, and unelaborated in the dilatation of the air-cells than in that of the bronchial tubes. Repeated returns of acute catarrhal attacks in this state of the air-cells give rise to most of the phenomena of dry asthma, the paroxysms of which are accompanied by extreme oppression. In the fixed forms of this disease the physiognomy is almost characteristic. Dr. Stokes, who makes this remark, draws

directly afterwards a portrait of a patient affected with it, which is certainly distinguished by remarkable and distinctive traits, although it is too highly charged to be a representation of the majority of persons suffering from dilatation of the air-cells. The complexion is generally of a dusky hue, and the face, although anxious and melancholy in its expression, is preternaturally full, when contrasted with the rest of the body. The nostrils are dilated, thickened, full, and vascular. The lower lip is enlarged, and its mucous membrane everted and livid, giving a peculiar expression of anxiety, melancholy, and disease to the countenance. The shoulders are elevated and brought forward, and the patient stoops habitually, — a habit contracted in his various fits of orthopnœa and cough, by the relief experienced from inclining the body upwards. The apices of the scapulæ are remarkably projected; and anteriorly the clavicles are arched and prominent; the sternum has lost its flatness or its relative concavity, and it is thrown forward and even arched both in a longitudinal and transverse direction; the intercostal spaces are widened but not dilated, as in empyema. When we examine the sides, however, we see the intercostal spaces deeply marked, and presenting no indications of protrusion; so that, if we compare the diseases of dilatation of the cells and empyema, with respect to the external conformation of the chest, we find that, in the first, the appearance of smoothness and dilatation is most evident superiorly, while in the latter the reverse occurs. The lateral portions of the chest are remarkably deep, and their convexity not at all proportioned to that of the anterior or posterior portions of the thorax.

On applying the hand to the inferior sternal region, we generally find that the heart pulsates with a violence which we should not expect from the examination of the pulse at the wrist, which is often small and feeble, whilst the impulses of the right ventricle are given with great strength. These phenomena are generally owing to a hypertrophied state of the right cavities of the heart which so commonly attends this disease, a state so frequently accompanied with a violent impulse and a feeble pulse. Two other causes may exist for the production of this symptom without supposing a disease of the heart; and these are displacement of the heart by the dilated lung, and a congested and enlarged state of the liver.

This disease may continue a great many years. It does not always prevent the subject of it from attaining an advanced age; although it must be admitted that it will seriously complicate and give additional power to other diseases. Of all the varieties of asthma, it is unquestionably, in the opinion of Laennec, that which affords to the patient the best prospect of longevity. Louis tells us, that it alone never causes death. MM. Rilliet and Barthez consider vesicular dilatation in children to be an acute disease. The chronic form in adults is, they think, of subsequent origin.

The *physical signs* of dilatation of the bronchial cells are a morbidly clear sound on percussion corresponding to the part of the lung affected, which is chiefly the anterior and upper; and inaudibleness, or nearly so, of the respiratory sound in auscultation. Sometimes, during coughing or violent efforts of respiration, a wheezing or sibi-

lant sound announces that the obstruction is not quite complete: and there will generally be some of the tubes which will give these sounds during common breathing. In children, however, the respiratory sound is louder than common, and there is no increased sonoriety on percussion.

Influenza—Epidemic Catarrh—Epidemic Bronchitis—*Grippe*. — By the first of these names is the disease, on which I shall make a few remarks, commonly designated. A more distinct idea of its true character is conveyed by its other titles of epidemic catarrh, or epidemic bronchitis. *Grippe* is the familiar French name for the disease. Beyond its rapid diffusion over not only extensive districts but entire countries and continents, and its attacking in quick succession the greater part of the population, the epidemic differs but little from the endemic disease. We meet with the same symptoms as in coryza, and sometimes limited like it; but more commonly, also like it, there is an extension of the irritation to the fauces and air-passages, constituting catarrh. Sometimes the whole force of the disease is spent on the brain, an occurrence presented likewise in common bronchitis; sometimes there is much associated gastric and gastro-intestinal derangement—a complication also met with, but more rarely, in this latter. In other cases, again, the violence of the epidemic disease is spent in the locomotive apparatus,—muscles, aponeuroses, and joints — a diversion from the common seat of attack not unusual in the ordinary seasons of bronchitis. If we were to attempt to designate influenza by any particular fashion of, or alternation with, other epidemic maladies, as of cholera, scarlatina, &c., it would be easy, as indeed I have done quite recently, to show analogous alternations with endemic bronchitis. Not more various, either, are the superficial features of this latter disease according to age, temperament, constitution, habit, and prior diseases, than are presented in the epidemic kind. We may perhaps specify two peculiarities of epidemic bronchitis, although these are not at all of a specific nature, viz.: the limited period of its duration in any one place, and the feelings of greater prostration by those who are attacked. Perhaps we may add, also, the greater tendency to gastro-intestinal disorders as a part of, or as succeeding, the bronchial epidemic.

Did time allow, I might repeat the history of the successive visitations of epidemic bronchitis from the first records in 1510 down to last year; and speculate on the conditions of the atmosphere that gives rise to the disease. In America it is known to have occurred as early as 1674, and it was again epidemic in New England in June of the succeeding year. More commonly appearing towards the latter end of autumn, or during the winter or spring, at times of obvious atmospherical distemperatures, influenza has, however, shown itself in midsummer, as was the case in 1844 in this region of country, without any very noticeable precursory or attendant meteorological phenomena. But in whatever year, season, or place it has occurred, we find it distinguished by the same general grouping of features, as regards the many and exceptional traits, as regards individual cases. Dr. Holland (*Medical Notes and Observations*) very truly remarks on this point. Sir George Baker's narrative of the influenza of 1762, or Huxham's still earlier reports of the epidemics of 1733, 1743, might be taken throughout as a description of those

of 1833 to 1837. That which is recorded by Sydenham equally corresponds with our recent experience. The history of the disorder, at Copenhagen and Berlin, will serve, with little variation, for its course and character at Lisbon and Malta.

This general uniformity can only be explained, Dr. Holland thinks, by "identity of physical causes, capable of being widely diffused." In conformity with this idea, Dr. Robert Williams (*Elements of Medicine*, vol. ii., p. 670), places its origin in the same category as that of epidemic cholera, by attributing it to a poison incubated beneath the crust of the earth, beyond the reach of atmospheric influences. If we accredit this hypothesis, we must suppose that the poison is diffused at an immense distance from its foci wherever these may be; for it is well known that crews of vessels have been affected in mid-ocean as strongly as the dwellers in Ind, or the northern Muscovites, in which countries Dr. Williams supposes influenza more especially to have originated. The admission of a terrestrial emanation will help us little in the theory of causation if we find that the poison is controlled in an apparently absolute manner by certain recognisable conditions of the atmosphere, and greatly modified if not neutralised by slight differences in locality. The following fact will convey to your minds the force of the objection, which I now hint, against Drs. Holland and Williams's hypothesis. In the account of the influenza which prevailed in England in 1803, by Dr. Carrick, he states that the inhabitants of that side of Richmond Terrace on Clifton Hill near Bath, which fronted the east, were universally attacked with the disease, while on the south side the great majority both of persons and families, in all respects similarly circumstanced, escaped it entirely. Now it is not easy to conceive, nor is it at all probable from the premises, that a poison so pervading and diffusive, and so subtle as to be compared to the terrestrial fluids of electricity or of magnetism, should be collected in such a definite direction and compass as to occupy a limited portion of the atmosphere, and to be driven in a current in one direction only.

Treatment. — But let us pass from speculative ætiology, which explains little, and diagnosis which, as I have already intimated, differs scarcely from that of bronchitis with its modifications, as already placed before you, with some fulness, to the subject of the *treatment* of influenza. This, also, need not detain us long. Great stress is laid by English writers on the feeling of prostration of the subjects of influenza, and on the danger from the use of the lancet or of the antiphlogistic course generally. Their experience is deduced mainly, I should suppose, from observations made on the over-fed and under-exercised citizen, and those who, even while they have a show of health, are enfeebled by an over-excitement of the brain and nervous system. This is the state of the better class of the inhabitants of a great European capital and of the large towns in Europe, and in England more particularly. Bloodletting is not well borne by such persons. But even in their case the attempt to establish anything like a marked contrast between the treatment of common and of epidemic bronchitis is misleading. You have been already told, in reference to the former, that, in simple phlogosis of mucous membranes large sanguineous depletions are neither tolerated nor required, to the same

extent as in phlegmasiæ of the serous membranes and parenchymatous tissues. The remark is applicable to both kinds of bronchitis, common and epidemic, and no more to the latter than to the former. Again, we must be guided by individual peculiarities in our treatment, and hence the aged and feeble are not to be bled with the same freedom as the young and robust, nor the intemperate and debauched as the sober and regular liver. Now, in epidemic bronchitis, although these last, the aged and the intemperate, are very liable to bronchitis in all its forms, they are so in greater degree to the epidemic variety. Of course the rule of caution is still more applicable in this last disease, but only on account of the greater number affected, and not of any peculiarity of the affection, or simply because it is influenza.

Whether or not you may think proper to receive this explanation, the fact to my mind is undoubted, that evacuations generally, including the sanguineous, are more useful and requisite in epidemic catarrh, as I have been accustomed to see it in successive visitations in the United States, than in England, judging from the representations of most of the medical authorities of that country. In a great many, probably the majority of cases, the attack is slight, and demands only rest and abstinence from meat, and of course all stimulating drinks, with sometimes a saline purge for its early and entire removal. But where there is a collection of symptoms in influenza, which in common would call for venesection or for topical bloodletting, the remedy ought not to be withheld from a fear of debilitating the patient. Even in the cases of the aged and those of delicate constitution, more mischief has occurred and more attacks ensued by the let alone or inert practice than by the more active. In these cases we are required to be more circumspect, and to take more than usual pains to detect the organic lesion, and when once discovered to remove it by appropriately decided measures. We are not, while watching the feeling of exhaustion and the real languor and prostration of the patient, to overlook bronchial or pulmonary phlogosis or cephalic congestion; nor in our endeavours to remove this latter, ought we to think lightly of the former. Curps or leeches over the suffering organ, or a small venesection, are not incompatible with the simultaneous administration of carbonate of ammonia, wine whey, and polygala senega, and the application of sinapisms to the extremities.

This much premised in the way of caution in the treatment of certain class of cases, I have only to repeat my belief, that you may in general, with perfect safety and propriety, follow out the course in epidemic bronchitis which, as philosophical observers, you would be inclined to pursue in common bronchitis; and to my lectures on this latter, including its chief varieties, I shall therefore refer you. The chief danger consists in denying, and consequently disregarding danger. I mean to say, that people generally regard influenza as they would sweating in a hot day — a process to be expected and gone through without any special provision being made for accidental or contingent discomforts. If complaints are made, they are treated lightly or not attended to, under an impression that they will subside; and that the doctor if he comes will bleed or give some strong medicine, or put the patient on diet, when, dear good man or old lady,

they cannot bear any reduction. Thus the parties reason or rave until the disease takes a sudden and alarming turn, and the doctor is sent for, to give — his sympathy for the fatal event and expressions of regret that he was not allowed his proper privilege of forming a judgment of the nature and requirements of the case, and of promptly shaping his measures accordingly.

In conclusion, and that you may not accuse me of abruptly terminating the subject of the treatment of epidemic bronchitis, I will repeat a few remarks which I made in my Journal (*The Bulletin of Medical Science*), in the month of August, 1843, in reference to the influenza then prevailing. "We bled those of our patients in whom we found pulmonary congestion or marked bronchitis, or who suffered much from headache, flushed face, throbbing temples; and in all cases with decided benefit. More expressed themselves relieved, after venesection, of their cephalic than of their pulmonary symptoms, although the predominance of the latter called more imperatively for the remedy. Purgatives, which often followed bloodletting with good effect, were applicable, however, to a very large number of cases in which the latter was not called for. Often complete relief, even when bloodletting was practised, was only procured by purging. The class of saline purgatives seemed to us to be preferable to others; but on this point there was no call for any great nicety of selection. The popular dose, of Epsom salts and magnesia, was quite an efficient remedy; the same may be said of the compound powder of jalap.

"To some patients of a nervous temperament, and restless and irritable withal, after venesection, we gave opium; sometimes in a full medium dose at once, sometimes in fractional proportions, repeated at intervals, with the effect of procuring for them tranquillity and sleep, and an abatement of all the unpleasant symptoms. Cough, and some bronchial irritation persisting, tartar emetic in minute proportions, as one-eighth to a sixth of a grain in solution, with a few drops of laudanum, for a dose, and repeated at intervals, were prescribed with advantage. Sometimes we substituted ipecacuanha wine, with a solution of sub-carbonate of potassa or liquor potassæ, and tincture of hyosciamus or of belladonna, in an adequate quantity of syrup. We have seen cases, as already remarked, in which the disease was ushered in with croup: relief was promptly procured by an antimonial emetic, as in the instance of the disease occurring in children.

"The influenza at this season, compared to former visitations in the winter half of the year, has been relatively mild. The difference probably arises from the greater relief to the pulmonary organs, and to the fasciæ and muscles in which the disease almost simulates rheumatism afforded by the naturally perspirable condition of the skin at this time, by which a crisis is more readily brought about than in the winter season. But whilst we admit this as a general proposition, it cannot be denied that cough and much languor sometimes persist for a considerable period, after the chief violence and all danger from the disease have disappeared."

The general sameness of the disease and corresponding sameness of treatment carried out in the west in the winter of 1841–2, are illus-

trated in the practice of Dr. Richardson, a highly intelligent and experienced practitioner of Rutherford County, Tennessee. "Many cases were alarming, so extensive and severe were the bronchial inflammation and pain in the head. These cases were treated with a general bleeding, cupping over the chest, mild purgatives, tartar [emetic] water, mucilaginous drinks, warm pediluvia with Dover's powder at night."

LECTURE LXXXVII.

DR. BELL.

DRY CATARRH. — *Bronchial congestion*, a preferable term — This with pulmonary emphysema constitutes mainly asthma. — *Treatment* — Mild aperients, alteratives—The alkalies—Regulation of diet.—ASTHMA—Its proximate cause—Remote and exciting ones in general—Varieties compounded of the nervous and congestive —*Symptoms*—Designation by the term spasmodic unnecessary—True asthma always implies spasm—Organic seat and anatomical lesions seldom ascertained —*Causes* enumerated—*Treatment*—To vary with the complications of other diseases with asthma—Bloodletting sometimes necessary—Emetics—Mild laxatives with narcotics—Remedies during the paroxysm—Stramonium extract the best—Counter-irritants—To prevent a return—Tonics, change of air, and bathing, and use of sulphurous waters.

DRY CATARRH. — Intimately connected with dilated bronchial cells, or rather its frequent precursor and cause, is the *dry catarrh* of Laennec, a few remarks on which will place all the characters of the former disease more completely before us, and will help, also, to enlighten us on the treatment. The anatomical characters of the dry catarrh are swelling, together with an obscure redness or violet hue of the mucous membrane of the lungs. This swelling is most remarkable in the smaller branches, which are indeed sometimes almost completely obstructed by it. They are frequently blocked up by a glutinous kind of matter, of a pitchy consistence, or somewhat firmer, disposed in globules of the size of hemp or millet-seed. This matter, which many persons, who do not think they have the disease, expectorate in small quantities every morning, is called by Laennec pearly expectoration. The physical signs are the same, very nearly, as those of dilatation of the air-cells, which, as already remarked, so generally accompanies this disease.

The term dry catarrh involves a contradiction, since the word catarrh itself denotes a flux or discharge. Laennec, who admits this etymological mistake, has chosen, notwithstanding, to designate in this way those inflammations of the bronchia which are attended with little or no expectoration. The coughs called gastric, hepatic, hysteric, &c., are all, according to this writer, examples of the coexistence of dry catarrh with some affection of the particular organs whence their qualification is derived.

I prefer the more pathological name, *bronchial congestion*, given to this disease by Dr. Williams. The symptoms of this affection are those rather of asthma than of bronchitis. They vary according to the extent of the affection. In its slightest degree it is presented by those individuals, who, every morning on waking, feel their breath rather short, until they have coughed up a little tough, semitransparent mucus. In its severer degrees, that is, when more of the bronchial membrane is affected, the shortness of breathing

may amount to a regular fit of asthma, accompanied by cough; and this may last more or less for hours and even days, and be at last relieved by the expectoration of the scanty, tough mucus just mentioned. There is little or no fever or sign of inflammation present; only sometimes a sense of constriction and heat, or rather of stuffing in the chest; but there is often much gastric disorder; the tongue is slightly furred; the uvula relaxed; the tonsils congested; digestion imperfect; the liver inactive; the bowels torpid, or liable to extremes; the hemorrhoidal veins swelled; and the urine turbid. Excesses in diet, the sudden removal of cutaneous eruptions, suppressed gout, and sudden checks given to perspiration, or any other free secretion, occasionally excite this affection. These causes, operating on systems not much disposed to inflammatory reaction, such as those of a torpid habit of body, destroy the balance of the capillary system, and occasion an undue distension or congestion of certain parts of it.

Of the accuracy, also, and practical value of the following remarks by Dr. Williams, I am fully persuaded, when he says:—"This bronchial congestion may doubtless originate sometimes in inflammatory affection of the same part; but according to my experience, it is more commonly the result of disorders of the digestive or other organs which tend to injure the tone of some or other part of the capillary system. Thus, these will, in some persons, locate this congestion in the capillaries of the face, harming nothing but their beauty; in others the encephalic vessels suffer, whence habitual headaches of an obstinate character arise; in others some part of the alimentary canal is the seat, whence indigestion, hemorrhoids, or some disorder of the alvine function ensues. So, too, the urinary or the genital organs may become the place of this congestion; or it may fall on the bronchial membrane, and induce the affection under consideration; and the local determination of the morbid vascular condition is, in individual cases, fixed on particular parts or organs in consequence of prior weakness or tendencies."

The *treatment* of dilatation of the air-cells and that of dry catarrh is to be conducted on similar principles. In both there is congestion of the cells, with imperfect and thick secretion. Both are marked in their course by paroxysms of asthma, often of great violence and frequent recurrence, and disorder of the heart, and occasionally other organs out of the chest. The pathology of pulmonary emphysema, and of its common antecedent, dry catarrh or bronchial congestion, is that of the chief forms of asthma, if we except the simple nervous; and must therefore be steadily held in view if we would properly appreciate the directions for its alleviation or cure. Various exciting causes, among the chief of which are cold and indigestion, will bring on an attack of asthma: but the predisposition depends on the habitual state of the mucous membrane and air-cells of the lungs just now described. To the removal of these latter, therefore, ought our efforts to be directed, rather than to the warding off of a paroxysm of simply spasmodic asthma. It must be confessed, that our prognosis, as far as relates to a speedy, or, in some cases, an entire cure, of the disease under consideration, is not very favourable.

Our difficulties, however, will induce us to press on all persons the importance of arresting, as soon as possible, those affections which are so often neglected or trifled with, on account of their being 'mere coughs,' or 'common cold,' — 'slight influenza,' &c.

Bronchial congestion, although it may have an inflammatory origin, is seldom of such a nature as to require active antiphlogistic measures. Not unfrequently, indeed, I have seen it prevail in persons of a lymphatic temperament, disposed to anemia, and who could illy bear such a treatment. In place, then, of direct depletion by bloodletting, either general or local, we ought to have recourse to derivation by moderate purging, applications to the skin of tartar emetic, &c., and a due regulation of the secretions by mild aperients and alteratives, with which some of the narcotics, such as hyosciamus, stramonium, or conium, may be usefully conjoined. I have seen in some cases of dry catarrh decided benefit from the prescription of colchicum. There is a class of remedies of which Laennec and other practitioners subsequently have made large use, and on which they have bestowed liberal commendations. I refer now to the alkalies. They are supposed to be efficacious by increasing the flow of bronchial secretion, removing the obstructing mucus already secreted, and attenuating or dissolving the tenacious sputa. In this way they tend to unload and reduce the congested membrane, and thus to relieve the dyspnœa that arises from tumefaction. With Dr. Williams I would say, I am far from wishing to extol chemical medicines in general; but, in the present instance, we may bring chemistry to our aid, in order to explain the action of alkaline attenuants. We know that we can, by the administration of alkaline medicines, render the urine alkaline, and increase the alkaline qualities of the blood. Now, there is no solvent of mucus more effectual than alkalies, and it is easy to perceive that an alkaline state of the bronchial secretion can scarcely be compatible with the formation of tough, solid mucus. Dr. W. found these remedies very effectual, and he is in the habit of giving either the liquor potassæ (ℳxx. to xxx.), carbonate of soda (gr. xv. to xx.), or carbonate of ammonia (gr. iij. to vj.), according to the character of the case, three or four times a day, with squill, ipecacuanha, or colchicum, and some narcotic, as may be indicated by the general state of the system and the prevalence of particular symptoms. I more commonly, myself, prescribe the sub-carbonate of potassa, in doses of from three to five grains, with wine of colchicum, thirty drops, in a simple syrup or mucilage, three or four times a day. I have found, in the catarrh of infants of the most tender age, the carbonate of potassa in minute portions, with a few drops of ipecacuanha wine, camphor mixture, and simple syrup, one of the best combinations for promoting a ready secretion and allaying the cough without offending the stomach. The propriety of the addition of laudanum will be judged of by the circumstances of the case. The preferable plan, it has seemed to me, when we desire to obtain positive and appreciable results by the administration of an alterative, such as the alkali, is to continue it at regular and not long intervals for a protracted period; and even to give it in the drink of the patient. It will, therefore, be better to direct

opium or one of its preparations,—laudanum, morphia, &c., separately, once or twice in the twenty-four hours, than add it to the alterative; and thereby either interfere with the freedom of administration of this latter, or complicate therapeutical results in such a way as to prevent our telling certainly the effects of the chief article prescribed.

A due regulation of the diet is, of course, indispensable for a cure. To this end all rich, acid, and irritating articles of food should be avoided. Tonics, the best of which are the sulphate of quinia and the sub-carbonate or the muriated tincture of iron, will be advantageously administered, after the other remedies have been used, to abate or remove the congestion. These will then contribute to preserve the balance between the several organs, and to allay the excessive sensibility, both of the bronchial mucous membrane and of the skin. By acting on this latter, we can often more safely remove the irritability of the former surface; and with this view the cold bath has been, not seldom, employed. For adults, whose constitutions are not yet broken down, and in whom congestions of the abdominal viscera are not complicated with those of the bronchia, and who are liable to paroxysms of asthma, from changes of temperature or slight exposures to cold, the cold bath offers a means of amelioration if, not of positive prevention, of such attacks. It should be used in the morning on rising.

I have said, that, in a paroxysm of dry catarrh, the shortness of breathing may amount to a regular fit of asthma accompanied by a cough. The resemblance is equally manifest in the morbid anatomy of the two diseases, which, in catarrh, was stated to be congestion of the bronchial mucous membrane with an obscure redness or violet hue of this part. Persons when suffering from dry catarrh have, the greater part of the time, a cough which may be called asthmatic, although it should be added, they seldom, some never, have a perfect paroxysm of asthma. Nor can it be asserted that in all, perhaps not even in the majority of cases of asthma, is there bronchial congestion; so, on the other hand, we know, that there may exist intense bronchitis, and also pulmonary engorgement, in which there is retarded and impeded circulation through the mucous membrane, without asthma proper resulting.

Asthma. — Having, so far, introduced the subject of this disease to your notice, I may as well at once sketch for your introduction its leading features and outlines of treatment. Asthma is generally admitted to depend immediately, as its proximate cause, on spasmodic contraction of the muscular fibres of the bronchia. The remote and exciting causes by which these are brought into irritative action are numerous, and somewhat diversified; but they may be arranged into two chief classes, viz.: — 1, those which act on the bronchial circulation, either directly, as certain states of atmosphere, some gases, and diseases of the heart, or indirectly, by morbid impressions on the skin, as of cold and moisture, or on the stomach either by undue repletion, or by excitement of its mucous membrane transferred by sympathy to that of the bronchia; 2,

those which act on the nerves of the bronchia and pulmonary tissue, as certain effluvia, and mental emotions, &c.

For the most part, however, there is a blending of the two, nervous irritation and capillary congestion; while, at the same time, the predominance of one or other will vary the features of the disease, and give rise to difference of nomenclature, as when we speak of *nervous asthma*, *congestive asthma*, and *catarrhal asthma*. According as the two elements, nervous and capillary, are equally blended, will be a tendency in the solution of the disease or abatement of its extreme violence, at any rate additional symptoms, by bronchial secretion, and hence we shall have *mucous asthma*, and *pituitous asthma*. A more correct view of these two last varieties would probably be, to regard the asthmatic as supervening on the original lymphatic, or phlegmatic temperament, the individuals of which have a constitutional tendency to a free secretion of mucus from the bronchial pulmonary membrane.

The *symptoms* of asthma are quite characteristic. After some disturbance of the digestive system, langour, irritability and depression of spirits, of more or less duration, the patient is awoke in the night, for that is the chief time of attack, by great difficulty of breathing, with a sense of tightness and constriction of the chest, and a feeling of inability to expand it freely. He rises up, leans forward with his elbows resting on his knees, or perhaps he clutches the bedclothes if he do not support his head with his hands, which together with his arms become a fixed point, the better to allow of the muscles common to the upper extremities and chest to contract now with all their force for the expansion of the latter. The breathing is excessively laboured, and is made with a loud and wheezing sound or rather noise, heard at a considerable distance. Instinctively, as it were, the sufferer now cries for air, rushes to any opening, whether of a door, or preferably still a window, where he can inhale fresher and cooler air. No matter how inclement the season, he will sit for hours at an open window, with head projecting out; and what would seem extraordinary, often without any additional inconvenience on the score of catarrhal complication or other serious pulmonary disease. It would be wrong, however, to assert that there is always immunity of this nature. I have known more than one of my patients suffer severely from an exposure of this kind; and hence I advise that the external surface be well protected by warm clothing, even put on up to the neck, while the sufferer inhales the outer cold air. The extremities are cold, while the skin of the trunk is often bedewed with sweat. The expression of the face varies, from that of haggardness and contraction, to fulness and flush. The pulse, also, is different, not only in different cases, but in the same case at different stages of the paroxysm. Sometimes it is small and frequent, as in the inception of most great disturbances of the nervous system; and afterwards acquires volume and resistance. Time unfortunately is given for these changes to be gone through in some cases of paroxysms of asthma, the duration of which is one, two, and even three days, with perhaps an abatement, but no distinct remission in

the early part of the day. More commonly, the paroxysm subsides as the morning advances, and the patient is up and about, attending to his daily vocations, or indulging in his daily pleasures; his fitness for which is rendered doubtful, notwithstanding his own declarations, by his shorter breath after any slight bodily exertion and necessity for pause, in speaking, after a sentence or even before its completion. He cannot assume the horizontal posture without inconvenience and a feeling of imperfect breathing.

You will have seen in the preceding brief description of symptoms, that there is laboured contraction amounting to spasm of the muscles generally, including both those of relation and those of organic life; and particularly of all those concerned in respiration. So evident is this, that it gives the finishing feature, the great characteristic of asthma, which would not be asthma without it. In this view of the subject, I do not see the necessity of the prefix *spasmodic*, for, as I have just said, the disease would not be asthma wanting spasm. Less objection applies to the other qualifying or expletive terms to which I adverted a little while ago, as they serve to designate some new, albeit occasional feature of the disease.

The organic seat and cause of asthma are inferred from the symptoms rather than demonstrated by *post-mortem* examinations. No perceptible change in the muscular fibres or supplying nervous branches of the bronchia are met with in those who have died during an asthmatic attack or from other diseases after years of suffering from asthma. The remark may be extended so as to include all the component parts of the bronchia or bronchio-pulmonary organs. Nor can we regard bronchial congestion and inflammation, as in the cases noted by Parry and subsequently by Andral, in any other light than occasional accompaniments, but not direct causes of asthma. At the same time we must admit that this state of the bronchial mucous membrane, whether it exists primarily or as the result of sympathetic gastric disease, will often singularly aggravate the paroxysm. The frequent recurrence of asthma, even though we should suppose it at first to be purely nervous, will produce congestion of the bronchial membrane, which, in its turn, will increase the susceptibility to the primary disease, and contribute also to cardiac disturbance by obstruction thus offered to the pulmonary circulation.

To the *causes* of asthma I have adverted in the beginning of these remarks. They are predisposing and exciting. The former include hereditary transmission, chronic diseases of other parts, as of the digestive and uterine systems, cutaneous disorders and gout; and in a more especial manner catarrh and eruptive fevers, such as measles, which spend their force on the bronchial membrane. Of the influence of the gastric over the bronchial mucous membrane in the production of asthma, we have continual proofs. Every person subject to this disease must have suffered at some time or other, in his own case, from a paroxysm brought on by excessive repletion in the use of particular ingesta. The danger is greater if irregularities of this nature are indulged in at night. A supper of lobsters or of fried oysters, for instance, will bring on an attack in the

night. The same articles eaten in the day, at an early dinner, might only have induced some degree of oppression and hurried breathing. I do not say that escape will be enjoyed even at this time, but at any rate the chances of such exemption will be greater.

But I have passed from the predisposing to the exciting causes in my last illustration. Of these latter, the most frequent are errors of regimen, the sudden and unequal application of cold, such as in common would produce catarrh, also strong mental emotions of a depressing character. Odours which are not even always offensive or perceptible to persons in health, will bring on asthma. I know a gentleman who has long suffered from the disease, and in whom invariably a paroxysm is produced by his sleeping on a feather bed, or resting his head on a feather pillow, or in a room in which there are feathers. As association and imagination act powerfully on the nervous system, it may be supposed that they would be operative in this case, but in some instances this gentleman has had an attack without his knowing until afterwards that he had been at all exposed to these emanations.

Particular but often inappreciable states of atmosphere will give rise to asthma in those predisposed to the disease. Sometimes, indeed, the contrasts are sufficiently marked to be felt by persons generally, as between the air of a town and that of the country, the air of elevated mountainous region or of the sea coast, and that of a low marshy district; each of which will affect asthmatic subjects, but sometimes in an opposite manner—that which is a morbid cause to one proving salutary to another. In some, spring or autumn is the season of attack. In a case for a long time under my care, the number and violence of the paroxysms through the year were reduced, so that the chief attack was in summer, and commonly in the hottest month, or July. The case of a gentleman in Baltimore, related to me by himself, is familiar to many. He cannot sleep at his country-house, although it is but a short distance from the city, without an attack of asthma being brought on in consequence. One asthmatic person on first breathing sea air after many years of suffering, expands the chest with delight, and exclaims, I live again! Another must run away from the sea shore on account of the paroxysms being renewed by going there after residence inland, in town. Dr. Watson, in his Lectures, tells of a college acquaintance of his, who, of two inns in Cambridge, can sleep in one of them, but not in the other. "Nay, he is thus variously affected within much narrower limits." When in Paris he never escapes a fit of the asthma, if he attempts to sleep in the back part of Meurice's Hotel, and never suffers if he sleeps in a front room. He cannot rest in Manchester Square (London). This he attributes to its being built upon piles.

In connection with certain odorous emanations, I might have mentioned the well ascertained fact of ipecacuanha causing dyspnœa and asthma in some persons, not only when present during its reduction to powder, but even if a parcel or bottle of it be opened.

When speaking of the etiology of asthma, age and sex are to be studied. The disease is represented to be a disease of adult age and as rarely occurring in early life. In the correctness of this view I

cannot coincide; as I have had patients of tender age suffering from the disease, and have known of others similarly circumstanced. Men are much more liable than women to its attacks.

Treatment. — As in the pathological outlines of the disease which I sketched for you at the beginning of this lecture, I did not deem it necessary to repeat the systematic divisions of asthma, so I shall not pretend to specify the mode of treatment for each of these, believing them, as I do, to be refinements without practical utility. It will be sufficient for all useful purposes to shape our therapeutical measures according to the indications furnished, first, by the relative predominance of the elements of nervous or congestive disorder of the bronchia; and secondly, by the nature and extent of the exciting sympathetic irritations of other organs. After having observed all the symptoms, not in an abstract manner, but as representing functional disorder and organic lesion, we can direct our remedies accordingly. When hereditary predisposition is present, our prognosis of ultimate cure will be less encouraging, and the treatment generally less active. If error in regimen has preceded a paroxysm so as to render it probable that the relation between the two is really that of cause and effect, we should proceed at once to rectify the error by the removal, if possible, of cause. For this purpose an emetic is often serviceable, both by freeing the stomach from the offending matter and by acting on the par vagum and the bronchial muscles and membrane supplied by it; in fine, by giving rise to a reflex action similar in its course but different in its operation from that which gave rise to the paroxysm. I have derived unequivocally good effects in more than one obstinate case from tartrate of antimony, at first to vomit, and afterwards, in smaller doses combined with opium, to remove spasm which may still have persisted after the emetic. In other cases, in which there is much flatus of the lower bowels, or in which prior constipation has existed, an enema of castor oil with spirits of turpentine or of assafœtida mixture will relieve the digestive disorder, and, at the same time, mitigate greatly the force of the respiratory disturbance. In some cases, again, the manifestations, both from the prior history and actual symptoms, are such as to justify venesection or detraction of blood by cups to the chest, both of which I have found serviceable, in giving relief at the time and in preparing the general system to be more directly and favourable impressed by the common antispasmodics and narcotics. Bronchial congestion or pulmonary engorgement associated with cardiac disease, will, as already remarked, contribute powerfully to the bringing on an attack of asthma. Their removal by sanguineous depletion will correspondingly contribute to that of the paroxysm which at the time most engages attention.

When asthma follows the retrocession of chronic cutaneous eruption, or the drying up of old sores, or alternates with gout, the indications are sufficiently clear, viz., to restore the external disorder or bring on the asthmatic paroxysm in the usual way. Immediate cutaneous excitement is to be induced by the warm or rather the moderately hot bath of 100° F., sinapisms to the extremities and the precordial region, and assiduous friction of the chest and spine with terebinthinate and other stimulating liniments.

For asthma supervening on catarrh or other bronchial inflammation, the treatment in the main will be that adapted to the primary disease, without allowing our attention to be diverted from it by the more violent asthmatic paroxysm. In such cases, while we still administer the remedies required by the phlogosis, congestion, or irritation, as the case may be, of the bronchia, we may, however, both allowably and advantageously combine with them certain articles of the commonly recognised antispasmodic and sedative or narcotic class. Thus, for example, to tartar emetic or ipecacuanha and the alkalies we add more freely tincture or extract of stramonium and belladonna than in common cases. A favourite prescription, with me, in mixed cases, including those of chronic gastro-intestinal disorder, is of blue mass and extract of stramonium, in the proportion of three grains of the former to two of the latter, taken every three hours until relief is afforded. If from any cause the blue pill be inadmissible, ipecacuanha may be substituted. Often I add it to the articles already mentioned in the proportion of one-fourth to half a grain.

During the paroxysm, when recurring habitually and without any notable complications which require the treatment that I have just sketched, various remedies have been recommended. Of emetics I have already spoken — giving the preference to tartrate of antimony, although ipecacuanha has most suffrages in its favour. Among the narcotics, stramonium and lobelia inflata have been much extolled. The popular, and in the minds of most people, the only way of using the former is by smoking the leaves, or the stalk or root dried. I prefer much the extract taken by the mouth, as affording a preparation of more uniform strength, and the dose of which can be more accurately measured than by the common fashion of smoking. Still greater uniformity of result might be anticipated from the tincture, but of this I cannot speak from my own experience as in the case of the extract. Of this latter, the dose will vary from half a grain to two grains, taken every hour or two, until its narcotic effects are manifested in a decided manner by its action on the brain and senses, and dryness of the fauces and throat, &c. In one of the most obstinate paroxysms that I ever witnessed, I gave twelve grains of the extract in two grain doses, with the effect of making the patient crazy for a time, but of entirely removing his asthma. After numerous trials I place more reliance on the extract of stramonium than on any other one remedy in resolving a paroxysm of asthma. Nitrate of potash and squills have been occasionally serviceable in this way, when given at short intervals and in adequately full doses. Counter-irritants over the cervical vertebræ produce, in some instances, good effects. A blister to this part has seemed to me to mitigate the force of the paroxysm. But, in general, I rely more on this class of medicines during the interval for the prevention of an attack than to remove it when it has actually come on. With this view I have directed plasters of tartar emetic to the chest, and the ulcers kept open by the occasional application of ointment of the same.

Coffee drunk very strong has been highly extolled by Pringle, Bree, and other writers on asthma. Its effects are uncertain and equivocal. Of the utility of galvanism I am a stranger, never having seen it used in this disease.

As in all other diseases in which the nervous system exerts predominant influence, and which are liable to occur either periodically or at irregular intervals, the most success is to be hoped for by a perseverance in judicious measures of a preventive character during the period between the paroxysms. These will be partly hygienic and partly therapeutic; and should be so directed and carried out as to include an entire system of regimen in the large sense and the judicious use of medical tonics and some alteratives. I need not enlarge on these topics, after having so recently pressed them on your attention, when describing the hygienic treatment and prophylaxis of chronic laryngitis and chronic bronchitis, and in a more particular manner of dry catarrh or bronchial congestion. They are strictly applicable to the preventive management of asthma.

Tonics, at times of undoubted service, must not, however, be employed as they too often are empirically and without reference to the state of the gastric and the bronchial mucous membranes, phlogosis in either of which contraindicates their use. The season and locality will influence us to prescribe quinia in some cases; and the complication with anemia or an otherwise impoverished state of the blood and enfeebled and disordered nervous system, will point to the use of chalybeates.

To the class of tonics belong travel, free exercise in the open air, frictions of the skin, and gymnastics. I have seen this last, after being regularly pursued for a while, protract the period between asthmatic attacks in sickly youths, and eventually almost remove the disease. Cold bathing, in the safest fashion of simple ablution of the surface after rising, has been strongly recommended by many writers on the disease. In some cases I have seen it useful; in others, in which the reaction was slow and imperfect, it seemed to cause catarrh and aggravate the disease. Drinking mineral waters and especially those of the sulphurous class, for a season, has been productive of manifestly good effects; but in making a selection much will depend on the disorder complicated with the asthma, and also on the toleration by the patient of the air of the locality in which the springs are found.

LECTURE LXXXVIII.

DR. BELL.

PERTUSSIS: HOOPING-COUGH—Its double connection—with the respiratory and with the nervous system—Analogous to asthma—*Symptoms*—*Duration*—Two periods—the precursory or catarrhal and the convulsive or hooping—Value of auscultation during the interval—*Causes*—Contagion the commonly recognized exciting cause.—Predisposition by early life—in boys more than girls—Complications — Bronchitis the most frequent — Morbid anatomy not clearly defined—Nervous origin probable—*Diagnosis*—*Treatment*—To be useful should be early and decided—Antiphlogistics followed by narcotics and antispasmodics —Counter-irritants to spine—Change of air—Vaccination—Attention during the paroxysm.—SUMMER CATARRH—SUMMER BRONCHITIS—Is not different from bronchitis of other seasons, except in its more strict periodicity—Outlines of treatment—Probable prophylaxis.

PERTUSSIS — HOOPING-COUGH. — The disease of which I am now to

speak has, in addition to these names, the first the recognised technical, the second the popular one where the English language prevails, been called also *tussis ferina*, *tussis convulsiva*, *chincough*, and *coquelucche*, the common French term, and *kink hoart* the German. Hooping-cough, if we regard the chief symptoms and seat of its pathognomonic one, the hoop or kinks, belongs to the class of diseases of the respiratory apparatus, and more particularly to the bronchial family. Reference being had to its convulsive character and some of its complications, it is claimed by some writers to belong to the Neuroses. I regard its alliances to be with those first mentioned, and accordingly introduce it after a description of the varieties of bronchial inflammation and congestion, and more immediately following asthma, which is itself of a somewhat compound nature, or neuro-bronchial.

If I were desirous of entering into detailed descriptions of all that belongs to hooping-cough, direct and collaterally, under the head of its symptomatology, progress, and duration, its complications, diagnosis, prognosis, causes, and treatment, it would be easy for me to do so without much trouble by drawing from the late work of MM. Barthez and Rilliet, heretofore often quoted and referred to in these lectures. But as my aim is practical, I must be brief; and just now there is the more necessity, from the great number of important diseases of the thoracic cavity, and, in fact, of the lungs, being yet to come before us for investigation.

Symptoms — Duration. — Hooping-cough is characterised by a convulsive cough returning in paroxysms of indefinite duration. This cough consists in a series of very short, abrupt expirations, which are followed by a long, hissing, and sonorous inspiration called hoop; the former is accompanied by a considerable, and, to all appearances, often alarming congestion of the facial and cephalic vessels; and the paroxysm is terminated by the expectoration and expulsion of ropy mucus, and not unfrequently by vomiting.

Systematic writers have described three periods of the disease,—the first or prodromes, — the premonitory — consisting of simple catarrh; the second of cough with hooping or kinks; and the third of a diminution, cessation, and modification of the hoops. It will be sufficient for all useful purposes if we admit the two first periods, viz., the preliminary or catarrhal, and the convulsive or hooping-cough. But even this order of appearances is not uniform; in some cases the hoop is the first evidence of disease; in others it precedes the catarrhal symptoms. Most commonly, however, the disease is ushered in by a catarrh, or we might rather term it simple bronchitis, which presents no peculiar symptom or matter for special diagnosis. Its duration varies from six to eight, ten, and fourteen days. Dr. Lombard, in his account of the epidemic hooping-cough at Geneva in 1838, noticed its being, in some instances, as long as a month and six weeks. The convulsive cough of the second period presents notable differences in its violence, the length of the interval between its returns, and the secondary symptoms more directly resulting from it. Sometimes the hoop comes on at once; at other times it is preceded by a tickling in the throat, and pains referred to the sternum. Occasionally the cough is preceded by nausea of some minutes duration; more frequently the face assumes an expression of restlessness; the

eye is shining; and irritability and peevishness succeed all at once to a lively and playful mood. The patient becomes uneasy, and if he is lying down he suddenly springs up into a sitting posture; if standing he hurries forward to grasp any solid and stationary object, or even a person near him, to serve as a fulcrum or point of support, moved probably by the same instinctive feeling that I noticed when speaking of asthma. Then supervenes the cough already described as consisting in several short, abrupt expirations, followed by a deep, sonorous, hissing and noisy inspiration, and after this an expectoration of ropy mucus, and sometimes vomiting. Several of these fits of convulsive cough may come on in quick succession, and this is sometimes the case during the height of the disease. To the symptoms of co-existing congestion are occasionally added hemorrhages from the mouth, ears, and lungs; or epistaxis, ecchymosis under the conjunctiva, incessant sneezing, and involuntary evacuations. The fit having terminated, the little patient recovers in degree its wonted expression, saving its watery eyes and somewhat tumid eyelids, and engages in its customary sports. The disease is generally apyretic.

The symptoms furnished by auscultation in hooping-cough are not of a decided character — provided the disease be simple. We can, indeed, hear the sounds proper to catarrh, but often no more. Between the short, sudden fits of expiration a common vesicular or slight wheezing sound may be heard; during the inspiration, again, nothing is heard, the air not reaching, it is supposed, the minute bronchial divisions, still less the vesicular terminations. Of small value, therefore, is auscultation during the paroxysm; but during the interval we can draw important deductions from it for diagnosis, by learning whether there are any complications, and of what nature and extent.

It is not easy to designate precisely either the duration of the fits of coughing or their repetitions in a given period. The number in the twenty-four hours generally goes on increasing for the first three or four weeks of the disease. Then, after being stationary for a while, they diminish in frequency. The precise period of the greater number of the attacks is in the night. They often come on without any obvious exciting cause; but at other times they may be referred to momentary irritation of the feelings, strained bodily exertion, or even to a simple change of posture. In other cases too rapid deglutition, cold, strong odours, smoke, and even the sight of another child hooping, will bring on a paroxysm.

Causes. — Pertussis is usually regarded as contagious. It may appear sporadically, and, also, epidemically; during the latter occurrence alone it is believed by some to be contagious. Without denying its transmission in this way I believe that in a great many, if not in the majority of cases, it will be difficult to assign to it any such etiology. As only attacking a person once in his lifetime, its analogy to other admitted contagious diseases is plausible. The greater predisposition in subjects of tender age is a fact of familiar observation. Of a hundred and thirty children with hooping-cough, whose cases were noted by M. Blache, a hundred and six were assailed between the first and seven years from birth; and twenty-four only from eight to fourteen years. Sex seems to have its influence, from the fact of girls being more subject to the disease than boys.

Complications. — These are special, direct and collateral. The former include convulsions and spasm of the glottis; the second, bronchitis, emphysema, pneumonia, and certain hemorrhages resulting from obstructed pulmonary circulation; and the third include derangements of the digestive canal, dropsies, tuberculisation, pleurisy, and laryngitis. This list of the last subdivision might be extended, if I were to follow the enumeration laid down by some writers.

Convulsions are far from being uncommon in their association with hooping cough, and add greatly to its danger, especially if they supervene directly on the paroxysm. Glottic spasm may be developed during the course of hooping-cough, and, as may well be supposed, renders the prognosis more grave.

But little difference of opinion prevails as to the frequency of bronchitis in complication with pertussis. MM. Barthez and Rilliet noticed it in half of the fatal cases of which they possessed authentic records. Dilatation of the bronchia occurred in the majority of these, and during life the symptoms were often of a nature simulating phthisis. Pneumonia, so often if not generally complicated with bronchitis, shows itself also in connection with pertussis, and for the most part in a lobular form. Disorder of the digestive system, and particularly of the stomach, generally accompanies hooping-cough, as if almost to form a part of this disease. Hemorrhages, with the exception of epistaxis, are seldom met with. Of the other diseases precedingly mentioned I need not speak, so unusual is their appearance with, or consequent to, hooping-cough.

If, after enumerating the complications of hooping-cough with other diseases we inquire into its special pathology and seat, we are obliged, as in the case of asthma, to reason from analogies and phenomena rather than from direct organic demonstrations. That the nervous element of the disease is evident and constant cannot be doubted. Its convulsive character, its occurring in paroxysms, and its being in a measure periodical and apyretic, as also the fit being brought on by mental emotions, are so many proofs to this effect. It has been observed, moreover, that cough with hooping and intermittent paroxysms have followed in cases of irritation of the pneumogastric nerves by bronchial tubercles. But, even admitting its nervous characters, we cannot help seeing, at the same time, that hooping-cough is something more than a neurosis, an inflammation of the pneumogastric nerve, as contended for by Kilian, Breschet, and others.

Different from the neuroses, this disease is transmitted (probably) by contagion, reigns often epidemically, and attacks a person but once in his life. Hooping-cough would seem, therefore, to manifest an affinity both to the exanthemata and to convulsive diseases.

Most of the phenomena of the disease are explicable by a lesion of the pneumogastric or eighth pair of nerves. The vomiting, for example, is the result of irritation of the pulmonary branches transmitted to those of the gastric mucous membrane. The long hiss and hoop which follow the short and abrupt expirations depend on a spasmodic constriction or partial closure of the glottis by the action of the recurrent nerve. The hissing is, in fact, analogous to that

already discussed under the head of spasm of the glottis. In the first stage of the paroxysm, the short, sudden expirations, by emptying the lungs of air, give rise to the marked and alarming symptoms at its close. Hematosis is suspended: the venous blood is thrown back on the superficial vessels and capillaries which are now in a congested state; and hence the swelling of the face, the livid colour of the skin, epistaxis, and conjunctival ecchymosis. The brain suffers by this retarded circulation and accumulation of venous blood, and headache, drowsiness, and sometimes convulsions are the result. It has been surmised that the medulla oblongata is the part of the encephalon which is more immediately affected.

Such, however, is the tendency to complication of disease of the tracheo-bronchial mucous membrane with hooping-cough, that good observers (Jadelot and Guersent) describe, as almost constant, either redness or ulceration of this part.

Little difficulty is entertained respecting the *diagnosis* of hooping-cough, owing, it is alleged, to the ease with which one can distinguish the peculiar sound or kink. But, besides that there are several degrees of violence of the disease, we sometimes meet with cases of acute bronchitis and of phthisis pulmonalis, also, in which the kink is very sensible, and were we to receive this as a pathognomonic sign we should be tempted to declare that the cases were ones of hooping-cough. By attention to the following differences between this latter and bronchitis, the diagnosis may generally be reached with sufficient accuracy. In hooping-cough, the catarrhal period precedes the hoop in a vast majority of cases, — the kink is associated with hissing and ropy expectoration, and almost always vomiting. It is in general apyretic, and unaccompanied by accelerated respiration in the intervals of the fit: the respiration, also, is pure. The kinks, whether more or less frequent, preserve the same character; after a while they decline, the cough becomes simply catarrhal, and the child is convalescent, if no complications supervene. No relapse.

In acute bronchitis with kinks, on the other hand, these are often heard at the very outset. They are in general shorter and less violent, and the hissing is either wanting or is weak and intermittent; there is little or no expectoration or vomiting. The disease from the very beginning is accompanied by intense fever and accelerated breathing, which goes on progressively augmenting. Sibilant and mucous rhonchus, and afterwards sub-crepitant are heard. There is extreme smallness of the pulse, paleness of the face, and the disease ends almost always in death, commonly within a short period. Relapse may occur.

When, continues MM. Barthez and Rilliet, to whom I am indebted for the preceding contrasted pictures, hooping-cough and bronchitis with kinks continue for some time, they present a remarkable similarity to each other. Both are accompanied by emaciation, phthisical habit and hectic fever.

There is yet another disease marked by convulsive cough, which it is still more difficult than bronchitis to distinguish from hooping-cough. I refer now to tuberculisation of the bronchial ganglions. When this latter is in its more advanced stages, the stethoscopic and

general symptoms are sufficiently characteristic: but when confined to the ganglions, the work of diagnosis is no longer so easy. The following are the distinguishing characters of the two diseases, as laid down by MM. Barthez and Rilliet. In tubercles of the bronchial glands the cases are isolated without any suspicion of their resulting from contagion. There are no distinct periods. The kinks are for the most part short, without hissing, ropy expectoration, or vomiting. There may be physical signs of bronchial tubercles. There are paroxysms of asthma, in some cases alternating with the hooping, continued fever with evening exacerbations, sweats, progressive emaciation, &c. Sometimes the tone of the voice is veiled as it were. The disease pursues a chronic course.

In contrast with these symptoms we find hooping-cough to be often epidemic, attacking many children at once, and transmissible by contagion. There are three (two) distinct periods, in the second of which alone there is hooping. This last is accompanied with hissing, ropy expectoration, and vomiting. The breathing is pure in the intervals of the kinks, and the pulse is natural unless complications be present. The voice also is natural: the progress of the disease mostly acute.

The age of the subject, and the causes under which the disease may have originated, are, also, to be inquired into, and the probability, by hereditary transmission or constitution, of bronchial tubercles being present.

Treatment. — On the assumption that hooping-cough is one of those diseases that must run their course, and that it is a neurosis, but without evident organic, certainly phlogistic lesion, the treatment ought not, we are told, to be of the heroic or very active kind. To moderate the violence of the paroxysms and to break their periodical character by giving tone to the nervous system, are represented to be the chief indications for our therapeutical guidance. In these views I do not to any great extent participate. I have so often found the catarrhal and bronchitic symptoms acquire and maintain an ascendancy, and so often been pleased with the active treatment deducible from their complication with the convulsive portion of the disease, that I have no hesitation in prescribing active remedies, such as bloodletting and purging, and sometimes an emetic, from the outset, if the disease attack with any violence. Indeed, I sometimes tell the parents of my little patients that a severe case will be a shorter one, attended with less distress and fewer complications, by furnishing me with good reasons for active treatment. Accordingly, I direct either venesection or local bloodletting by cups and leeches, according to the age of the child and the severity of the cough. I have seen the sufferings of the little patient speedily relieved by cups to the chest, and both the violence and duration of the disease obviously abated by this and analogous means. It requires no strained or remote analogy, from a knowledge of the effects of tartar emetic in other diseases, on the organs supplied by the pneumogastric nerve and especially those of the broncho-pulmonary apparatus, to place faith in its efficacy in pertussis, even if direct experience were at first wanting in its favour. This medicine meets safely the double indications of bronchial inflammation or congestion, and spasm consequent on neurosis, over both of which it exerts a

manifestly controlling influence. If the tongue be loaded and efforts made to eject, in coughing, a thick tenacious mucus, it may be given to vomit; and afterwards in contrastimulant doses.

Abatement of the disease to a greater or less extent procured by these means, we can act with advantage on the secretions from the bronchial mucous membrane by the administration of calomel, with which may now be combined minute proportions of opium or its use alternated with some of the antispasmodics, such as assafœtida. If the catarrhal symptoms still persist with a hard cough or dyspnœa, we revert to the tartar emetic in smaller doses in solution, combined with mixture of assafœtida, or extract or tincture of belladonna.

In milder forms of the disease, after an emetic of ipecacuanha and a mercurial cathartic, we may prescribe with advantage camphor mixture with sub-carbonate of potassa, ipecacuanha wine, and colchicum wine or tincture of belladonna; watching for any bronchitic or pneumonitic complication, and then direct cups or leeches as already advised. I have at different times been pleased with the effect of leeches behind the ears and cups to the nucha—remedies of good report, whether we adopt a cerebral pathology of the disease or not.

You will perhaps say there is nothing peculiar, certainly nothing specific, in this mode of treatment so far, more than you have heard as applicable to bronchitis. This is just the inference I should wish you to draw; believing as I do that, if you act up to the creed in the premises, you will have little call for special remedies or any prolonged serious disease to the annoyance both of the patients and yourselves.

The inflammatory or congestive complications and period over, and the disease reduced to a simple neurosis, recourse may then be had to a class or classes of remedies which, to have given earlier, would have been, to say the least, premature, more probably still, mischievous. Here I fall more willingly than I could conscientiously do before into the routine of practice recommended by most systematic writers, — each of whom, by the way, has his favourite medicine, or prescription rather, for while he praises one particular article of the materia medica he combines it with others which may well divide with it reputation on the score of activity.

Some remedies are prescribed because, while they are allowed to have decided curative powers, their use can be continued for a length of time without detriment. Of these the principal are flowers of sulphur, sub-carbonate of iron, and oxide of zinc. Sulphur was regarded by Hufeland as a specific. He recommended it to be given from the beginning of the disease; while Schneider, Kopp, Riecken, and others, prefer its use at a more advanced period. It may be given in milk or with syrup in doses of from five to fifteen grains, according to the age of the child, three times a day. When there is excess of mucous secretions without corresponding freedom of expectoration, it has been advised to add to the sulphur a little ipecacuanha, in the dose of half a grain to a grain. Subcarbonate of iron, recommended by Dr. Steyman, has had its efficacy tested by Dr. Lombard, who thinks it well adapted to abridge the duration and intensity of the disease, while, at the same time, it improves digestion and the

general health. It is given in doses of from fifteen to twenty grains twice in the twenty-four hours. Oxide of zinc is administered in doses of half a grain every four hours to a child three years old, and a grain and a half to two grains in the same periods in older children.

Of the narcotics displaying antispasmodic and sedative operation, belladonna is most entitled to our confidence. It is given in powder, infusion, syrup, extract, and tincture; the two last are the preferable forms: of the first, one-twelfth to a sixth and fourth of a grain, diffused in syrup, is given twice a day, and of the latter from three to ten drops twice or three times daily. I usually combine with the belladonna, ipecacuanha wine and subcarbonate of potassa—a preparation so often brought to your notice in connection with hyosciamus in catarrhal and the more severe bronchial affections, after suitable depletion.

Hydrocyanic (prussic) acid has had some warm eulogists, among whom Drs. Granville and Roe seem to regard it as the remedy in hooping-cough. Potent when pure even in small doses, dangerous and fatal if there be any notable increase in strength, as has happened from mere difference in the formula even when the same dose was prescribed, and yet so apt to lose its strength by evaporation and become inert, hydrocyanic is one of those doubtful articles on which we can never place reliance for anything like prolonged use either in hooping-cough or in any other disease. More might be expected from the cyanide of zinc in this disease, and in the convulsive neuroses generally.

Of the antispasmodics, so called, assafœtida in American practice has had the greatest reputation. It is given usually in the form of mixture or of tincture; preferably in the former state, in dose varying with the age of the child and stage of the complaint, from ten drops to half a drachm, mixed with syrup, three or four times a day. I almost always direct it with camphor mixture and one of the alkalies, to which, on occasions, a little laudanum is added.

There is yet one other remedy of admitted power that has been prescribed with notable benefit in the disease before us. I now refer to the arsenite of potassa (Fowler's solution) which, as an antispasmodic and exerting a powerful influence on the nervous system, may readily be supposed to be actively remedial in the simple spasmodic form of hooping-cough. I have seen it very speedily control cases of considerable severity and of long standing, beginning in a dose of two drops twice a day, gradually increased to four drops. A safer remedy, although analogous in some important particulars in its operation, is the sulphate of quinia, from which I have also derived good effects in the more advanced stage of the disease.

Revulsives in the shape of counter-irritants to the skin, and applied more particularly to the nucha and along the dorsal spine and also to the chest, have from time immemorial been much used. Of these it will be sufficient to designate oil of turpentine with certain adjuvants; also tincture or juice of garlic, tincture of assafœtida, croton oil, &c. Assiduous friction alone along the spine, two or three times a day and persevered in for a considerable period each time, will be of good service. Warm pediluvia and the warm bath are serviceable in the earlier periods of the disease; the tepid and

shower bath in some of the more protracted, but yet simple cases. Change of air is recognised, among the chief agents of an hygienic nature, as a means of giving speedy and after a little while entire relief to patients who had been brought to a very low state, with emaciation and night sweats, by the duration and violence of the disease.

Vaccination has been spoken of in very decided terms as an efficient means of moderating the violence of pertussis. Of its value in this way I know little from personal experience, and in looking to others for counsel I find the evidences of too contradictory a nature to allow of my reaching a positive conclusion.

During the paroxysm itself some minute but not unimportant matters of detail should be enjoined on the patient or attendant of the little invalid. It ought never to be left alone; and on the coming on of a fit it should be made to sit up and allowed a firm support, particularly for its head, which should rest on the hand of the person who has charge of it at the moment. Mucus collected in the back part of the mouth and pharynx should be detached and brought out by the finger or a feather. With the same view the patient should be induced to take a few mouthfuls of tepid or even cold drink. Where the paroxysm has been violent and unduly prolonged, a compress dipped in cold water and applied to the lower part of the sternum has displayed a tranquillising operation.

Summer Catarrh. — Summer Bronchitis. — Hay Asthma. — Hay Fever. — A troublesome bronchitis attacks some persons uniformly in summer, and owing to the accidental circumstances of individual susceptibility to being strongly impressed by vegetable odours and exposure to emanation from hay, the disease has been supposed to be the product of such exposure, and hence has been called hay fever or hay asthma. But even were we sure that this vegetable effluvium is not a coincidence merely with the coming on of the disease from other causes, we could still only receive it as an occasional cause. Persons living entirely in the city without exposure to any such effluvium are affected in a similar manner.

The peculiarity of this disease consists more in the season at which it makes its attack, and the marked annual periodicity of its visits, even to a particular day in the month, — with some in June, with others in August, — than in any symptom or order of symptoms varying from those of catarrh or bronchitis. It exhibits in different subjects all the varieties of these latter. Sometimes it spends its force on the mucous membranes of the eyes and nose, giving rise to all the unpleasant symptoms of coryza; then, again, it exhibits itself, as in the case of a youthful patient of mine, in the form of catarrhal ophthalmia; but more commonly it settles on the tracheo-bronchial mucous membrane, causing the phenomena of bronchitis with greater or less oppression in breathing, and at times almost simulating asthma. But in no one of its modes of manifestations can it excite suspicion either of any specific cause or of peculiar organic seat or symptomatology.

One diagnostic feature has been assumed for it by some patients and their physicians; in the fact, as they believe, that it will run its course despite of any mode of treatment or attempt at prevention, except in this latter case entire change of air by travelling be pro-

cured. But even this is not always effectual prophylaxis. The marvel here, as respects persistence of definite duration, is not greater, however, than we often meet with in cases of common bronchitis when it attacks certain persons, who will tell you that it is no use for them to take any medicine — their cold will run its course. The fact I believe to be very problematical in either common winter and vernal or summer bronchitis. But, be this as it may, the inference that the disease should be allowed to go on through its entire period without recourse to therapeutical means is erroneous, and leads to mischievous results.

All the precautions required in a case of common acute bronchitis to prevent remoter bad consequences, such as chronic bronchitis, dilated bronchia, development of tubercular disease, are equally demanded in the affection now under notice. In some cases venesection will be required to relieve bronchial and associated pulmonary congestion, — followed by tartrate of antimony and opium. In others cups to the chest, or leeches to the trachea or under the clavicles, and calomel, will answer the same purpose. Those oppressed with tenacious mucus will be relieved by an emetic, and afterwards the use of alkalies with hyosciamus and ipecacuanha. To the aged and the constitutionally feeble we give early, after appropriate evacuation, whether by bloodletting or by purging, tonics, alternating or combined with some of the stimulating gums.

They who may object to a course of medicine, as they term it, will still receive benefit by some revulsives to the skin, such as croton oil or tartar emetic. Considering the strictly periodical returns of summer bronchitis, it would be well worth while to excite cutaneous irritation by these means, and to keep it up two or three weeks, before the usual time for the coming on of the disease. The use of some of the narcotic extracts with sulphate of quinia or a preparation of iron during this period, as also contributing to the same end, would be worth a trial, and, consistently with this view of the case, would be a change of regimen so as to produce a modification of the customary functional actions.

LECTURE LXXXIX.

DR. BELL.

HEMOPTYSIS OR BRONCHIAL HEMORRHAGE.—May be called bloody secretion—Is idiopathic or secondary; the last variety most common—*Causes*,—age, inherited predisposition, certain employments, atmospheric exposures, plethora, compression of the chest—Tubercular diathesis and disease the most frequent cause —Next to this diseases of the heart.—Hemoptysis often vicarious—Apoplectic congestion of the lungs, an effect rather than a cause—Explanation of its origin —*Symptoms*—Quantity of blood discharged variable—The physical signs few—*Diagnosis*, not easy—*Prognosis*—*Organic changes of structure*—*Treatment*—Indications, to arrest the discharge and to prevent its return—Venesection to be freely used at first—Attention to posture—First remedies simple,—cold sponging of the neck and chest—Risk of reaction, unless suitable depletion is practised—Leeches to remote parts,—vulva or anus—Active purging—Peculiarity sometimes following the use of leeches—Sugar of lead—Tartar emetic—Blue mass with laxatives—Astringents—Narcotics and chalybeates.

HEMOPTYSIS OR BRONCHIAL HEMORRHAGE. — Appropriately does

the consideration of bronchial hemorrhage follow that of bronchitis, or bronchial congestion; the former being in truth but a modification of the latter; the discharge of blood giving the relief from the inflammatory congestion of the bronchia in one case which the secretion of mucus and pus affords in the other. In hemoptysis the secreting point may be said to be transcended, and blood is exhaled from the bronchial mucous membrane.

This disease is either primary or idiopathic, or it is secondary and symptomatic. An attention to these two distinct varieties will not only influence our prognosis, but also guide us in the treatment. The first is often without danger, curable with ease, and when cured will leave the person attacked in good health, and open to the common chances of longevity. The second variety, associated as it often is with tubercles of the lungs, is of bad augury; not so much on account of the disease of the bronchia, as because it indicates a certain degree of advance of phthisis pulmonalis. The bursting of softened tubercles into the bronchia is often accompanied with a slight hemorrhage, from the rupture of small vessels, which soon stops spontaneously. But, on the other hand, a rupture of a bloodvessel traversing a tuberculous excavation may give rise to losses of blood of much more gravity, and which may even prove speedily mortal. It is only in such cases as these that there is any foundation for the once current pathology of hemoptysis, in making the disease depend on rupture of vessels. For the most part, it is, as already indicated, a true bloody exhalation or hurried secretion from the capillary exhalent and secreting vessels of the mucous tissue.

The *causes* of hemoptysis are numerous and diversified. The period of life which predisposes to it are of youth and adult age, or from 15 and 20 to 30 and 35 years. As regards sex, women are more liable than men, in the proportion, according to Louis, of three to two: their liability is greatest in the period between 40 and 45 years of age. The sanguine and nervous temperaments are the most predisposed. Persons whose parents had suffered from the disease, or were phthisical, or who are threatened with consumption, are in most danger from hemoptysis. This is increased by certain employments, such as of a tailor or shoemaker, which require the body to be much and long bent forward. Sudden variations of temperature, and particularly change to a dry, cold air, are enumerated among the causes of spitting of blood, which is, on this account, more frequent in spring and autumn than at other seasons. The excitement from long exposure to a burning sun has a similar morbid effect in some instances. Maritime exposures, and particularly those to the east wind, is a too frequent cause of hemoptysis, and should be carefully shunned or abandoned by those who are predisposed to its attacks. If elevated regions have contributed to produce the disease, we must attribute the results rather to the cold, and in the case of travellers ascending high mountains, to the great muscular effort and excessively hurried respiration in consequence, than to the rarefied atmosphere.

Hemoptysis has supervened on protracted mercurial treatment, the use of iodine, the inhalation of irritating gases; also after strong moral emotions, excessive venereal indulgences, and prolonged vigi-

lance. It may be caused by general or local plethora; the latter induced by ardent spirits, loud and protracted speech, the suppression of an habitual hemorrhage, blows on the chest, or compression of this region. Unhappily the examples of the force and frequency of this last cause are multiplied from day to day by the terrific practice of corseting, so general among women, both gentle and simple, beautiful and ugly; whether they be attendants on the ball-room or the church, giddy or serious, religious or profane. It is doubtless owing to this cause that, as M. Andral thinks, consumption is so frequently met with in the other sex. M. Andral, it is true, does not join in this latter opinion.

M. Andral gives the following statement, as the result of his own observations, in regard to the relative frequency of the several modes of connexion between hemoptysis and consumption.

Of the persons whom he had known to die of that disease, one in six never spit blood at all. Three in six (or one-half of the whole number) did not spit blood until the existence of tubercles in the lungs was already made certain by equivocal symptoms. In the remaining two-sixths, the hemoptysis preceded the other symptoms of tubercular disease, and *seemed* to mark the period of its commencement.

By this comparative statement you will see how very frequently hemoptysis occurs as one of the symptoms *connected* with tubercular phthisis. Under this physician's observation it happened in five cases out of six. In the experience, however, of Louis, the proportion, though very large, is not quite so great as Andral found it. Among eighty-seven instances of consumption, there were fifty-seven, or four in every six, in which hemoptysis had been present.

Next, as Dr. Watson truly says, to *tubercular* disorganization of the *lungs*, the most frequent source of pulmonary hemorrhage is to be found in organic disease of the *heart*. It has been stated by Chomel, Bouillaud, and others, both in this country and abroad, that the disease in these cases is most commonly situated in the *right chambers* of the heart. But this is certainly a mistake. The error has arisen from arguing upon erroneous analogies, instead of attending to matters of fact. However, the statement is just as little supported by reason as it is by the result of general experience. The only alteration in the right cavities of the heart which we could suppose likely *à priori* to cause pulmonary congestions, and thereby hemoptysis, would be increased strength and thickening of their muscular parietes — hypertrophy; a morbid condition which is comparatively rare on that side of the heart, and which, perhaps, would not suffice for the production of hemoptysis, even if it did oftener exist. The direct effect, on the other hand, of any *obstacle* to the free passage of the blood in the right chambers of the heart, would be to gorge the *liver*, and the system of the *vena portæ;* and to prevent the lungs from receiving their due proportion of blood. But any material obstruction existing in the *left* auricle or ventricle will impede the return of the blood *from* the lungs, lead to its accumulation in those organs, give rise to mechanical congestion, and so dispose strongly to pulmonary hemorrhage.

Hemoptysis is often vicarious of the menses, and recurs under such circumstances with considerable regularity; discharges of this kind are not always incompatible with life, since they have been known to take place for a period of thirty, and even forty years, as in the cases stated by Pinel. Laennec thinks that suppression of hemorrhoids more frequently gives rise to *pulmonary apoplexy*, which is sometimes an immediate and always a serious though far from a necessary cause of bronchial hemorrhage. Pulmonary congestion and the hemorrhage under consideration are not unfrequently dependent on hypertrophy of the heart, and dilatation also of its cavities. Illustrative of the pathology of the disease and the real origin of the apoplectic congestion, the following remarks of Dr. Watson (*op. cit.*) are quite appropriate: —

"In truth, the morbid condition of the lungs which I am now speaking of, has been badly named. The application, by Laennec, of the term *apoplexy* to the *lungs* was singularly unfortunate; for it suggests an analogy between two things, which, though resembling each other in the appearances which they leave behind them in the organ affected, are yet, essentially, unlike. I have shown you, in a previous part of the course, that cerebral hemorrhage depends almost always upon the giving way of a bloodvessel, in consequence of the morbid brittleness of its coats; while what is called pulmonary apoplexy can very seldom indeed be so caused. The notions which I have been led to form upon this subject differ materially from those which you will find expressed in the works of almost every writer on pulmonary apoplexy. The opinions I entertain were stated several years ago, in some lectures which I was appointed to deliver before the College of Physicians; and I have constantly been in the habit of mentioning them to the pupils of the Middlesex Hospital, and to my medical friends. It is a matter of satisfaction to me to find that they are esteemed to be correct by so sound a pathologist as Dr. Carswell, who has alluded to them in one of his fasciculi on the *Elementary Forms of Disease.* Laennec speaks of the pulmonary apoplexy, as if *it* were the *cause* of the hemoptysis. But this is surely a very incorrect view of the matter. The partial engorgement, and the hemoptysis, are not mutually connected with each other as cause and effect, but they are *concurrent* effects of the *same* cause; of that cause which gives rise to the extravasation or exhalation of the blood in the first instance. A part of the blood so extravasated passes outwards by the trachea and mouth; while a part is forced in the contrary direction, into the ultimate divisions of the bronchi, so as to fill and block up the whole tissue of a single lobule, or of a bunch of contiguous lobules, and thus arises the *circumscribed* variety. Andral conceives that the sanguine effusion *takes place* in the ultimate air-cells; and *he* applies to this form of disease the term *pneumo-hemorrhage*, to distinguish it from ordinary hemoptysis, which he calls *broncho*-hemorrhage; and this I believe to be the true pathology of the *uncircumscribed* variety. But it seems to be vastly more probable that, in the other form of the complaint, the seat of the effusion is in one or more of the larger branches of the air-tubes; and that the blood, a

part of it at least, is driven backwards into certain of the pulmonary lobules, by the convulsive efforts to respire which the patient makes when threatened with suffocation by the copious expulsion of blood, or by a paroxysm of cough and extreme dyspnœa; especially if the blood is poured out from the membrane while the chest is in the state of expiration. It is easy to understand how certain portions of the lungs, without undergoing any actual change of texture, may in this manner be so choked up and crammed with blood, which afterwards coagulates, so as to preclude any subsequent admission of *air*."

"The principal *symptom* attending the formation of these masses is *hemoptysis;* and the principal, though not the only *cause*, is disease of the heart. The hemorrhage is often severe and copious in the first, or circumscribed form; sometimes slight and scanty, but commonly slow, oozing, and persistent, in the second or uncircumscribed form. The heart disease is in its left chambers, and very often consists in contraction of the mitral orifice. No example of pulmonary apoplexy, or of pulmonary hemorrhage, even *apparently* dependent upon hypertrophy of the *right* side of the heart, has ever fallen under my notice."

Among the curiosities of this disease may be mentioned its originating sometimes from strong sensations; such as the impression of music, above all, on phthisical patients. M. Andral relates the case of a young man who spit blood whenever leeches were applied to his chest. Sometimes this discharge has come on in consequence of the application of a sinapism or a blister; means these, in other cases, of arresting the disease. Frank tells us of a person who could not sleep during the day without a spitting of blood resulting; and that he saw another who was seized with hemoptysis whenever he ate honey, and another again after having eaten asparagus. In very nervous subjects the disease has been brought on by strong odours.

In the *symptoms* of bronchial hemorrhage, we note considerable variety. These have been met with in persons who have been attacked, without any precursory or even associated symptoms, and who enjoyed good health afterwards, as they had before. Very generally, however, the disease is ushered in by numerous and marked symptoms. Among these I may mention a feeling of heat and weight, and an inexpressible uneasiness in the chest, or in some part of that cavity; a saltish taste, or that of blood, in the mouth. Soon afterwards the extremities and sometimes the whole surface of the body are cold, and irregular chills are experienced in the back and loins; the countenance is changed, the face becoming alternately pale and flushed: there is a singing in the ears, lustre and injection of the eyes, headache, and palpitation. The pulse is accelerated, full, hard, and vibrating: pain and uneasiness in the limbs are complained of. The laborious breathing is augmented, and the patient feels a kind of bubbling caused by the passage of air during the movements of inspiration and expiration, and at the bifurcation of the bronchia a sensation of tickling and pricking. Now comes on expectoration, consisting of mucus streaked with blood, or of pure blood, or this fluid is ejected by mouthfuls. It is

florid and frothy, unless it has been retained for a time in the bronchial cells, in which case it is dark, and towards the end of the attack clotted.

Sometimes the quantity and rapidity of the discharge are such that one would describe it as a vomiting of blood. After it has ceased the patient commonly experiences relief, especially from the oppression, palpitations, and headache. This absence of disease may be either temporary or permanent. Often, at the expiration of a not well-defined period, the same symptoms of congestion, already enumerated, are manifested, and are followed by fresh hemorrhage. In some cases this kind of paroxysm has returned five or six times in the course of the day; its intensity diminishing, however, at each repetition. The quantity of blood discharged is very variable; some persons only giving out a few drops, others many ounces, and even some pounds, in the twenty-four hours.

There are hardly any physical signs of bronchial hemorrhage: nothing peculiar is indicated by percussion; the chest being perfectly sonorous, and auscultation only shows a mucous rattle or rhonchus with unequal bubbles, usually larger than those of catarrh, and formed, one may suppose, of more liquid materials. The rattle is more or less evident according to the quantity of blood effused. These remarks apply to simple bronchial hemorrhage; but when it is associated with and kept up by that congested and indurated state of a portion of the lung called *pulmonary apoplexy*, auscultation makes us acquainted with the true diagnosis. In this case the stethoscope, according to Laennec, furnishes us with two principal signs, viz., 1, the absence of the sound of respiration over a small, circumscribed space; and, 2, the crepitous rhonchus around this space. This rhonchus, which here indicates the slight infiltration of blood, already described, is always found at the commencement of the disease, but it is frequently wanting in its latter stages. When these signs, and the fact is of great importance, coexist with pulmonary hemorrhage, we may be assured that the origin of the discharge is in the pulmonary substance, and not in the bronchia simply. If the induration of pulmonary tissue is excessive, the absence of sound, or at least of sonorousness on percussion joined with the signs already indicated, leaves no doubt of the nature of the disease, and prevents its being confounded with any other except peripneumony; and even then only in cases in which the spitting of blood is not very considerable.

In the spitting of blood which accompanies tubercles of the lungs, we can determine the nature of the cause or combination by the physical signs characteristic of the tuberculous affection, to be hereafter described. Commonly the hemorrhage in this case is bronchial or simple; whilst that connected with pulmonary apoplexy depends more on hypertrophy and other affections of the heart, and particularly of its right side.

The *progress* of hemoptysis is not by any means uniform. It has been already stated that, in some cases, the attack takes place but once, and with its cessation the person is left in good health. There are individuals, and particularly of the female sex, who spit a little

blood every day for months and even years. In some it is readily reproduced by the same causes which brought it on at first; in others it comes on without obvious cause. Appearing for the most part at irregular intervals, bronchial hemorrhage is sometimes periodical: in some women it supplies regularly every month the menses. Moseley and other writers relate cases in which it has corresponded very accurately with lunar epochs, in the male sex. After the cessation of the active discharge there is cough, and the mucus expectorated is usually mixed for some days with dark or clotted blood, which daily diminishes in quantity.

The *diagnosis* is not always easy, particularly between pneumonia and hemoptysis, if the latter be dependent on pulmonary apoplexy. In pneumonia the sputa are distinct, and, as it were, fused, which is not the case in the other disease. In nasal hemorrhage the blood sometimes passes into the posterior nares, and thence into the fauces; and is brought up by hawking, sometimes accompanied by cough, but the fluid is dark, and not frothy, like that which comes from the bronchia. In some cases, again, there is a slight hemorrhage from the vessels of the pharynx, which, calling the bronchia into sympathetic irritation, may be associated with cough, and mixed with the expectorated matter thus brought up, and impose on the physician as a true hemoptysis. This latter is usually represented as readily distinguishable from hematemesis, by the cough, dyspnœa, vermilion colour of the blood, and its mixture with bubbles of air, when the discharge is fromthe bronchia; while in hemorrhage from the stomach there is nausea, oppression at the epigastrium, mixture of the blood with aliment, and with bile and mucosities. It may happen, however, that the patient is seized with vomiting at the same time that there is bronchial hemorrhage, and then we may expect to see alimentary matter mixed with the blood; nor is the colour of this fluid always so contrasted in the two diseases as is generally represented by systematic writers. Costiveness and tardy digestion may accompany both hemoptysis and hematemesis; but these symptoms are most common in the latter. The pulse is generally fuller and harder in the bronchial than in the gastric hemorrhage. The expectorated blood sometimes comes from the rupture of an aneurism of the aorta, in which case there is little time allowed for nicety of diagnosis or recourse to remedies, as the case at once terminates fatally.

Our *prognosis* in bronchial hemorrhage or hemoptysis will be inferred from what has been said in preceding parts of this lecture on the varieties and progress of the disease. M. Andral assures us, that he has ascertained, by autopsic examinations, that more than a fifth of the cases of hemoptysis are not tuberculous, that is, are not dependent on or associated with pulmonary tubercles. In addition to the remarks already made on this point, I may add, that we see individuals in advanced age who in their youth had spitting of blood; some of them valetudinarians, others in robust health. Still, must we not forget the important and melancholy fact, that in a large majority of cases of bronchial hemorrhage this is preceded or followed by pulmonary consumption.

The *organic changes of structure* produced by, or rather associated with, and following simple hemoptysis, are not numerous nor well marked. Blood, more or less fluid, has been found in the bronchia; and when coagula are present, they exhibit, at times, fibrinous concretions in the form of polypi. The mucous membrane is commonly a little softened and tinged with blood in its entire substance: but in general its alterations are not different from those met with in simple bronchitis. Sometimes, even, it is pale, or at most presents a light rosy tint. A similar state of other mucous membranes which were the seat of hemorrhages has been observed; as those from the intestines, which have been found pale, with slight injection in some points. We may, as M. Andral suggests, attribute this want of colour of the mucous membranes, after death from hemorrhage, to the circumstance of the blood having escaped from the vessels in place of remaining in them, and giving rise to the appearance of congestion and inflammation. But in hemoptysis dependent on pulmonary apoplexy or pulmonary hemorrhage; that is to say, when bronchial hemorrhage has succeeded to hemorrhagic effusion into the pulmonary tissue, the organic changes are more evident. Portions, not indeed large, of the substance of the lungs, are found indurated equal to the greatest degree of hepatization. The extent of lesion is both small and circumscribed; the pulmonary tissue around being quite sound and crepitous, and has none of that appearance of progressive induration which we find in pneumonia. The indurated portion is of a very dark red, exactly like that of a clot of venous blood, and quite homogeneous; disclosing nothing of the natural texture of the part, except the bronchial tubes and the larger bloodvessels. In hepatized lung after pneumonia, on the other hand, we can perceive, says Laennec, who draws the contrasted picture which I am now copying, the dark pulmonary spots, the bloodvessels, and the fine cellular intersections; all of which give to this morbid state the aspect of certain kinds of granite. M. Andral's description of the appearance of indurated portions of the lungs in hemoptysis with pulmonary apoplexy is nearly similar to that of Laennec's, as will be seen by reference to his *Clinique Medicale.* The tissue of the lung at the indurated portions, says this writer, was very hard black, and granular, when cut into; and there issued out from them a liquid similar to coagulated venous blood by strong pressure. Around this altered tissue the lung was pale, crepitous, and engorged with serosity. The description of the mode of this formation, by Dr. Watson, has been given in the beginning of this lecture.

The TREATMENT of bronchial hemorrhage resolves itself into, 1, the means of arresting the discharge; and 2, those of preventing its return. It consists in diminishing the sanguineous congestion of the lungs, and in relieving the oppression of these organs, and consequently the turgescence of the bronchial mucous membrane, by revulsive action on other organs and tissues. Venesection and sedatives are employed to meet the first indication; and purging, sometimes vomiting, tonics, and external counter-irritants, to meet the second.

Of the remedial effects of bloodletting, M. Andral is disposed to think more highly than even our own heroic school at home. Those of the latter, who derive their notions of French practice from a perusal of some of the older writers and chance passages in English books, will be surprised to learn that the author just named expresses himself in the following manner, on this subject, in his *Cours de Pathologie:* We have recourse to emissions of blood either to ward off an attack of this disease, or to arrest it, or to prevent its recurrence. When a patient, continues M. Andral, exhibits all the symptoms which characterise the imminence of hemoptysis, as when he is oppressed and pale, and has rigors through his frame, bleed him at this time, and you will prevent the hemorrhage. Bleed, also, when the hemorrhage is present, and bleed largely if you wish to obtain satisfactory results. If you use leeches, take especial care that they be not applied to the chest, but to the anus, especially when you have to deal with nervous subjects, or with women.

As a general rule we should draw blood at once from a vein, in an attack of hemoptysis, and in such quantity as to produce a marked impression on the system, which is measured, not only by a reduction of the pulse, but by a removal of the oppression, heat, and stricture of the chest, and a feeling of relaxation bordering on syncope. But in doing this we must not act empirically, and without an understanding of our true position, determined by a knowledge of the premises. In incipient hemoptysis, and in the first attack, we should bleed more freely than after the hemorrhage has been considerable, or in a case in which it has been of repeated recurrence. We ought, also, to be aware, that a simple idiopathic bronchial hemorrhage will sometimes be of itself sufficient to relieve the congestion, which may have been but temporary, of the mucous membrane; and that if the discharge do not cease spontaneously, it is readily stopped by means of an easy application to be hereafter mentioned. When, on the other hand, we are led to believe, from the habit and general appearance of the patient, and from the physical signs, particularly those furnished by auscultation formerly detailed, as well as by the excessive oppression, and sometimes even acute pain of the chest, that the bronchial is associated with pulmonary hemorrhage or apoplexy, then should we not lose a moment's time in having recourse to the lancet, and in procuring a large abstraction of blood. One bloodletting, says Laennec, of twenty-four ounces on the first or second day, will have more effect in checking the hemorrhage, than several pounds taken away in the course of a fortnight. It is even beneficial, in general, continues this able practitioner and writer, to induce partial syncope by means of the first bleeding. In cases of this kind, the fear of exhausting the patient's strength is without foundation, since we know that the most copious venesection falls short of the loss of blood sustained from pulmonary hemorrhage, in young and robust subjects, even in the course of a few minutes; *while the debilitating effect of the hemorrhage is infinitely greater than the loss of blood produced by the lancet.* (Forbes's Translation.) This advice does not assuredly look like tampering with the dis-

ease, by trusting its cure to the expectant method, which some persons still believe to be synonymous with French medicine.

Simultaneously with recourse to bloodletting should be the employment of other auxiliary but not unimportant measures. The position of the patient must be semi-erect, or sitting, if the strength will allow of it; or, at any rate, he should be propped up in bed so as to have the chest and shoulders raised; nor must these parts be enveloped in warm bedding and clothing; but on the contrary they ought to be exposed to a cool air, and even the chest sponged with cold water and vinegar. The remedies at this time, taken internally, may be of a simple and readily obtainable kind; such as vinegar, or common table salt, or mouthfuls of cold and even ice water. My theory of the effects of this refrigerating or sedative practice, is, that the diminished excitement produced on the capillaries and exhalents of the skin, and the gastric mucous membrane, is participated in by those of the bronchial mucous, which, in consequence, refuse to give passage to the blood brought by the larger vessels. But, in advising these remedies, and I think the remark may be extended to the acetate of lead, erroneously called an astringent in place of a sedative, we must be prepared to see after their use a reaction of the capillary tissue, and a renewal of the discharge, if it have depended on pulmonary congestion, strengthened by general plethora, and perhaps hypertrophy of one of the great cavities of the heart. The occurrence of a reaction is not so much an argument, however, against these sedative or refrigerant agents, adjuvants to bloodletting, as against reliance on their sole use, unless in simple bronchial hemorrhage. The inference which I wish to draw from these remarks, is, that the indication to be fulfilled, not only in hemoptysis, but in other hemorrhages, is to remove the cause; as it may be supposed to depend either or increased molimen, or undue determination to the lungs, and congestion of the bronchial mucous membrane. Even if we were possessed of certain means for curing a lesion of the vessels which exhale and secrete blood, their early employment would be of doubtful efficacy at best, and most probably decidedly injurious. This is a question which ought to be presented, from the beginning, to the mind of the physician who has taken charge of a case of hemoptysis, and who may be debating with himself, or with a medical friend, the propriety of trying substitutes for venesection, in order to arrest the hemorrhage. The quantity of blood, and the exaltation of vital phenomena, consequent on or associated with its greater afflux at this time to the lungs, must be diminished. The means are depletion and derivation. Venesection in the arm or in the foot carries out both of these objects, but more particularly depletion and unloading of the vascular system. After this, derivation is easier; and when the hemorrhage originates in the suppression of some other discharge, it is necessary. Thus, if habitual hemorrhoids have disappeared, or the menses have been wanting beyond the customary epoch, leeches to the anus, and a brisk purge of calomel and aloes, or, for more prompt effect, a stimulating enema, as of oil of turpentine even, are called for. Without giving it the importance which I

once did, and which perhaps some of my professional brethren are still inclined to do, I cannot but think that the removal of hepatic congestion and of obstruction in the portal circle by active purging, as a revulsive measure, will contribute to relieve the oppression of the lungs in hemoptysis. Nor can we overlook the direct sympathy noticed before between the bronchial and gastro-intestinal mucous membranes, and the benefit received in phlegmasia and congestions of the former by a pouring out of fluids from the latter.

In speaking, as I have just done, of the application of leeches, and of the employment of purgatives, as both of them answering the indication for derivatives, I do not mean to affirm that they are either identical or equally beneficial in their operation. Purgatives follow properly and safely in subjects of both sexes after bloodletting; leeches chiefly, if not only, under the circumstances stated, viz., of suppressed hemorrhoids or menses. Obviously proper as these last would seem to be from analogy, and a knowledge of their generally beneficial derivative action, they are not always safe or useful in hemoptysis, certainly not as a substitute for venesection in the first attack and early period of the disease. Laennec has noticed the return of the menses and aggravation of menorrhagia during the application of leeches to the epigastrium. The first of these effects I have myself seen from this cause. But still farther, general bleedings, and more particularly those of small extent, have appeared, under the observation of the French writer just quoted, to have a like effect on hemoptysis; and cases of this kind are clearly those in which purgatives should have a trial. On this remark, Doctor, now Sir James Clark, has the following comment: — "The fact is not generally known, though it is one of great practical importance. In a plethoric person threatened with apoplexy of the brain or hemoptysis, the application of leeches may, and, I believe, frequently does, cause the very occurrence of the disease it was intended to prevent. I have more than once seen slight hemoptysis follow the application of leeches round the anus (and have warned patients not to be alarmed at it), when applied to obiviate pulmonary hemorrhage. In one case a severe attack of hemoptysis took place a few hours after the application of the leeches, requiring general bloodletting, &c. A very small bleeding may, as Laennec observes, produce the same effect; but independently of the quantity of blood abstracted, there is a sympathetic effect produced on the extreme vessels by the action of the leeches, or the consequent flow of blood from their punctures, which is very desirable and useful when we wish to promote a sanguine secretion, as the menses; but may be injurious when we wish to obviate an effusion of blood from the extreme vessels: a general bleeding is by far the better practice in the cases under consideration."

Upon the whole, then, the safer practice is, after venesection, to purge; and in so doing selection should be made of those articles which procure abundant evacuations without straining, the bad effects of which in congestion or retarded circulation of the lungs can be readily imagined. I have myself found, that common mercurial purgatives, such as calomel and jalap, calomel followed

by the compound powder of jalap, or by rhubarb and magnesia, are preferable to the simple saline; although theory would indicate the superiority of these latter on the ground of the more copious fluid discharges and consequent diminution of the bulk of the contained blood of the vascular system following their operation.

Hemoptysis with febrile reaction may at once be treated, after venesection, or where the hemorrhage is but slight and its returns have been frequent, without this preliminary, by sugar of lead, *sub-acetas plumbi*. This medicine has acquired great and in many cases deserved reputation in nearly all the forms of hemorrhage, particularly when administered in conjunction with opium, as in the following formulæ: —

℞. Plumb. sub-acetat., gr. xii.
Pulv. opii, gr. i.
Sacch. albi, ʒss.
M. ft. pulv. vi.

Take a powder every two hours, or until the hemorrhage is arrested. In cases of general plethora and capillary excitement, the opium is not a fit addition; but, on the other hand, where the excitement is unequal and the plethora local, this medicine contributes very much to equalize the circulation; and, by causing a certain degree of fulness of the capillary circulation in all the organs, to take off the strain upon those of the lungs. Care ought to be used that a simple, and in milder cases a sufficient remedy, in hemoptysis, diluted mineral acid, and especially the sulphuric, be not administered at the time in which you are prescribing the sugar of lead. But, on the other hand, it may be prudent, and will rather aid the refrigerant effects of the salt of lead, to follow the advice of Dr. Thomson, by directing your patient to drink dilute acetic acid, in order to prevent any possibility of the conversion of the acetate into the carbonate, in which last form alone it is specifically injurious to the animal economy.

My own experience enables me to speak with considerable confidence of the powers of the potassio-tartrate of antimony, or tartar emetic, in restraining and arresting pulmonary hemorrhage, and that in the most safe manner, viz., by diminishing the morbid action of the heart, abating the inflammatory congestion, as well as producing a sedative impression on the bleeding capillaries themselves. But whether you choose to adopt my explanation or not, you may be assured of the fact. I give the tartar emetic in simple watery solution, in the dose of an eighth to a fourth of a grain, every hour or two, according to the urgency of the case and the toleration of the medicine by the stomach, without vomiting being brought on. Even if nausea and retching should ensue, the state of arterial sedation which precedes will prevent any injurious effect, or any increase of hemorrhage, which, without such prior depression, would be readily brought on by vomiting. In the weeping hemoptysis, or oozing of blood, not much in quantity at a time, but persisting with, at the same time, febrile reaction, yet not enough to justify venesection, I have prescribed the tartar emetic with the best effect. So obvious, indeed,

and at the same time so mild is it in its effects, that my patients have at different times asked for a renewal of it, when its use had been temporarily suspended.

When hemoptysis assumes a chronic character, and you have symptoms of bronchial congestion, with small but frequent discharges of blood, and associated disorder of digestion, you will find the use of the blue pill in doses of three to five grains, joined to a grain of ipecacuanha once or twice a day, and, if necessary to procure a full alvine discharge, rhubarb and magnesia or a small dose of salts on the following day, a good plan of treatment; to be continued until the tongue is clean and the bleeding either arrested or reduced to a very small quantity at prolonged periods. Sometimes a pill, composed of ipecacuanha and soap, taken two or three times a day, for some days, will suffice under these circumstances. If anemia be present, or the patient much reduced by the hemorrhage and the vascular excitement be inconsiderable, small doses of the oil of turpentine, as ten to twenty drops in some mucilage three times a day, are found to restrain and check the discharge. It is in cases of this nature, and in scrofulous habits, that the hemorrhage has been called passive. In these, astringents have been prescribed, such as alum, pure tannin, galls, or rhatany in moderate doses. In cases of incipient tubercle, the administration of narcotics and some preparation of iron should be tried, under the hope of postponing for a time, at any rate, the development of the symptoms of phthisis. With this view, also, even more than merely to prevent the recurrence of hemorrhage, a permanent discharge from the inside of the arm by a blister, or from the chest by means of tartar emetic, may be kept up with good effect.

All the customary means of giving tone to the general system, without any special strain upon the lungs, should be had recourse to. Of these the chief are, plain nutriment, moderate exercise, especially on horseback, and alternately with that on foot; the tepid and after a while, if the reaction be sufficient, the cold bath, by momentary immersion or by shower; frictions, and great attention to preserving the feet warm and dry. Late hours and nocturnal excess of any kind are to be avoided by the invalid, who is fearful of a return of hemoptysis.

LECTURE XC.

DR. BELL.

PNEUMONIA.—The transition slight from bronchitis to pneumonia—Peculiarity of seat of pneumonia—Definition—*Stages*—*Symptoms*,—local and general,—The three chief diagnostic ones,—Cough, expectoration, characters of the sputa, dyspnœa, pain, decubitus—Percussion—Auscultation—Crepitation—Appearance of inflamed lung—The several stages of inflammation—*General Symptoms*,—Disordered circulation and pungent heat of the skin the most common—*Symptoms of Infantile pneumonia*—*Precursory symptoms and complications*—Pneumonia succeeding bronchitis and other diseases—*Typhoid pneumonia*—*Progress*—Collapse—*Duration*—*Disease*.

PNEUMONIA.—PERIPNEUMONY.—PNEUMONITIS.—PULMONITIS.—The passage from the bronchial tubes, and more especially their vesical

terminations, to the adjoining tissue external to them, or the pulmonary parenchyma, is indeed slight; and, as Dr. Stokes aptly remarks, he who would call pneumonia a bronchitis of the terminal tubes would be hardly guilty of a misnomer. In fact, between vesicular bronchitis and pneumonia, which is believed by the best pathologists to consist in inflammation of the pulmonary vesicles, the difference is but nominal. Even if we suppose different parts to be affected in the two diseases, how slight is the line of demarcation between the terminations of the bronchia and the pulmonary cells. The surface is continuous in both, and in its properties is nearly identical. Rokitansky (*Manual of Morbid Anatomy*) thinks that pneumonia, having its seat in the air-cells, might be denominated parenchymatous croup.

A comprehensive definition of pneumonia is given by Dr. Williams (*Cyclopedia of Practical Medicine*); viz., *Fever, with more or less pain in some part of the chest; accelerated and somewhat oppressed breathing, cough with viscid and rusty-coloured expectoration; at first the crepitant rhonchus, afterwards bronchial respiration and bronchophony, with dulness of sound on percussion in some part of the thorax.* He adds: pathologically, pneumonia consists essentially in an inflammation of the parenchyma of the lung, occasionally but not necessarily extending to the pleura investing them; which inflammation, though it usually occasions a certain combination of general symptoms, it not so essentially connected with these symptoms as to receive from them an infallibly pathognomonic character.

Stages. — Before speaking of the symptoms of pneumonia, let us carry along in our minds the several stages of the disease, which are enumerated by Dr. Stokes (*op. cit.*) to be: — 1st. The lung drier than natural, with intense arterial injection. No effusion of blood into the cells. 2. (Laennec's first.) The cells gorged with blood. No change of structure. 3. (Laennec's second.) Solidity and softening (the red softening of Andral). 4. Interstitial suppuration. 5. Abscess.

The chief recognized varieties of pneumonia are the *vesicular*, the *lobular*, and the *lobar*, according as patches of vesicles alone, or those of an entire lobule, or an entire lobe, or all the lobes of a lung, are the seat of inflammation. Rokitansky makes four varieties of pneumonia; viz., croupal (ordinary or plastic pneumonia), typhous, catarrhal, and interstitial; dependent to some extent on the peculiarities in the state of the blood. Catarrhal pneumonia, rarely seen in adults, is not uncommon in children: it is always lobular, always has a bronchitis of the tubes belonging to the diseased portion of the lung associated with it, and is a frequent concomitant of the various diseases of childhood, especially of hooping-cough and suffocative catarrh. Its especial seat is in the superficial lobules, many of which are often affected, and which become bluish-red, dense, and moderately firm. The interstitial pneumonia is that commonly described as chronic, — sometimes it occurs spontaneously, and spreads from one lobule to another. It is most frequent at the apices of the lungs. More commonly it is a consecutive affection.

The *symptoms* are local or general; those furnished by the lungs; those by the other organs or organic symptoms sympathetically and

secondarily disordered with them. Under the first head we include cough, expectoration, pain, dyspnœa, decubitus, and the signs furnished by percussion and auscultation. Before speaking of these in succession, I may as well at once tell you of the three chief diagnostic marks of pneumonia. They are: 1st, the crepitating sound transmitted when the ear is applied to the chest, or rather to that part in which is contained the diseased lung; 2, the rust colour of the sputa; 3, the peculiar pungent heat of the skin.

Local Symptoms. — Cough is present in a very large majority of cases of pneumonia; but it exhibits no peculiarity, nor are its violence and frequency proportionate to the violence of the disease. The expectoration in the beginning of pneumonia is commonly null, or analogous to that in acute bronchitis. From the second to the third day it assumes its characteristic appearance: the sputa become sanguinolent, owing to the intimate mixture of blood with mucus. Their colour varies with the quantity of blood which they contain; and hence they may be yellow, rusty, or of a decided red; and they may even pass through all these shades in the same day. Their density augments as the disease advances; they become viscous, tenacious, transparent, and strongly adherent to each other. So decided, at times, is their gelatiniform consistence, that the vessel containing the sputa may be completely inverted without their being detached from it. This last change is seen when the inflammation passes to the second stage, for so long as it remains in the first, the sputa have not tenacity enough to adhere to the sides of the vessel.

A termination of the disease in resolution is indicated by a less heightened colour and viscidity of the sputa; but if, after becoming thinner, they are again tenacious, they indicate that the pneumonia is paroxysmal. Sometimes, even although the sputa have lost all their pneumonitic characters, and exhibit those of the catarrhal state, yet auscultation still apprises us of a crepitation or crepitating rhonchus (*râle*) of more or less duration.

A suppression of the expectoration may occur from an exasperation of the disease; and also from an excessive viscosity of the sputa, or from the weakness of the patient; and in these cases the secreted matter may accumulate in the trachea, and cause death by asphyxia; or this result may be brought about by a suppression of the secretion itself.

The expectoration may be also suspended by other diseases complicated with pneumonia, by purgatives given early in the disease, by excessive bloodletting or its unseasonable repetition; and by all the causes which aggravate pulmonary inflammation. In some cases of fatal pneumonia the sputa are not suppressed; but they are smaller in quantity, become changed in their appearance, and are opaque and mottled with dirty, reddish-gray streaks, resembling those seen in the last stage of consumption.

When pneumonia terminates by suppuration, the sputa are grayish, inodorous, and in a measure purulent: even in the red hepatisation or friability they may preserve the same characters; and, finally, they may lose their viscosity, and resemble a liquid of the

consistence of gum-water, and of the colour of liquorice or prune decoction. The termination in gangrene is manifested by the expectoration of a greenish matter, which yields after a while a dirty-gray, and exhales an insupportably fetid and characteristic odour. When pneumonia passes into a chronic state, the sputa are like those of pulmonary catarrh. All cases of pneumonia are not characterised by distinct expectoration: some of them slight, some grave, running their course to a happy or fatal termination; and yet the sputa merely resemble those of a simple bronchitis. In intercurrent or secondary pneumonia particularly, it is common to see the absence of expectoration.

The colour of the sputa is attributed generally to the blood, in varying quantity, mixed with them. They are rarely tinged by bile.

The dyspnœa is generally in proportion to the extent and seat of the inflammation; although in this respect there are great differences among different individuals. When the breathing is hurried and laborious, and the feeling of oppression so great that the patient sits up in his bed, complains of a weight in his chest, has the face of a violet-red, or of a livid hue, and pants to such a degree that speech is extremely difficult, if not impossible, — we must augur an unfavourable termination. Dyspnœa may, it is true, remain after the danger is over; and in such a case it is owing either to the imperfect resolution of the disease, or to the weakness of the patient.

Pain, according to Andral, is never felt in pneumonia, unless there be pleuritis coexisting; but Laennec asserts that simple inflammation of the lung has given rise to pain; a fact which he had an opportunity of ascertaining by dissection of the patent after death. Commonly, the pain is felt behind the mamma, or a little below or just above and between it and the clavicle; or in one or other of the hypochondria. It is increased by coughing, change of posture, pressure on percussion.

As to the decubitus, it is not correct that the sick always lie on the affected side: the posture is generally on the back.

Percussion does not show any change in the sonorousness of the chest, in the first stage of pneumonia; and it is rarely until the second or third day that a dull sound is evident. As the disease disappears the natural sound of the chest is restored. Percussion cannot be practised when the walls of the thorax are painful or covered with a vesicated surface, or when there is deformity of the chest. In practising percussion, do not forget that the liver on the right side, and the spleen on the left, will cause a dull sound on percussion of the lower part of the thorax.

Auscultation, either by applying the ear to the chest, or by the intervention of a stethoscope, enables us to reach generally an accurate diagnosis of pneumonia. The sound heard at this time, if the diseased part be that chosen to which to apply the ear, yields the *crepitating rhonchus* of Laennec, or the *fine crepitation*, as some others term it. This kind of crepitation does not, however, entirely replace the respiratory murmur of health, which is more or less marked on the occasion; but in proportion to the intensity of the in-

flammation is the intensity of the crepitation, which, after a time, entirely conceals the respiratory murmur. By some observers (Drs. Gerhard and Rufz), this crepitation is said to be wanting in children between ten and five years old suffering from pneumonia : by others (MM. Rilliet and Barthez), it has been distinctly heard. With the exception of three cases, it has always been blended with bronchial respiration, in the experience of these last mentioned writers.

The crepitating rhonchus, or the minute crepitation, is characteristic of the first degree of pneumonia, or that of turgescence and engorgement, — the second of Dr. Stokes, who believes intense respiratory murmur in the affected part and fever to be indicative of the (his) first stage, and the precursor of crepitation. In the first stage the pulmonary vessels are so much distended that the whole tissue is of different shades of red. In some cases, a frothy serum exudes when the lung is cut; this is probably the effusion of blood after death, for it is not observed in those cases in which the blood remains in a fluid state. Andral examined an inflamed lung, after drying and slicing it; and the only difference which he could perceive in the structure, was that the coats of the cells were somewhat thicker and redder than natural; but there was not that obliteration of the cells that might have been expected if they had been filled with blood. This last may cease to be heard under two different circumstances; in the first, crepitation yields to the respiratory murmur, and the disease ends in resolution; in the second, it advances from bad to worse, and then no sound is heard, or else crepitation is replaced by another sound; the phenomena are increased, and the lung becomes hepatised. This change is the result of deposition of lymph in its cellular interstices, and the retention of blood or engorgement in its minute capillaries. Hepatised lung is denser and more solid than before; but it is also more friable; more easily crushed and broken. If we take a portion of hepatised lung, and examine the torn surface with a magnifying glass, the pulmonary tissue will appear to be composed of a crowd of small, red granulations, lying close to each other. These are, we may presume, the air-vesicles clogged up, thickened, and made red by the inflammation. The colour of hepatised lung will vary much, according to the quantity of blood left in it; if this be much, it will be red; if little, pinkish-brown, or reddish-gray; if mixed, the black pulmonary matter. Lung thus diseased does not collapse when the thorax is laid open: the marks of the ribs are frequently visible on the surface. The texture of the lung at this time is sometimes so soft that a moderate degree of pressure between the fingers reduces it to a state of pulp. Sometimes the state of organic change just described is confined to certain of the pulmonary lobes, and then it is called *lobular* pneumonia.

The deposition of lymph which constitutes hepatization of the lung completes the obstruction of the minute tubes and cells; hence all crepitation ceases, and the only sounds that reach the ear are those of the air and voice in the larger tubes. Instead of the respiration with its prolonged murmur, there is only a *short whiffing*, as Dr. Williams expresses it, confined to parts only of the respiratory act, and often ending abruptly with a *click*. This bronchial whiffing is

not heard in every case, but only when the hepatisation involves considerable bronchial tubes; and it is most commonly found in the middle portions of the chest. M. Andral designates the sound given out at this time, on applying the ear to the chest, by the term *tubular respiration*, owing to its resemblance to the sound which would be produced by blowing into a tube close to the ear of a listener. It is a variety of bronchial respiration. The voice is modified at the same time in a peculiar manner, in its passage through the lungs and parietes of the chest, on reaching the ear of the physician applied to the latter. The vocal resonance of the tubes is also transmitted by the condensed lungs to the parietes, as a vibration or *fremitus*, which may be distinctly felt by the hand placed on the affected side, and which is much stronger than that on the healthy one. This affords an easy mode of distinguishing between a hepatised lung and a pleuritic effusion; for the latter when considerable generally abolishes completely the vocal vibration.

Often we hear in the same patient and at the same time different signs furnished by auscultation, which announce different stages of pneumonia. On the healthy side we hear, by auscultation, the normal respiration, of much more intensity than in health. Sometimes auscultation supplies us with negative results. This happens when the fluid accumulated in the bronchia is in quantity enough to cause so strong a bronchial rhonchus as to cover all the other sounds. If the inflammation be very limited and only occupy a part of the base, centre, or root of the lungs, auscultation, M. Andral thinks, gives no indication to guide us. Auscultation traces the morbid changes in the lung through the stages of engorgement to hepatization. "Can it," says Dr. Watson, "trace it any farther? I believe not, with any certainty." But, at last, he adds, —the structure of the lung breaks down, and a portion of it is expectorated, and finds its way into the vacant spot, and gives rise to large *guggling* crepitation. Among the local symptoms should be noticed a diminution in the motion of the affected side, in proportion as the air fails to get admittance into the inflamed lung.

The third stage of Laennec, to which inflammation brings the lungs, is that of *suppuration* or *yellow* hepatization. This consists in the conversion of the semi-solid particles of lymph or blood, which constitutes the solid or red hepatization, into an opaque, light-yellowish, friable matter, and finally into a fluid pus. This suppuration is generally diffused in the form of purulent infiltration; but it is very rare to find it assume the character of a distinct abscess. This last is an uncommon termination of pneumonia. In several hundred dissections of persons dead of this disease, made by Laennec during a space of more than twenty years, he only met with five or six collections of pus in the inflamed lung. Once only did he find a *large* abscess of that sort. Andral has only once seen a real abscess of the lung form as a consequence of pneumonia. Phlebitic deposits of pus and sometimes tubercular vomicæ and cavities, may have been taken for genuine abscesses of the lung.

Gangrene is an unusual result of pulmonary inflammation; being nearly as uncommon as the formation of an abscess. It seems, how-

ever, as remarked by Dr. Williams, to arise pretty generally from the influence of those noxious gases which directly destroy the vitality of the tissue of the lung. The lungs of persons who have died some days after being nearly asphyxiated in sewers, have been found reduced, in parts, to a dark brown, greenish, or livid softening, having a very fetid odour, and being probably the result of the poisonous influence of the gas on a congested lung.

General Symptoms. — Among these, the most constant is disordered circulation, manifested by a frequent and rather full and sometimes hard pulse, which becomes small when the inflammation is very violent, but acquires volume after bloodletting. We are taught to mistrust acute bronchitis, in the course of which an intense febrile disturbance supervenes, even although expectoration and auscultation should not furnish any characteristic signs of pneumonia. A chill is the customary prelude or announcement of the inflammation of the lung, and the fever thenceforwards lasts as long as the disease. A very frequent pulse is a bad sign in pneumonia, as it indicates intense inflammation. Rarely does the case terminate favourably when the pulsations exceed 140 in a minute. Coinciding with this morbid state of the circulation is the frequency of the respiratory movements; and when this correspondence is destroyed by the pulse becoming slow, and yet the respiration remains much hurried, we have reason to fear a fatal result; in fact, approaching death. Should the pulse be still frequent when the other morbid symptoms have in a great measure disappeared, there are probably some remains of phlogosis. If intermittent, we are to attribute it to some disease of the heart. The belief entertained by the old writers, and still accredited by some of the moderns, that the fever precedes the pneumonia as its cause is not correct.

The febrile suffusion of the cheeks is sometimes more manifest on one side, that, as we read, which corresponds with the side of the affected lung; but in this respect there is no uniformity. The redness of one cheek more than that of the other may depend on the patient's habitually lying on one side. Disorder of the digestive functions is chiefly manifested in anorexia and a white and somewhat loaded tongue. There is not much thirst. The cutaneous exhalation differs in different cases; the skin is often dry from the beginning; at other times bedewed with moisture, which is converted into a copious sweat. This last symptom, generally described as either indicative of a milder disease or of an approaching crisis, I have found, not seldom, to precede a fatal termination; and hence, unless a free and particularly a viscous sweat be associated with favourable symptoms, indicating an abatement of the inflammation, it ought to be regarded with mistrust. If the skin has remained dry through the whole of the period of the disease, and towards the decline of the latter it is covered with sweat, we may regard this as critical and of good augury.

Without attaching to it all the importance which it is thought to merit by the gentlemen themselves, I shall repeat in their own language what Drs. Bright and Addison say respecting pungent heat of the surface, as diagnostic of pneumonia: —

Of all the symptoms of pneumonia, the most constant and conclusive in a diagnostic point of view is a pungent heat of the surface; by this symptom alone the first stage of pneumonia may in most instances be readily recognised; by this symptom alone pneumonia has been repeatedly pronounced to exist, before asking a single question, or making the slightest stethoscopic examination of the chest. The presence of this symptom will seldom mislead even in the most complicated forms of inflammation within the chest. It is by no means contended that it is necessarily present at some period of every case, although that is not probable; but it may be safely affirmed, that when inflammation is confined to the chest, however varied may be the tissues involved in the inflammatory process, provided this symptom be present, pneumonia may be confidently pronounced to form a part in nineteen cases out of twenty, and perhaps in a larger proportion. A similar pungent heat of the surface is now and then observed in certain forms of renal dropsy; more frequently in continued fever, especially in children; and still more commonly in the eruptive fevers of the exanthemata and erysipelas; and as such cases may supervene upon already existing disease within the chest, the fact ought to be carefully remembered. — *Elements of the Practice of Medicine*, p. 241–2.

The urine is of a deep red during pneumonia, and deposits a lateritious sediment at its decline. But among the glandular organs, there is no one, the functions of which are so disordered in this disease as those of the liver. Inflammation of the right lung is often attended with hepatic irritation, and the flow of bile is followed by bilious vomiting or stools. In other cases the liver is differently affected: the biliary secretion is impeded, and then predominates what is called the bilious diathesis. This is the bilious pneumonia of Stoll and other writers, and is a complication quite common in our Middle and Southern States. The tongue, eyes, and skin, are yellow; the patient exhales what has been called a bilious odour, and he is tormented with cephalalgia in the lower part of the forehead, head, or back of the eyes.

There is not, often, much disorder of the nervous system in pneumonia. When delirium occurs, we should regard it as the result of cerebral complication rather than a regular symptom of the disease. It is most apt to supervene on the sixth day, or from this to the ninth. At times, however, there is great prostration of force, and from the very outset an adynamic or typhoid state manifests itself. This is most common in old persons. To this complication I shall refer under the title of *typhoid pneumonia*.

Symptoms of Infantile Pneumonia. — The importance but yet difficulty of diagnosis of pulmonary inflammation in children and the frequency of the disease, will justify my making some additional remarks on this topic. Acceleration of the pulse and of respiration are important symptoms in the disease, and influence not a little our prognosis. When there is no complication of other acute diseases, they may be taken as a measure of the intensity and extent of the inflammation.

At the outset of the disease there are some peculiarities in the mode

of respiration, and, if the child be still fed from the breast, of sucking, mentioned by Dr. West (*Memoir on Infantile Pneumonia — Brit. and For. Med. Rev.*), which will aid us in forming a correct, and, what is of great importance, an early diagnosis. If, while a healthy infant is sleeping, the mouth be gently opened, it will be observed that the tongue is applied to the roof of the mouth, and that respiration is carried on through the nares. So soon, however, as the lungs become affected, even when no other symptom exists than general febrile disturbance, and perhaps the vomiting above alluded to, the infant will be seen no longer to breathe solely through his nose, but to lie with his mouth partly open, and drawing in air through it. This imparts to the tongue its preternatural dryness, and the same inability to respire comfortably through the nares causes the child to suck by starts. The infant seizes the breast eagerly, sucks for a moment with greediness, then suddenly drops the nipple, and, in many instances, begins to cry. As the disease advances, these peculiarities in the mode of sucking and respiration often become more striking, but it is at the onset of the disease that it is of especial importance to notice them, since they afford most valuable indications of its real nature.

As respects the physical signs of infantile pneumonia, it may be said that the mucous rhonchus is heard in most cases in which catarrh has preceded the symptoms of pneumonia proper; but, Dr. West thinks, it should be looked on as one of the least important of the physical signs of this disease, since it was present in thirteen only of fifty-one children under five years of age. It is of importance, however, in the young subject, as the immediate precursor of bronchial respiration; while in the adult there is no such connexion. "The sub-crepitant rhonchus is a sign of far greater importance than the mucous rhonchus, whether we regard the frequency of its occurrence, or the consequences which follow it. It was heard in forty-two out of fifty-one cases; in thirty-one of which it either had not been preceded by mucous rhonchus, or if it had, that had ceased before the patients came (says Dr. West) under my notice."

The observation made by M. Guernard is confirmed by Rilliet and Barthez; viz., that these sounds readily disappear if the little patients are kept seated for a short time; and that their greatest distinctness is when the child is raised from the bed.

Bronchial respiration, of all the modifications of the respiratory sound, deserves, in the opinion of Rilliet and Barthez, the most particular attention. It was present in two-thirds of their cases, and when its existence was not ascertained, either the disease was very slight, or it had become impossible to practice auscultation during the last few days of the life of the patient. Frequently, the bronchial character was only observed during expiration, the inspiration remaining perfectly natural, or manifesting a slight rhonchus. It may be regarded as indicative of lobular pneumonia, the most frequent form of the disease in children. In those from two to five years old, the bronchial respiration was in a certain number of cases preceded by rhonchi of different kinds. In children of a more advanced age, it was ushered in by an obscurity of the respiratory sound, and in this class, more than in the other, it was the first symptoms established. In children, from two to five years, it always

existed on the posterior part of the thorax, and, most commonly near the vertebral column; although, as Dr. West, who makes a similar observation, adds, it is not by any means invariably confined to this situation.

Percussion is of much less value than auscultation in investigating the presence and characters of infantile pneumonia. Dr. West describes a difference between the upper and lower part of the chest as appreciable long before bronchial respiration becomes audible; when bronchial respiration exists, dulness on percussion can always be detected, and even if it should be necessary to percuss with the utmost gentleness, so as scarcely to elicit a distinct sound, the finger is yet sensible of the presence of solid lung beneath.

The *precursory symptoms and diseases* on the invasion of pneumonia are various. Some of its complications will be spoken of at this time. Sometimes the patient has felt, for a few days preceding, discomfort, fatigue, anorexia, disclination to motion without either auscultation or percussion indicating pneumonia. Occasionally, a day, or two or three days, before the attack, a slight fever, like that which precedes variola, scarlatina, measles, &c., accompanies the preceding symptoms. This is the inflammatory fever which, in the opinion of some writers, always precedes the local malady. In some cases all the organs are threatened in succession with disease: to-day, the patient complains of gastric symptoms; to-morrow, of a tendency to cerebral congestion; subsequently, to rheumatic pains, until, finally, the pneumonia discloses itself. M. Andral has seen pulmonary inflammation preceded by two paroxysms of intermittent fever, and during the cold stage of the third a slight cough supervene, pain appear, the sputa of a characteristic nature; and, in fine, all the symptoms of pneumonia evinced. Sometimes pneumonia succeeds bronchitis; the inflammation, at first limited to the large bronchia, extends to the smaller ones, and finally to the vesicles. Nothing is more common than the union of these two diseases; so much so, indeed, that some have declared that bronchial inflammation exists in every case of pneumonia. This union is most common in children, especially when lobular pneumonia is present. Tubercle is a frequent complication. In the greater number of cases, however, there are no precursory phenomena, and the patient is all at once seized with a chill, and pain in one or other side. Commonly the chill precedes the stitch; at other times the order is reversed; or, again, there is neither pain nor chill, but cough and fever are the first declaratory symptoms. When pneumonia supervenes on violent fevers, it is preceded by great dyspnœa. Occasionally, I may not say unfrequently, in fever, the pulmonary inflammation is not revealed by any symptom, and its presence is only proved by dissection. Broussais records instances of this in the intermittent fever which attacked the military in the hospital at Bruges; it is far from uncommon in our intermittent fever in the United States, and especially in that marked variety of it called of late years the congestive. I have had occasion when describing the organs affected in epidemic cholera, to mention the congested lung in many fatal cases of that disease. This state was

most evident in the stage of reaction. Disease of the large intestine is mentioned by MM. Barthez and Rilliet, as a most frequent complication; as is also gangrene of the mouth.

In subjects worn down by cancer and other chronic diseases, Laennec has pointed out the occurrence of pneumonia, which soon ends in coma, tracheal rattle, and death. The bronchial affection of measles sometimes passes into pneumonia, especially if the eruption is repressed or disappears suddenly; but in this case the symptoms are commonly urgent and sufficiently characteristic. Pneumonia is sometimes produced in gouty and rheumatic subjects, and this may occur either vicariously, so that the limbs are relieved, or conjointly with these affections. P. Frank has remarked that, in rheumatic subjects, pneumonia sometimes terminates without any expectoration, and with a copious discharge of clear urine, amounting to twelve pounds and upwards. This curious fact is another evidence of the connexion which subsists between rheumatic and gouty affections and a diseased state of the fluids of the body. Several surgical writers have noticed the occurrence of pneumonia after amputation and other great surgical operations, and likewise after extensive wounds; and it has been supposed that this disease is frequently the cause of death in these cases. I well remember to have heard Dupuytren frequently speak in his clinical lectures at the Hotel-Dieu, of this always troublesome and not seldom fatal sequence of amputations, particularly in scrofulous subjects; and so impressed was he with the necessity of some preventive measures, that he uniformly directed a blister to be applied, and a discharge established, commonly on the chest or the inside of the arm, before he removed the diseased limb. M. Erichson (*Med. Gaz.*, 1841), by whom this subject has been examined in detail, regards pneumonia thus occurring as in close affinity with typhoid pneumonia.

I revert now to the complications of pneumonia with bronchitis, and particularly of that modification called *typhoid pneumonia.*

Epidemically prevailing under the names of typhoid pleurisy, bastard peripneumony, putrid pneumonia, &c., its ravages are great, and even when occurring sporadically, or as an intercurrent, it is not less to be dreaded. In the United States during the last war with Great Britain, and for two successive winters after the peace, or from 1813–14 to that of 16–17, this disease prevailed very extensively, in fact from Canada to Georgia. The general predisposing causes were, atmospherical extremes and vicissitudes, especially prolonged cold and moisture; the occasional predisposing ones are defective food, mental anxiety, or derangements and feebleness of the nervous system, by the prolonged or suddenly increased use of ardent spirits. The aged and the intemperate, and those much exposed to hardships, are the chief sufferers; although, in other instances, disease, rapidly followed by death, came on in young subjects of different habits and constitutions. The most speedily fatal and least manageable complication, was that with angina. Endemically typhoid pneumonia is met with in low marshy districts, during the later winter months; cold and moisture seeming to give rise to pulmonary congestion at this season, with the same readiness

that heat and moisture did, during the antecedent autumn, to congestions of the spleen. According to the class of subjects, we may expect, in those countries, and with some slight modifications of temperature, to see bilious pneumonia and typhoid pneumonia. In towns and situations in which a large number of people are congregated, with but limited opportunity of inhaling air, while they are still exposed to its inclemencies, and on whom imperfect alimentation and the use of ardent spirits also exert their effects, we see the disease more manifestly of a typhous character, with gastro-intestinal complications, and attacking subjects of different ages thus circumstanced.

By whatever name we may designate the disease, we cannot help being struck with the general sameness of the causes assigned by different writers, and on reflection, with the mode in which these causes operate, by enfeebling the nervous and capillary systems and inviting congestions, the precise location of which will depend on prior weakness and present atmospherical conditions. If we admit the share which the nervous system, thus deteriorated, performs in the special etiology of the disease, we must go a step farther, and see in its morbid condition a cause for depravation of the blood, and the introduction of a new element in the pathology of typhoid pneumonia. It was in reference to the probable part performed by the blood in the production of this disease that I have elsewhere made the remark that its history yet remains to be written. It may be that the same causes which tend to derange the functions of the nervous system act also on the composition and quality of the blood, and that the two stand in the relation of common effects rather than in that of cause and effect. Be this as it may, we cannot overlook the state of the blood, in studying the pathology, or in laying down the indications of cure, of typhoid pneumonia. Connecting the observations left us by Huxham, of the peculiar appearance and change of the blood in the disease, with the remarks of M. Andral (*Essai de Hématologie Pathologique*) on the defibrinisation of this fluid in cases of pyrexia in which there is such a tendency to sanguineous congestions, we know enough to authorize a belief that in typhoid pneumonia the blood has undergone a change of this nature, analogous to that in scurvy and in splenic congestions.

We cannot say, as Dr. Stokes justly remarks, that there is any specific typhoid pneumonia; but we find that, under a variety of depressing circumstances, conditions of the lungs more or less analogous may be induced, presenting the characters of the disease as given by various authors. Among these he refers to Huxham on Fevers; Stoll, *De Peripneumonia Vera*; also Burserius, who has described an erysipelatous pneumonia. In the writings of Good, Williams, Mackintosh, and Andral, the disease is noticed. Louis merely alludes to the occurrence of hepatisation in typhous fever, in *Recherches sur la Gastro-Enterite*. In the earliest editions of the *Histoire des Phlegmasies*, the statements of Broussais, written before he had formed his theory of fever, may be studied with great advantage. He recognised the secondary and complicated pneumonia of typhus, the latency of the disease, and its slow resolution. P. Frank has described

several varieties of the disease; of these, the *nervous peripneumony* seems most like the disease as met with here.

This disease is seen most frequently in hospital than private practice — a fact strongly illustrative of its connection with the low state of the system. Dr. Stokes has observed it in the following cases:—

1st. As a complication with enteritis, or gastro-enteritis.
2d. Complication with true typhus.
3d. Occurring in cases of bad erysipelas.
4th. Supervening in cases of the diffuse cellular inflammation.
5th. Complicating the delirium tremens from excess.
6th. As a consequence of phlebitis.
7th. As apparently the sole disease.

Now, although these cases must be considered different as to their original nature, yet, with respect to the pneumonia, they have a certain agreement; for the affection is more or less latent, presents similar physical signs, requires that the antiphlogistic treatment should be employed with extreme caution, and in many cases that the free and early use of stimulants should be resorted to. Of the cases above noticed, those complicating typhous fever are most frequently observed.

The terminations of typhoid pneumonia are various; it may rapidly produce a fatal hepatisation; it may form gangrenous abscess; or induce a chronic solidity of the lung, passing into the tubercular condition.

One of the most interesting circumstances to the practical physician is the extreme slowness of its resolution, as compared with the sthenic pneumonia. Months may elapse before the respiratory murmur is restored, and in many cases this is never completely re-established. The fact, that contraction of the chest has been only met with in these cases, shows the slowness with which the disease is removed. For copious details on the pathology of typhoid pneumonia, I refer you to Dr. Stokes's Treatise on *Diseases of the Chest.*

The *progress* of sthenic pneumonia is well and tersely described by Andral (*op. cit.*). From the first to the second day of the disease, pain, chill, impeded respiration, cough without expectoration, crepitating rhonchus, resonance of the chest, and fever, are the observable phenomena, and those which constitute the first period of the disease. From the second to the third day the expectoration is distinctive, by its becoming viscous and variously coloured. The crepitating rhonchus (crepitation) is more evident, the resonance of the chest is weaker on the side in which the pneumonia exists; the pain is less acute than at the beginning, but the dyspnœa is increased; the patient lies on his back; the fever is violent, skin dry, sometimes moist. If resolution be not effected at the first stage of the disease, or that of engorgement, and the symptoms be more intense, the second stage is reached; and then the laborious breathing is increased, the speech is tremulous, the tenacity of the sputa is augmented, as is also the dulness of the chest on percussion; crepitation disappears and yields to bronchophony; the pulse is strong, frequent, and full, or it is either really or apparently feeble. At this stage the pneumonia may terminate suddenly by asphyxia, or its resolution may still be brought about. In this latter case there is an abatement of the symptoms and approach to conva-

lescence. If the pneumonia reaches the third stage, the expectoration in the larger number of cases is watery and brown, and more or less like plum-juice. Commonly, also, the face becomes pale and cadaverous some days before death. There are no definite periods for the several stages of pneumonia to be gone through. Sometimes suppuration takes place at the fifth day; and sometimes the lung is only in a state of red hepatization by the fifteenth and even the twentieth day. Whatever may be the degree and kind of pneumonia, it pursues a uniform course with evening exacerbations.

In some cases, after the subsidence of pain and all the unpleasant symptoms of pneumonia, and when the patient is congratulating himself, and praising his physician for the removal of his disease and the prospect of a speedy restoration to health, things take a most unexpected turn. The pulse becomes slow and weak, the skin cool, then cold; sweat oozes from every pore, but to increase the coldness and weakness. If the patient is asked how he feels, his reply is, — "quite comfortable;" his only complaint is, that he cannot sleep. Uneasy at this new state of things, the physician who had probably already allowed his patient light nutriment, now makes it more stimulating, by substituting animal broths for sago, or arrow-root, panado, and bread and tea. He directs, also, wine and water at intervals, and warm applications to the feet, and frictions of the skin generally. No reaction taking place, and the serous oozing from the skin still continuing, more like that in epidemic cholera than any other morbid state, powerful stimuli are prescribed, — such as volatile alkali, wine whey, hot brandy and water, and opium in small and repeated doses internally, and sinapisms and blisters externally; but all without avail. The patient becomes weaker and weaker, and finally expires without pain, and with less pulmonary oppression than is common with the dying. In this brief sketch I have had in view an actual occurrence. It was in the case of a patient of my own who had been bled twice; the first time sixteen, the second twelve ounces, for pneumonia with a severe stitch in the right side. A blister subsequently applied removed this pain; calomel and tartar emetic with a little opium were given; and in the course of four or five days the patient seemed to be out of danger; his pulse good, breathing easy, expectoration free, decubitus natural. In this comfortable state, taking light nourishment and using some mild diaphoretics with opium, he remained two days, after which the symptoms already described began to appear. The period of sinking and collapse was of three days duration, during which nothing seemed to arrest the progress towards death; nor indeed to impart even temporary force to the pulse or warmth to the skin.

With so vivid a recollection of the case, made to me more interesting by the estimable character of the man who was its subject, I was attracted by the heading of a paper in the *Edinb. Med. and Surg. Journ.* (1840), entitled, "Remarks on Collapse occurring during the Treatment of Acute Pneumonic Diseases, by Mr. Kerr, of Paisley." This gentleman gives the outlines of three cases, two of which were fatal, resembling the one which I have just described. He does not

speak of their putting on any of the symptoms of typhoid pleurisy or pneumonia. Mine had nothing of that character at its onset; but, on the contrary, exhibited all the symptoms of well-marked acute inflammation.

The mean *duration* of pneumonia is from twelve to twenty-five days. In some cases it terminates in two or three days; in others, has extended to thirty and even forty days.

LECTURE XCI.

DR. BELL.

PROGNOSIS AND TERMINATION OF PNEUMONIA.—Critical evacuations and critical days—Age modifies results—The old and young most apt to sink under pneumonia—Part of the lung most liable to inflammation—Which side most affected—Complication with other diseases increases danger—*Morbid Anatomy of Pneumonia*—Varieties of pneumonia—Participation of the pleura with the lungs.—*Causes*—External and internal—Climates and countries in which pneumonia prevails most—Is a common disease in southern Europe—Winter and first spring months the chief seasons for pneumonia—Immediate or exciting cause—Particular employments less apt to cause the disease than is supposed—Internal causes,—Liability of the disease to return in the same person—Tuberculous phthisis—Age—young children most liable—Sex—men much more liable than women.—*Treatment*—Great mortality in pneumonia—Contradictory reports of different modes of treatment—M. Louis's results adverse to bloodletting.

PROGNOSIS AND TERMINATION.—The prognosis in pneumonia is always serious, although physicians are not agreed as to the proportionate mortality; some rating it at one in three, others at only one in twenty; and one in fifty, and even sixty cases. Even of the probable result of cases apparently favourable, as measured by the symptoms, we ought to speak with caution. Our opinion will be modified by the stage of the disease, its duration, and the tendency to a crisis by spontaneous evacuation. A very frequent pulse, as when it is 120, and hurried respiration, are bad signs; so is an obstinate cough with scanty or difficult expectoration. The character of the expectoration will guide us materially in prognosis. Thus, in simple pneumonia the viscidity and rusty tinge of the sputa are in exact proportion to the intensity of the inflammation, and their increase in quantity and diminution, or tenacity and colour, are the common attendants on resolution. Dirty or watery-brown sputa and those containing pus, import great danger, inasmuch as they indicate the probable supervention of the third stage, and a gangrenous odour generally implies a state of great peril. The sudden suppression of expectoration is generally an unfavourable sign; for although the disease may be resolved without any increase of the expectoration, yet this has always a favourable influence and contributes greatly to the cure. A dry, harsh state of the skin attends bad cases complicated with gastric disease, exhibited in a loaded or parched tongue, great thirst, sickness of stomach, and tenderness of the epigastrium. A moderately perspirable

skin is the most favourable state; profuse perspirations, as I have already stated, sometimes occur in fatal cases. The same has been remarked of diarrhœa, yet both these discharges occasionally prove critical. A copious deposit in the urine may be generally viewed as a favourable sign; and the observation of Hippocrates seems to be commonly true, that if, after having been turbid, the urine becomes clear before the fourth day of the inflammation, a fatal result may be anticipated. Delirium is generally considered to be a symptom of great danger; and it is the more so when it is constant and not merely the temporary effect of the nightly febrile exacerbations; but in hysterical females it is of less importance. Equally fearful is a comatose or lethargic state, as it shows that the functional disorder has greatly encroached on the strength required for the necessary treatment.

Of the evacuations regarded as critical, Laennec believed the lateritious sediment in the urine to be the most common: Frank and Andral describe perspiration as more frequent. Dr. Williams, whose summary of opinions I am now making use of, believes that the two are commonly conjoined; and there seldom occurs in pneumonia a perspiration that can be called critical, without, at the same time, a deposit in the urine. A copious expectoration of a critical character does not occur so often as is described by Sydenham and Cullen, and, indeed, by the older writers generally. Andral, confirming the opinions of Hippocrates and other writers, says, that there are certain days in the duration of the disease in which there is a great tendency to amelioration. Of ninety-three cases, he found that twenty-three gave way on the seventh, thirteen on the eleventh, eleven on the fourteenth, and nine on the twentieth days. The recoveries in the remaining cases commenced in twelve out of forty-two non-critical days, as many as eleven being ascribed to the tenth day. Thus the recoveries on critical days averaged as high as fourteen, while those on non-critical scarcely exceeded three.

The *age* of the subject will modify our prognosis. In children the inflammation continues for a much longer period in the first stage; after some weeks duration presenting only some hepatised points at the margin of the lung or in isolated lobules. The same peculiarity has been noted by Laennec in certain epidemics. On the other hand, there is a remarkable tendency to pneumonia in old and debilitated subjects to pass rapidly to the state of purulent infiltration, — even within a period of twenty-four to thirty-six hours after the inception of the disease. Gangrene, though it generally portends death, does not necessarily terminate in this way. A strong constitution and youth have sufficed to triumph over this sinister state of things. The extent of the inflammation modifies greatly the prognosis. Thus a double pneumonia affecting both lungs at once is frequently fatal, even in the first stage; and whenever the whole of one lung is involved there is much danger of an unfavourable issue.

The part of the lung that is inflamed will not be without its influence on our prognosis. It has been a question, disputed by different writers, as to the relative frequency of inflammation of the upper or lower portion of the lung. Andral's statistics on this point are in

favour of the predominance of the latter. Of 88 cases of pneumonia, in 47 the inflammation was of the inferior lobe, and in 30 of the superior lobe, while in 11 the entire lung was affected. There is, however, a greater risk of fatal result when the upper lobe is the part inflamed. Dr. Hughes, in 101 cases, states, as a result of his inquiries, the inflammation to have attacked the base alone in 62; the entire lung in 12; the posterior part alone in 8; the apex in 5; the centre alone in 3. The parts were not mentioned in 2, and various parts in one or both lungs, without specification, in 9. MM. Valleix and Vernois assign, in 139 examples, pneumonia of base and summit, 44; base alone, 44; summit alone, 20; disseminated lobular pneumonia, 31.

From the combined observations of Andral, Chomel, and Lombard, Dr. Forbes has shown, that out of a total of 1131 cases, the right lung was affected in 562, the left in 333, and in 236 the disease was double; the general result of which would be, that out of every ten cases, five would be of the right, three of the left, and two double. This result is probably near the truth, and corresponds pretty closely with Dr. Stokes's experience; but, adds this gentleman, it will be found that the double pneumonia is more frequent than appears from the above statement. It commonly happens that, notwithstanding a great preponderance of disease in one lung, a careful physical examination will detect more or less of it in the other, even though no local pain or distress exist, which could lead to its detection. Confirmatory of this opinion is the following table:—

	Right Lung.	Left Lung.	Both Lungs.	Unascertained.
Andral (210 cases)	121	58	25	6
Valleix and Vernois (128)	17	0	111	
West (37)			37	
Hughes (101)	52	29	19	1
,, (145)	43	40	60	2
Total (621)	233	127	252	9

The complication of other diseases with pneumonia increases the danger; as in the case of fevers and the exanthemata, and the more formidable is the inflammation in these cases because it is often latent. Pneumonia occurring in the course of a phthisical disease is seldom severe in itself, but it has a tendency to accelerate the development and softening of the tubercles. This inflammation is more than usually fatal in pregnancy and the puerperal state. It is especially dangerous at the extremes of life, more particularly in weakly infants and in cachectic old people, and those exhausted by habitual excesses; and the fatality is much greater among the lower classes than among those well and regularly fed and clothed.

Morbid Anatomy of Pneumonia.— Many of the details under this head have been anticipated in my remarks on the different stages of the disease, and the anatomical characters of each. These I shall not repeat. I may advert to the varieties of pneumonia, viz., *vesicular*, *lobular*, and *lobar*, according to the part and extent of the organ affected. Inflammation attacking the vesicles, the paren-

chyma remaining intact, is vesicular pneumonia. But in what does this differ from vesicular bronchitis? Or, again, the inflammation may attack not only the separate vesicles, but all the vesicles of a lobule, without the parenchyma being affected. All parts of the lung may suffer in this way; but the lesion is most manifest at the external portions, the root, the inferior lobe, and the central vesicles. This will constitute *lobular pneumonia*. Finally, the entire lobe of a lung and all the lobes of a lung may be seized with inflammation, constituting *lobar inflammation*. Lobular pneumonia is most common in children.

Inflamed bronchia, so common an accompaniment to pneumonia, are, of course, seen in fatal cases of this latter. The attack is often begun by bronchitis, which may mask the other disease. Sometimes bronchitis is consecutive on the pneumonia. Mechanical alteration of the bronchia, sometimes noticed in fatal pneumonia, consists in their obliteration, which always begins in those of a medium calibre. More frequent still are the cases in which the pleura participates in the inflammation of the lung proper. This state is recognised after death by an injection of varying distinctness, in albuminous concretions, slight serous, purulent, or bloody effusions. Pleuritic effusion is seldom extensive when pneumonia coexists with the pleurisy.

Rokitansky thus describes the *post-mortem* appearances after catarrhal pneumonia: 'It is always lobular, always has a bronchitis of the tubes belonging to the diseased portion of the lung associated with it, and is a frequent accident of the various catarrhal diseases of childhood, especially of hooping-cough and *catarrhus suffocativus*. Its especial seat is in the superficial lobules, many of which are often affected, and which become bluish-red, dense, and moderately firm. The walls of the air cells are swollen even to the closure of their cavities, which, when the swelling is less, contain a watery, mucous, and slightly frothy secretion. There is no trace of a granular texture discernible. The pulmonary substance around the diseased lobules being, for the most part, emphysematous, they appear (when they are situated at the surface) depressed somewhat below the level, and are distinguished by their dark colour."

Causes. — The causes of pneumonia may be considered under the two heads, — of those external, and those connected with the individual himself. The first include climate, season, and atmospherical exposures in general. Pneumonia is a rare disease in hot latitudes, but if scarcely known in the East Indies, it is of occasional occurrence in the West Indies. In southern Europe it is far from being uncommon; as we learn that in the Archipelago and Greece there is one case of pneumonia to thirty-eight cases of disease in general. Of the Ionian Islands, Corfu is said to suffer most from this disease. The gradual substitution of pulmonary for hepatic disease is shown in the English troops returning from India losing the latter and becoming subject to the former. In Italy pneumonia is quite a common disease. At Pavia, it appears, from a return made for a period of three years, that in the first year one-seventh of the cases received into the hospitals were of pneumonia; in the second year, the proportion was a sixth; and in the third year, a fourth. At Padua, the proportion is

very variable; being at one time a fifth, at another a sixteenth, then a twenty-third, and even a fifty-eight. At Wilna (Russia), the proportion is one in seven to one in eight. Pneumonia is very common in Rome, — a fact long ago pointed out by Baglivi; indeed, there is hardly any difference in this particular between that city and London. There is good reason to believe that inflammation of the lungs is a prevailing malady along the whole European coast of the Mediterranean; in regions and districts, the climate of which has been long supposed to display a sanative influence in all chronic and pulmonary diseases, but in a more especial manner in consumption. I shall point out more formally, hereafter, this fallacy, when treating of the etiology of phthisis pulmonalis. At Nice, Genoa, Pisa, and Florence, the disease prevails greatly, and cuts off many of the inhabitants. The neighbourhood of Naples, or around Mount Vesuvius, is remarkable for this occurrence. Hence it may be called truly endemic, especially by those who attribute it to the noxious exhalation which prevails there. To more recognised climatic influences should we attribute the endemic character of pneumonia in northern Europe generally, in which we must include Great Britain.

There is not entire uniformity in the seasons, even in the same latitudes in which pneumonia is most rife. In general, however, it may be said that the latter winter and first spring months give the largest number of cases in northern and middle Europe, and in the United States. In the West Indies, on the other hand, the maximum of frequency is in summer. In Paris, the chief months are January and April. Recent statistical returns in England show, that the greater mortality from pneumonia in persons under 15 years of age takes place in December.

The immediate and exciting cause of pneumonia is represented to be sudden transition from a warm to a cold medium while the body is heated, and especially in a state of perspiration. Facts justify this explanation in many cases; but in many more, perhaps the majority, it does not apply; and we are fain to suppose a peculiar predisposition by which certain individuals under common exposures contract pneumonia. Still, knowing the seasons and districts in which the disease is most prevalent, we can hardly refuse believing that a sudden and concentrated application of these atmospherical influences, in the manner just described, should count largely in our inquiries into the causation of pneumonia. The epidemic occurrence of the disease is clearly proved, although even here, again, we shall be at a loss to account for the fact in any known and appreciable imitations and combinations of states of the atmosphere.

The influence of particular employments, in which those engaged are much exposed to cold and humidity, has been greatly overrated, as we learn from Thackrah, among others. Regularity in other respects, and particularly avoidance of alcoholic stimulation, renders exposures of this nature, and even sudden transitions from high to low temperature, comparatively innocuous.

That there are internal causes, a special but not *à priori* recognisable predisposition, by which pneumonia is readily developed and renews its attacks in certain persons more than others, we can

hardly doubt. Authors relate cases in which the same person has had the disease repeatedly; Dr. Rush mentions twenty-eight times; M. Andral sixteen times in eleven years; and M. Dezoteu fifteen times. Perhaps the chief predisposing cause, at any rate the one depending on recognised peculiarity of organization, is tubercles of the lungs. Seldom is there a case of tuberculous consumption in which pneumonia is not developed; and often I have seen it near the close of the disease rendering its removal in the then exhausted condition of the patient, who is sinking rapidly into death, a matter of great difficulty. The influence in this case is, however, reciprocal; for pneumonia, though it does not directly cause, yet it developes the production of tubercles. Pneumonia may supervene on chronic bronchitis; and still more readily and frequently on acute pleurisy. It complicates sometimes dothin-enteritis, as also measles, scarlatina, and small-pox, and follows the suppression of any of these eruptions; as indeed it does of less acute ones. Phlebitis is sometimes associated with it. Chronic inflammation of some other organ singularly predisposes some individuals to pneumonia. One of the most severe cases of the disease which I ever met with, if measured by the structural changes in the lungs, terminated the life of a lady who had for years suffered under chronic gastritis with softening of the mucous membrane of the stomach.

Age has an influence on the etiology of pneumonia. All ages are declared by M. Andral to be subject to pneumonia. It has been known to attack the fœtus *in utero;* and it is quite common in children, rather less in adult life, and prevalent in old people. Guersent reports the disease to be very common and fatal among children, and that, of the deaths in the hospital of sick children at Paris, before the completion of the first dentition, three-fifths occur from pneumonia which is chiefly latent. The age between one and five years from birth is declared by MM. Barthez and Rilliet to be a predisposing cause of pneumonia. Secondary acute pneumonia is much more frequent at this age.

Sex displays a modifying influence, in the greater readiness of men to contract pneumonia. Out of ninety-seven cases which occurred in the wards of *La Charité*, under the care of M. Chomel, seventy-three were men, although the number of patients in the hospital wards, of either sex, was nearly the same. MM. Rilliet and Barthez tell us that of 245 cases of pneumonia, 95 were of girls and 150 boys.

Treatment.— If inferences were to be drawn respecting the treatment of pneumonia from the proportionate number of fatal cases, we should be greatly at a loss to determine on which side the advantage lies; both owing to the fluctuation at different times in the same place, and the different results published by two sets of writers of the same cases. The great success of M. Laennec, under the tartar-emetic treatment, in his only losing two out of fifty-seven cases, has been often quoted in his and its favour; whereas if we are to believe in the critical accuracy of M. Bouillaud, the deaths were seven in number, leaving at this rate the mortality to be rather

less than one in eight. In the *Charité*, in the years 1825 and 1826, the results of M. Laennec's practice was 12 deaths in 30 cases of pneumonia. M. Chomel very frankly admits, the deaths in his hospital practice were one in four; but M. Louis goes still farther, and rates it at one in three. M. Bouillaud, in summing up the results of the practice which he advocates, early and full bloodletting, reports in 102 cases 12 deaths and 92 cures, which is a mortality of 1 in 8½. M. Lacaze of Montgeron, near Paris, has published, in the *Journal Hebdomadaire* (1834), a statement of the treatment of 42 cases of pneumonia treated by large bleedings, which shows only one death out of the entire number. In the question of mortality and of treatment, you must, however, always remember that, as a general rule, with equal skill, and the same means employed in out-door practice as those enlisted in hospital service, the results will be in favour of the first. The class of persons who, in large numbers, are sent to hospitals, their prior mode of life, poverty, bad feeding, overwork, or excesses of various kinds, and the deteriorating influence of the air of a hospital, are all adverse circumstances against the favourable effects from a remedy or plan of treatment. On this account we cannot implicitly follow the practice pursued by hospital physicians, nor receive for our guidance their caution against a full antiphlogistic course of treatment in inflammatory diseases. The inability of their patients in the hospital to bear free depletion, ought not to be received as evidence of its inapplicableness, to patients of even a similar age and temperament out of doors. I deem it the more important to introduce these cautionary remarks just now, believing that they will apply to the opinion of Dr. Stokes respecting his inculcation of restricted venesection in pneumonia.

It is difficult to explain the results furnished by M. Louis's tables, with respect to bleeding in pneumonia. To find that, with the exception of the first few days, it matters little at what period we bleed, is indeed an unexpected result, and one which is opposed to the experience of all practical men in this country. It may be observed, however, that M. Louis has not separated the sthenic from the asthenic or typhoid pneumonia; and as we know that the lancet has comparatively little efficacy in the latter form, we must conclude, and without impugning the method or accuracy of M. Louis, that its value in the sthenic pneumonia is greater than what appears from these calculations.

In addition, it may be observed, that no mention is made of local bleedings having been employed in connexion with the lancet; had these means been extensively employed, there would, doubtless, have been stronger evidence in favour of bloodletting. It is certainly true that we can seldom cut short a pneumonia by bleeding. In two instances only have I seen this result, but the common effect of general bleeding is to remove or modify the constitutional symptoms.

In some cases the affection is merely converted from a manifest *into a latent but progressive disease*, while in others the lung con-

tinues unresolved, and in a passive condition. In such cases, tubercle, chronic induration and atrophy are commonly the results.

But I reserve for the next lecture a methodical view of the treatment of pneumonia in its varieties and stages.

LECTURE XCII.

DR. BELL.

TREATMENT OF PNEUMONIA. — Superiority of venesection over all other remedies — Extent of its use and frequency of repetition — Not to be deterred by fear of interfering with critical evacuations — Circumstances which modify bloodletting — Original strength of constitution; complication of pneumonia with other diseases — Purgatives — Tartar emetic — Laennec and Louis's advocacy of—Mode and rule for using — Revulsives and counter-irritants — Opium and other narcotics — Depression to be met by stimulants and mild tonics — Treatment of complications — Bilious pneumonia,—The pneumonia of children — Less depletion required in the cases of children — Tartar emetic in their case — Regimen and drinks in Pneumonia — *Convalescence* — Cautions requisite in — *Treatment of Typhoid Pneumonia* — Depletion less used, and stimulants more freely; complications to be attended to — *Chronic Pneumonia* — Physical signs of — Caution against much depletion in. — *Œdema of the Lungs* — Symptoms and treatment.

THE treatment of pneumonia will differ according as we have the simple primary or secondary, and the mixed or typhoid pneumonia. It is to the first that my remarks will chiefly apply just now. As respects venesection too cautiously advised by Dr. Stokes, although I would not go so far as the late Dr. Gregory of Edinburgh, who was in the habit of saying in his lectures that, provided he was called early in pneumonia, he would be contented to dispense with all other aids than those of the lancet and water gruel, I cannot help regarding it as the chief remedy, itself superior to all other means, and not to be replaced by any other or by all others. M. Louis's authority is sometimes invoked against bloodletting in pneumonia, which he says is neither shortened nor materially influenced by the remedy. But here is one of the instances of the fallacy of the numeral method. Without a careful specification of the constitution and habits of the persons whose cases are numbered by M. Louis, his estimates cannot be introduced as contradictory to the experience of both ancients and moderns in favour of free, or we might, as Dr. Watson properly does, say prodigal bloodletting. The abstraction of blood is productive of immediate and direct relief to the suffering organs which are now able to resume in degree their functions at once. To be most effective, venesection ought to be practised at the first invasion of the disease; an advantage which may be readily procured in private, but very seldom, if ever, in hospital practice. M. Andral advises free bleeding from a large orifice; but to stop short of bringing on syncope, to prevent which he advises that the patient be bled in a recumbent posture. Leeches and cups, which are of service in cases of pleuritic stitch, ought, as this judicious practitioner recommends, to be considered as *adjuvants*, but not a principal remedy nor as substitutes for the lancet.

If we can bleed early, within the first twelve or twenty-four hours of the attack, and produce a decided impression just short of syn-

cope by this remedy, we may then, as so strenuously recommended by Dr. Armstrong, give at once a full dose of opium, as of two or three grains, with a view of arresting the further progress of the disease. The efficacy of the opium will depend entirely on its early administration; after the first day we cannot hope for much from it, and when hepatisation has begun it will be injurious. How often should the bleeding be repeated? Dr. Stokes tells us (*Treatise*, &c.) not more than twice; M. Andral says from three to five times; and that, if the disease is very violent, blood may be abstracted twice in the same day, once in the morning and once in the evening. Some have bled fifteen to twenty times in a pneumonia. My own observations would induce me to press the use of the lancet without stint, where there is pleurisy associated with pneumonia, until the pain is removed and the breathing comparatively easy. It is hardly worth while to speak of a bloodletting which does not produce a decided impression; short of this it seems to aggravate the sufferings of the patient. On one occasion, a young woman, a dispensary patient, was directed by me to be bled, and she was bled, but not to the extent which I wished. I prescribed a repetition of the operation on the morning following the first venesection, but the quantity fell far short of the exigency of the case. In the afternoon (the fifth day of the disease), when I again visited her, I found her still suffering acutely. I now opened a vein myself, and let the blood ow until twenty ounces were abstracted. From that hour she was relieved, and her convalescence may be said to have begun at the same time.

We must not be restrained from a bleeding by a fear of its interfering with a crisis by expectoration, or urine, if the inflammation be still great, and the symptoms urgent as at first. Bloodletting is best on the first day; it is good on the second and the third, and will often save life on the sixth and even the eighth day of the disease. After expectoration is freely established, and the sputa have lost their viscosity and rusty colour, and the breathing is easier, it would be imprudent, under an idea of accelerating the cure, to draw blood. Venesection in pneumonia is a remedy of necessity, not of precaution; nor is it one of cumulation, an increase merely of remedial impression for the removal of the disease. Bloodletting cannot be as efficacious in the hepatisation of pneumonia as it is in the primary stage of engorgement; but still it often produces excelent effects; even, as M. Andral assures us, after the gray hepatisation in the suppurative stage. Not that we bleed in this case for the removal or absorption of the pus, but to relieve other parts of the lung in which hepatisation still prevails. Mere smallness and frequency of pulse will not deter us from using the lancet, if the accompanying symptoms indicate oppression rather than depression or prostration. The pulse in pneumonia, as in most of the phlegmasiæ, often rises and acquires volume after bleeding. Copious sweat has been regarded by some as a cause for our withholding the use of the lancet; but I have already told you that often a warm sweat even accompanies some of the worst and fatal cases; and hence, that it is not critical, nor can its suppression be attended with deleterious effects, if this result follows an abatement of the intense phlogosis

which, in some cases, seems to keep it up. By some physicians the inflammatory buff and cup of the blood drawn are regarded as a necessary appearance to indicate and justify the repetition of the bloodletting. But on this point there is no uniformity; for in some of the worst and inflammatory cases of pneumonia you will not see any buff in the blood.

Returning from this digression, let me conclude my remarks on the circumstances requiring and modifying bloodletting in pneumonia. In old persons we are too apt to be deterred from this remedy, under an idea that they are weak, and their systems will not react under the temporary depression caused by loss of blood. But this is a mistake, if assumed as a general rule. Original strength or weakness of constitution, prior health or disease, and the habits of the patient, are qualifying circumstances of more importance than those of adult or of advanced life. An old man of seventy, who has been habitually robust, healthy, and temperate, can part with more blood than a young man of twenty-five, of an anemic or scrofulous habit, and weakened by excesses of any kind, — in the same disease. I both ordered to be bled and cupped a female eighty years of age and of a thin habit, and apparently fragile constitution, who had pleuro-pneumonia during the last winter (1843–4). She recovered entirely, and is at this time in good health. In the complication of pneumonia with eruptive fevers, some physicians are afraid to draw blood, — imposed upon by the small, frequent pulse, and predominance of nervous symptoms, great weakness, and apparent prostration. This is often the critical epoch, when bloodletting is most required to save the patient. It will be more necessary in these cases than in others, to aid in bringing on reaction by moderate stimuli, with small doses of opium and external warmth and frictions. A similar remark applies to the supervention of pneumonia on gout. The attack is still pneumonia, by whatever terms we may choose to qualify it; and if it is not removed by active treatment, it will kill the patient. The complication of pneumonia with typhous and typhoid fevers is a very common occurrence, and merits prompt attention. Congestion predominates over inflammation, and we cannot hope to free the lungs by full bleedings; but we may greatly relieve them, and simplify the diagnosis by small bleedings either from the arm, or preferably by cups to the chest, — on the sides, under the clavicle, and between the shoulders.

Although bloodletting is the chief, it must not be regarded as the sole available remedy in pneumonia. In the beginning of the disease and towards its decline tolerably active purgatives, into the composition of which calomel enters, are administered with good effect. In fixed hepatisation we cannot promise ourselves much service from them. But next to bloodletting in pneumonia comes tartar emetic. My own experience, and I have used this medicine freely for the last twenty-five years, is coincident with that of Dr. Stokes and the French School. I would quote on this particular point, in terms of decided approbation, the language of Laennec, who says: "As soon as I recognise the existence of the pneumonia, if the patient

is in a state to bear venesection, I direct from eight to sixteen ounces of blood to be taken from the arm. I very rarely repeat the bleeding except in the case of patients affected with disease of the heart, or threatened with apoplexy, or some other internal congestion. More than once I have even effected very rapid cures of intense peripneumony without bleeding at all; but in common I do not think it right to deprive myself of a means so powerful as venesection, except in cachectic or debilitated subjects. I regard bloodletting as a means of allaying for a time the violence of inflammatory action and giving time for the tartar emetic to act." M. Lepelletier, among the numerous pathological facts contained in his volume, gives, from various sources, the details of twenty-four cases of pneumonia successfully treated by venesection and tartarized antimony conjointly, and of twelve failures by the same method; of thirteen fortunate ones by tartar emetic, and of two fatal by the same means. (*Brit. and For. Rev.*, vol. i.)

We generally begin, says Dr. Stokes, with the use of from four to six grains on the first day. The dose is increased by one or two grains daily, until ten, twelve, or fifteen grains, are exhibited in the twenty-four hours. I have never gone beyond this dose; but it must be remembered that the most careful attention was always paid to local treatment.

For the reduction of the ordinary inflammations of the lung in Ireland, continues Dr. S., our returns show that it is seldom necessary to administer more than from twenty-five to thirty grains of the remedy given in the doses above mentioned. In many cases, however, larger quantities have been employed; thus, I have often continued the exhibition of the remedy to the amount of fifty grains, and one case, where an acute double pneumonia was superadded to a chronic bronchitis, one hundred and seventy grains were used at the doses of twelve grains daily. The patient's symptoms and appearance daily improved under its use, and, during the latter period of its exhibition, his appetite and digestive powers were excellent. In this case, the recovery was perfect and permanent. In many cases, the first doses produce vomiting, and in some purging; but the effects generally subside after the first twenty-four hours. With respect to the interval of tolerance, I have constantly verified the statements of Laennec, and there is hardly a more interesting circumstance in medicine than to see a patient take from eight to twelve grains of the remedy daily, without vomiting, purging, or sweating — without any effect, indeed, save the gradual removal of the pneumonia. This treatment is seldom followed by abdominal irritation. In one patient, after the use of eight grains daily for four days, violent vomiting, diarrhœa, and pain in the abdomen, supervened. These symptoms subsided under a sedative treatment, but returned, in two days, with such violence that the lancet had to be employed. In another case, the usual symptoms of poisoning with tartar emetic followed the first dose of the medicine; both these patients recovered without difficulty.

Believing that adequate justice is not done to the antimonial practice by our medical brethren generally in the United States, many of whom are pleased to reject what they call theory, on the strength

of some *à priori* reasoning of a hypothetical nature of their own, I give insertion here to the opinions of M. Louis on the subject. This gentleman's skepticism on the remedial value of modes of practice the most esteemed by others is well known, as, for instance, on the efficacy of bloodletting in pneumonia; and hence more will be thought of his favourable view of the utility of tartar emetic in full doses in this disease.

"To sixteen of the individuals who recovered, tartar emetic was administered, during a period of from four to seven days, in quantities progressively increasing from six to twelve grains in six ounces of the distilled water of the flowers of the linden-tree (eau distillé de tilleul), sweetened with half an ounce or an ounce of syrup of poppies, and the patients took these quantities in six or eight doses. Their disease lasted, on an average, eighteen days: three days longer than that of the individuals not subjected to this treatment; so that it would appear at the first glance, that the emetic tartar had a pernicious effect on the course of the disease, instead of having accelerated its fortunate termination.

"But this influence was pernicious in appearance only. The emetic tartar was administered, after several bleedings had been performed, on the eighth day of the affection on an average, because the disease continued acquiring greater and greater intensity; and in cases not bled for the first time till the fifth day, as a mean term: whilst it had been performed on the third day in the cases in which this medicine was not employed. That is to say, it was given under the most unfavourable circumstances, and in severe cases, which explains the long duration of the disease in those who took it. Let us add, that it is not necessary to insist on the importance of this fact, that the patients, for whom the emetic tartar was prescribed, were older than those who did not take it, in the proportion, on an average, of forty-five years to thirty-one: an enormous difference, which shows that not only had the medicine no pernicious effect on the duration of the disease; but that in some cases it must have accelerated its course and prevented a fatal termination.

"The last proposition appears, moreover, to be confirmed by the changes which almost immediately followed the exhibition of the emetic tartar. From the day following that of its first employment, fifteen of the seventeen persons who took it found themselves a little better, or much better, having then perceptibly more strength, an improved physiognomy, and the respiration less restrained. Besides, thirteen of them, whose chest emitted a sound more or less completely dull over a certain space, when the emetic tartar was first administered, showed from the following day a perceptible improvement in this respect; percussion of the thorax being already more sonorous; and these various ameliorations were permanent, and made additional progress daily.

"The increase of strength from the day next ensuing, or that in which the medicine was administered, is the more remarkable, as its action was accompanied with frequent purging and vomiting. In sixteen cases out of seventeen, the alvine evacuations were

very numerous, ranging from eight to fifteen on the first day, one half less frequent on the second, and on the third and fourth, not more so than in the ordinary state. The vomitings were less numerous, and of a shorter duration, than the alvine discharges: they did not continue beyond the first day, and were absent altogether in five instances.

"Three of the patients who died took the emetic tartar, and did not experience any improvement on the day following that of its administration. One alone of these had not the evacuations mentioned.

"Thus of twenty cases in which the emetic tartar was employed under unfavourable circumstances, three only were fatal; which cannot leave a doubt, as it appears to me, of the utility of this medicine, in large doses, in the treatment of pneumonia; and so much the more as these three individuals were all aged, being sixty or seventy years old."

Dr. Stokes judiciously advises that in those cases where the remedy has been borne well, it is not advisable to omit its use suddenly. He has seen frequently a severe relapse to follow this practice, but by diminishing the dose at the rate of a grain or two daily, these effects can be avoided. In those cases where the tartar emetic is not borne, or its use seems inadmissible, he has generally recourse to a mercurial treatment; this is to be conducted both by the internal and external use of mercury. Calomel, combined with blue pill and opium, is to be administered every third hour, and its action assisted by mercurial frictions, and the application of the ointment to blistered surfaces. I mention this practice of Dr. Stokes, but would not recommend its adoption.

Laennec has been severely censured for his statement, that the gastro-enteritis of fever does not contraindicate the use of the tartar emetic. In this matter he has been scarcely done justice to, for there is every reason to believe that he makes use of the term gastro-enteritis in the conventional mode then so prevalent in Paris, and in which gastro-enteritis and fever were convertible terms. There is no ground for believing that Laennec would give tartar emetic in acute gastritis; and his statement is reducible to this, that the remedy may be employed in the pneumonia of fever; and without entering into his reasoning on the subject, we must agree with him, that the contradications to the use of this, as of all other medicines, ought to be founded on experience alone. It is now proved, that the existence of typhous fever does not contraindicate the use of tartar emetic, but that, on the contrary, its exhibition may be followed by the happiest effects; the *gastro-enteritis of Broussais*, then, does not contraindicate the use of this remedy.

The rule to guide us in the antimonial practice is thus described by Dr. Stokes: — The success of the antimonial treatment depends on or is favoured by, the inflammatory character of the fever, the early stage of the disease, the absence of complication with other diseases, the fact of the patient having borne bleeding well, and the firmness of the coagulum; the more the case presents these characters, the greater will be the likelihood of the tartar emetic acting favourably.

But in the typhoid, secondary, and complicated cases, in those where the powers of life have been previously injured, where bleeding cannot be used with boldness, and where stimulants are required, the exhibition of the tartar emetic, in full doses, is very hazardous. The mercurial treatment is to be preferred from its greater safety, and, in this disease, more than equal efficacy.

In the Meath Hospital, the tartar emetic was used after the manner of Laennec; but its exhibition has been conducted on a different principle; for while he considers it as his chief remedy, Dr. Stokes found it secondary to general or local bleeding. The formula used is that already given in a preceding lecture on bronchitis.

It is while the crepitating *râle* is heard more distinctly, and before a complete solidification has taken place, that the remedy answers best. Indeed, in the advanced stages of the disease, and where the object is to remove hepatisation, the antimonial is inferior to the mercurial practice; but the mere occurrence of hepatisation does not contraindicate the use of the antimony, if it be in the early stage of the disease, *and while the crepitating râle is advancing in other portions of the lung.*

As a prompt abater of inflammation *calomel* is inferior to tartar emetic, but where congestion is complicated with phlogosis, and especially where secretion from a mucous membrane is suspended by an inflammatory condition of the latter, calomel is entitled to a preference. This medicine acts on the gastro-hepatic and gastro-intestinal apparatus, which are liable to be implicated in pneumonia, and in this way, by revulsion, relieves the oppressed lungs, at the same time that it facilitates abundant secretion of sputa and thus unloads the turgid and congested air-cells. Calomel contributes, also, to a more natural action of the skin, which becomes softer and cooler under its use. We may advantageously combine with it nitrate of potassa, and, taking care not to offend the stomach, minute doses of tartar emetic. My own usage is, after an adequately full venesection, to administer a mercurial purge of calomel and jalap, or ten grains of calomel followed, after four or five hours, by half an ounce of sulphate of magnesia and a drachm of the wine of colchicum seeds. I then, if the lancet is not again called for, but the pneumonia persist, direct calomel in a dose of two grains every two hours, to be continued for forty-eight hours, either alone or in combination with nitre and tartar emetic. But in thus prescribing calomel, I do not desire to see those proofs of extreme constitutional operation, in ptyalism, short of which its best therapeutical effects may, in a vast majority of cases, be obtained.

Counter-irritants in the shape of sinapisms to the extremities and hot pediluvia, are generally and usefully prescribed. As revulsives, leeches to the vulva or the anus, in cases of suppressed menstruation or of hemorrhoids, shortly before the coming on of the pneumonia, are directed in preference to their application to the chest. Blisters, a favourite remedy with nearly all writers, are beginning to be regarded with mistrust by some of the most judicious of our practical men. In the acute and febrile stages of the disease they

are not to be relied on; and they irritate, often excessively, the patient, especially if he be of a nervous temperament. When prescribed, they ought to be either very early, or, a safer practice, towards the decline of the disease. In children we must trust more to counter-irritation than in adults; and hence, in cases of pneumonia, attacking the former class of subjects, we direct stimulating liniments rubbed on the skin, irritation of the lower extremities by liniments or sinapisms, the warm bath, and blisters to the chest.

Drinks of the demulcent class are always preferred: but we must study variety, so that the patient may not have a distaste, or, in fact, a disgust towards them. We are cautioned against the free use of drinks, in pneumonia, as calculated to injure both by filling the bloodvessels and by inducing dyspnœa, owing to distension of the stomach.

I spoke of opium as a medicine which might be usefully given on the accession of the disease, and especially and mainly after a large bleeding. This period over, we ought to be very sparing in the use of opium, which may increase the pulmonary congestion, both by its effects on the circulation and by dangerously weakening the innervation on the respiratory muscles, and also by its operation on the lungs themselves through the par vagum. On the subsidence of the pulmonary inflammation and of the violent action of the heart, and the coming on often of nervous symptoms and wakefulness, — Dover's powder, in doses of three grains every two or three hours, will be of much service. When calomel is administered, this fashion of opiate may be usefully combined with it, even in an earlier period of the disease; and, as already pointed out, the addition of a few drops of laudanum to the tartar emetic solution is both admissible and proper. You will find no contradiction between these admissions in favour of the occasional use of opium, and the general prohibitions precedingly laid down. Opium alone, after the first day, and in such doses as to produce its hypnotic effects, is prejudicial; but opium combined with calomel, or with tartar emetic, or even ipecacuanha, serves both as an adjuvant and corrigent, and aids the operation of these medicines without any inconvenient exhibition of its own more distinctive and peculiar powers. In cases of doubt, less objection applies to other narcotics, such as hyosciamus; and as a narcotic diuretic which directly soothes, and indirectly relieves also, by a revulsion on the kidneys, digitalis is entitled to consideration. Calomel and digitalis are most useful, particularly the former, in the pneumonia of children.

Sometimes sudden depression follows venesection, or comes on in the process of pneumonia, as I stated at the conclusion of my lecture before the last. This requires mild tonics and even stimulants. Of the latter I prefer, as prompter in its operation, and less hurtful subsequently, carbonate of ammonia, to which small doses of Dover's powder and wine whey are properly added. In the cases in which we are forbidden to repeat venesection, but rely on the calomel, it is no bad practice to give, alternating with this latter, the carbonate of ammonia; and in some instances, where the expectoration and urine are scanty, small doses of oil of turpentine.

In our recourse to tonics we shall be chiefly guided by the state of the stomach and the predominance of gastric debility. Of this class, calumba infusion, with a few drops of nitric acid, will be found to meet our wishes most satisfactorily.

The complication of hepatic disorder, or it may be inflammation of the liver with pneumonia, ought not to make any difference in the essential points of practice in the latter disease. Venesection cannot be postponed nor preferred in favour of emetics and purgatives, nor of mercurials which do not purge; but these remedies, and especially purgatives, will very properly follow bloodletting, and contribute not a little towards the cure. In those cases of *bilious* pneumonia, or, as these are generally designated with us, bilious pleurisy, whether there be pneumonia with pleurisy, pleuro-pneumonia, or pleurisy alone, preference should be given to calomel over tartar emetic, after the lancet has been used. We give calomel at first to act on the bowels, aiding its operation in this way by saline purgatives, and afterwards as a direct antiphlogistic; a sedative, in fact, but not as a sialagogue. The presence of the menstrual flux has been supposed to contraindicate bloodletting in pneumonia; but without reason, if the symptoms are violent, and the case is of such a nature that it would otherwise call at once for venesection.

In the pneumonia of children we have at first difficulty in establishing a correct diagnosis, latent as the disease is so apt to be in this class of subjects; and, afterwards, a difficulty in carrying out and adopting our views of practice, in reference to their peculiar constitution. Bloodletting is required in primary infantile pneumonia, but not to the extent nor with the same freedom of repetition as in the case of adults. If it does not materially shorten the disease, it abates the febrile movement and diminishes the local malady and the probability of complications. Could we, with Dr. Gerhard (*Am. Jour. of Med. Sciences*, vol. xv.), in his valuable paper on the pneumonia of children, suppose that this disease, in subjects from two to five years of age, approaches more to sanguineous congestion from mechanical obstacle to the circulation, than to inflammation, we should feel the less inclined to bleed, and would trust more to revulsion and counter-irritation. But as MM. Rilliet and Barthez pertinently ask (*A Treatise on the Pneumonia of Children* — Translated by Dr. Parkman of Boston): a rapid progress, formidable symptoms of reaction, evident traces of an inflammation of the lung or its dependencies — are not these sufficient to characterise an inflammatory affection? Whatever shade of pathological opinion on this point we may adopt, the fact is not the less clear that children do not in general require nor bear very copious abstraction of blood. Nutritive life is active in them; and there is great mobility both of the circulatory and nervous system; but their powers of reaction are not great. We are restrained, also, by another consideration in the disease before us. It is seldom idiopathic; but results from other diseases and ailments, among which bronchitis is one of the principal. Thus gradual in its approach and complicated with other diseases, their pneumonia is not of that open kind that would justify large and repeated bloodletting. The experience of MM. Rilliet and

Barthez, and the recorded testimony of other writers which they adduce, are unfavourable to the remedy, which, as they allege, under these circumstances, exerts little or no immediate salutary impression, and displays no influence in shortening the duration of the disease. More may be expected from the application of leeches under the clavicles, or cups on each side of the chest, or between the shoulders, than from venesection; for unless we produce a stronger effect on the disease than it is in our power to do by the common expectorants, we shall almost certainly lose our patients. Respecting the value of the tartar emetic treatment in the pneumonia of children, my own experience coincides with the conclusions of the French writers just named, viz., "that the tartar emetic may be employed with success in the child; that there is no danger in a somewhat elevated dose; that the tolerance is generally easily established; that the gastro-intestinal accidents give little cause of fear; and finally, that this medicament appears to act more directly upon the pulse and respiration than upon the hepatisation itself." This remedy is likewise of service in secondary pneumonia. From a grain to a grain and a half may be taken in the twenty-four hours. But a remark made by MM. Rilliet and Barthez will not a little diminish our faith in the therapeutic powers of even the most approved remedies in this disease. It is; that the first signs of amelioration appear in nearly all cases at the same period of the disease, from the seventh to the ninth day, whatever may have been the treatment employed.

The *regimen* in ordinary pneumonia ought to be strictly antiphlogistic throughout; and hence a restriction to simple drinks, demulcent and diluent. Warm drinks are those generally recommended; but unless there be some gastric complication forbidding their use, cold ones are not inadmissible. If the counterstimulant plan be adopted, the patient should not be allowed to drink much liquid until toleration to the tartar emetic is established.

An exception to the antiphlogistic course in pneumonia is sometimes met with, in the cases of old and intemperate persons, to whom, in some instances, wine and even spirits has been allowed. The safer practice will be to give volatile alkali (carbonate of ammonia) in union with opium; and if farther stimulus be required to sustain the sinking powers of life, wine whey in small quantities at short intervals will answer every purpose.

The temperature of the room should be attended to, in connexion with the other parts of the treatment of pneumonia. Hot air and currents of cold air are alike injurious: an average temperature of 60° F. will be the best, but this is to be understood of the air for breathing, and not that to which the skin can be exposed in an uncovered state. I have no doubt of the good effects of occasionally allowing the patient to breathe cold air, admitted by opening the windows; provided there be no current blowing across or over him, and also that his whole body, even his face, with the exception of his mouth and nostrils, be carefully and warmly covered at the time.

Posture is of great moment in pneumonia; so that the chest should be raised above the level of the lower part of the body. The best

means of doing this is by a bed-chair with a notched rack, which will allow of its being raised to any required angle. Muscular exertion of all kinds, including that of talking, is injurious, and must, except for the necessary acts of defecation, &c., be prohibited.

Convalescence. — Remembering the tendency to tuberculous disease of the lungs in consequence of pneumonia, we must watch with peculiar care the state of the pulse and the breathing, and ascertain the state of the lungs by auscultation, so as to be prompt and decided in case of any remains of crepitation, to keep the patient on a restricted regimen, and even to have recourse to leeches and cups, if local or partial (lobular) inflammation remains.

Sometimes convalescence may be retarded by a passive œdema of the lungs, as it is termed by M. Andral, which follows inflammation. Tonics are useful in this state; the diagnosis of which is not clear, or rather it must be reached empirically by watching the effects of treatment; for, as we learn from the same high authority just named, dyspnœa and the crepitating rhonchus, to which this form of the disease gives rise, are not sufficient to enlighten us.

We are apt to be misled both during the progress of pneumonia and of many other phlegmasiæ, by a persistent fulness and tension, or at least vibration of the pulse, which is due to hypertrophy, or sometimes temporary irritation of the left ventricle. A persistence in bloodletting and analogous depletion is not called for in such a case, or at any rate after the symptoms proper to pneumonia have disappeared. I have found tincture of digitalis in small doses, five drops, or vinous tincture of colchicum, twenty drops, twice or thrice a day, with a little sweet spirits of nitre, or cream of tartar in solution, to bring down the pulse, and at the same time meet the other exigencies of the case, should there be any remains of pulmonic congestion.

The means for preventing a relapse are the same as those which are prophylactic against pneumonia. They will consist in a careful protection of the skin by suitably warm and, what is best for this purpose, flannel and woollen clothing: nor will these be of much avail unless the chest and the shoulders up to the neck be kept uniformly covered, and the feet be protected by thick and warm shoes from cold and dampness. The neglect of a plain principle of hygiene in this respect will explain in a great degree why women and children are such sufferers from pulmonic disease. It is bad enough for mothers to be such slaves of absurd fashion in their own persons, as to expose their shoulders to the cold in the way in which they commonly do; but it is positive cruelty, whose only excuse is gross ignorance, to subject their infants and other children to similar exposures.

Treatment of Secondary including *Typhoid Pneumonia.* — Dr. Stokes enumerates the principal points of difference between the treatment of the typhoid and that of primary sthenic pneumonia. They are —

"1st. That general bloodletting is to be used with extreme caution.

"2d. That the mercurial is in general to be substituted for the antimonial treatment.

"3d. That counter-irritation may be employed at an earlier period.

"4th. That the vital forces are to be carefully supported.

"5th. That as gastro-intestinal disease frequently complicates the pneumonia, close attention must be paid to the abdominal viscera.

"6th. That stimulants are to be used with greater boldness and at an earlier period."

A still more extended view of the subject may advantageously be taken, by our regarding all secondary or intercurrent pneumonias as associated with states of the system in which debility predominates, owing to the exhaustion by the other and primary disease or the habits of life which either predisposed to or excited them into activity. Hence we may expect to find pneumonia occurring in the progress of small-pox, measles, scarlet fever, hooping-cough, remittent and typhoid fevers, and sometimes also in cachectic and enfeebled habits of body, under all of which circumstances the treatment must be modified by these complications. But, and herein is a source of danger, we must not content ourselves with merely regarding pneumonia, in such cases, as a symptom or condition of organ dependent on the primary disease and removable by the means employed for it. We have to deal not the less with pneumonia, although its febrile associations are different from the usual ones, and the sensibility of the patient so small that the several stages are gone through with hardly any notice from general symptoms. We are not the less required to direct remedies especially for the removal of the morbid condition of the lung, although we must not draw blood with the same freedom, nor give tartar emetic as liberally, nor restrict our patient to the antiphlogistic regimen, as we do in simple sthenic or primary pneumonia. I am afraid that some practitioners persuade themselves that the stimulating medicines administered for the removal of debility and to quicken the action of the sluggish heart and inert brain, will carry off at the same time the inflammation of the lung. This kind of medication will do no such thing. All that we can hope for from it, and the exhibition of some nutritive stimulants at the same time, is to sustain the powers of life generally, and thus give an opportunity for the inflammation to go through its several stages, with the prospect, often indeed a faint one, that absorption may be sufficiently active to remove the deposited blood in the parenchyma, or expectoration vigorous enough to allow of the patient to throw up the pus that may have been formed.

In this kind of pneumonia, then, we must have recourse to the compound practice, which, although it may be adverse to the simplicity of systematic medicine, is really required by the exigencies of the case. It consists in the administration of diffusible stimulants, at the same time with that of the remedies more particularly adapted to pneumonia. Thus, while we direct volatile alkali, camphorated julep, wine whey, brandy and water, oil of turpentine, sago with wine whey, &c., we may often usefully draw a few ounces of blood from the chest by cups or leeches, give minute doses of tartar emetic with opium, or its weaker substitute ipecacuanha similarly combined; or the indications forbidding the antimony, we have recourse to calomel, at first

in such doses as to act on the bowels, and afterwards as a counter-stimulant, and sedative alterative.

More freely than in sthenic pneumonia shall we have recourse to revulsion to the skin, to counter-irritants, and among these blisters are entitled to a favourable consideration, and should be used earlier than in the sthenic or simple variety. Great attention is required at this time, also, to the posture of the patient, which should be semi-recumbent, alternating with entire pronation; or if this cannot be done, he should change from back to side, and from one side to another. In some cases of secondary pneumonia with very hurried pulse and but slow respiration, I have employed small doses of digitalis with advantage. Cold skin, on the other hand, is benefited by oil of turpentine mixed with some mucilage.

Chronic Pneumonia. — It may sometimes happen that acute pneumonia stops short after the effusion of lymph or stage of red hepatisation, and the diseased portion of the lung, after partial absorption, assumes a dense and indurated character, and a colour varying from a dingy red to brown, buff, and sometimes gray, the "*induration gris*" of Andral. This morbid change of texture is almost always in circumscribed spots. There is also a slow inflammation of the lung, accompanying tubercular formations, to which the epithet chronic may be applied. Most of the consolidation of lung met with in phthisis is of this nature. Dr. Gerhard (*op. cit.*) represents acute pneumonia to have a tendency to become chronic in young children.

The symptoms of chronic are similar to acute pneumonia, but of reduced intensity. The same may be said of the physical signs, which are those of circumscribed consolidation with, of course, obstruction of the pulmonary vesicles of the part.

The diseased portions of lung may remain unchanged for a length of time, producing only some impediment to respiratory function and a slight paroxysmal fever. But in other cases they become the means and centres of fresh inflammation, or they may become the seats of ulceration, and phthisis terminating in death.

The *treatment* will be modified by the stage and duration of prior disease and the constitutional diathesis of the individual. General bloodletting is not called for, and will mostly be mischievous; but it is different, in some cases, with local detraction of blood by cups or leeches over the diseased lung, which contributes to check progressive inflammation and to stimulate the absorbents to remove the lymphatic exudation, — a result quickened by counter-irritants, calomel, or blue mass with narcotics, and the iodide of potassium with the syrup and infusion of sarsaparilla. A regulated regimen, and moderate exercise in a pure and mild air, are of course to be enjoined.

Œdema of the Lungs — Pulmonary Œdema. — A few words will suffice for a notice of effusion into the pulmonary tissue, which, although it have its seat here, is, like all hydropic formations, merely symptomatic of other and often remote organic disease, commonly obstruction to the circulation. Pulmonary œdema results from organic diseases of the heart, lungs, or liver; it occurs also in eruptive

fevers, especially scarlet fever and measles, and in consequence of renal disease, as I have had occasion to mention in its proper place.

The symptoms are both remote or displayed in other organs, and direct or evinced in derangement of pulmonary function. The former are the direct product of the organic causes, and of course various; the latter are cough, difficult breathing, and thin mucous or serous expectoration. With these we generally find also œdema of the limbs. On percussion, the chest emits a dull sound, or one less clear than natural. The vesicular murmur is also indistinct, and particularly at the posterior part of the chest. The physical signs are, indeed, closely analogous to those in the first stage of pneumonia; but there is an absence of the characteristic symptoms of these latter, such as fever and even rust expectoration, and the disease does not advance to other stages.

The *treatment* will depend of course on the organ affected and the duration of its disease, the degree of phlogosis, &c. If the heart be the seat, the remedies will be varied according to the part affected: sometimes direct depletion, sometimes tonics and diuretics doing most good. When œdema of the lungs follows scarlet fever or measles we are generally content with the employment of hydragogue cathartics and diuretics; of the former the compound powder of jalap or scammony with cream of tartar, and of the latter digitalis alternating with solution of cream of tartar, calomel and squills. When the oppression is considerable, and complaint made of pain in any part of the chest, the application of a few leeches, or in their stead, of cups, will both relieve, and predispose to a more satisfactory operation of the purgatives and diuretics.

LECTURE XCIII.

DR. BELL.

PLEURISY — PLEURITIS.—Its forms and complications—*Chief symptoms*—Fever, pain, difficult breathing, hard and frequent pulse, and decubitus on the back—Even the chief symptoms not always present; and they may be present without pleurisy—Structure of the pleura—*Anatomical lesions*—Change in the pleura itself,—in its secretion; immediate effects of this latter—Quality and changes of secreted matters—false membranes—their characters—tubercles and cancerous bodies—Change in the secretion and state of the lung by the effusion—*Causes*—Identical almost with those of pneumonia—Cleghorn's description of *bilious pleurisy*—*Physical signs*;—altered conformation of the thorax, dulness on percussion,—resonance of voice in auscultation—œgophony;—friction sounds.—Diminished vibration of the parietes of the thorax—*General Symptoms*—Fever, state of pulse, buffy and cupped blood—*Progress, duration, and termination* of pleurisy—*Varieties*—*Complications*—*Prognosis*—*Typhoid Pleurisy*—*Puerperal Pleurisy*.

PLEURISY — PLEURITIS (πλευριτις, from πλευρα, the side; also the membrane that lines the ribs, the *pleura*).

Pleurisy signifies inflammation of the serous membrane which lines the cavity of the chest and invests the contained organs of respiration. The forms under which pleurisy presents itself are various and important. It may be acute or chronic; it may affect one side of the chest or both sides; it may be general, involving the whole of one side; or partial, only part of one side; it may be simple or com-

plicated; the complications may be either accidental or essential, and in the latter case, the pleurisy and its complication stand to each other in the relation of effect and cause.

The chief *symptoms* of pleurisy are, fever after a chill, and pain in the side, which is usually acute, pungent, and lancinating, as if a sharp instrument were driven into the side whenever the patient inspires. With these are associated difficulty of breathing, which is quick, short, as if jerking; dry cough, hard and frequent pulse, flushed face, and most generally decubitus on the back or the affected side.

A few remarks will be in place on each of these leading symptoms; and first on the pain. Commonly pain exists from the very beginning of the disease, but it is often wandering until after the first or second day, when it becomes fixed and permanent, and also circumscribed in one spot. Its seat is on a level with or just below one of the mammæ at the part corresponding with the lateral attachments of the diaphragm; and it is thus fixed even when the inflammation pervades a much greater space, perhaps the whole of the pleura. Occasionally it is felt in the shoulders; in the hollow of the axilla, beneath the clavicle; along the sternum, and sometimes over the whole of one side of the thorax; or on a line corresponding with the borders of the false ribs, or of either hypochondrium, in the epigastrium, or even in the lumbar region. In most cases the pain, after having been very acute during the first period of the disease, diminishes in violence, becomes obtuse, and may cease entirely, even before the termination of the disease. Sometimes, after having thus ceased, it returns with intensity, indicating a renewal of the inflammation.

But we may have the symptoms enumerated, and pain, also, which is one of the most constant features of pleurisy, without this disease being actually present. Sharp pains of a nervous, and still oftener of a rheumatic character, closely imitate those of pleurisy; and if they happen to be attended with feverish excitement the resemblance is perfect. On the other hand, even exalted sensibility of the pleura itself is not by any means a necessary accompaniment to its inflammation; and there are cases in which there had been scarcely a suspicion of disease in the chest, and yet acute inflammation and its concomitant, copious effusion, had been for many days or weeks occupying the pleura. The symptoms of oppressed breathing, proceeding from the pressure of the effusion, will be distinct only when this latter has accumulated very rapidly. In this cause of embarrassment we seek to be enlightened, and generally with success by the physical signs.

The *breathing* is commonly hurried in pleurisy. If there is no effusion this labour of respiration must proceed from the pain being opposed to the free contraction of the muscles which dilate the thorax. Effusion being present, the dyspnœa is generally proportionate to the quantity of the effused fluid. But even to this state of things there are marked exceptions; some persons, with effusions, as we learn from Andral, not only talk readily, but are able to walk about and perform journeys without any inconvenience on the score of respiration. The modifications in the respiratory act will depend mainly on the

portion of the pleura inflamed; in costo-pulmonary pleuritis, the breathing is chiefly diaphragmatic; while in inflammation attacking the pleura which lines the diaphragm, the thorax is mainly dilated by the intercostal muscles.

The *cough* characteristic of pleurisy is short, catching as it were, dry, or accompanied with a thin mucous expectoration. The cough is not in this disease, any more than in pneumonia, proportionate in frequency or force either to the intensity or the extent of the inflammation. Should the sputa assume more consistence and other different appearances, we may suspect complication, as of pneumonia and bronchitis, or, a rare case, the opening of the pleuritic effusion into the bronchia.

Nothing very positive can be inferred from the *decubitus*, which varies in different cases; for although in some the patient lying on his back with a slight inclination to one side, or lying on one side, may lead to a suspicion of effusion in this side; yet in a large majority of cases we find, as M. Andral has observed, that, whether there be effusion or not, the decubitus is on the back.

Before I speak of the physical signs and the anatomical lesions in pleurisy, it is fitting that I should direct your attention to the *pleura*. The pleura consists of two layers; one distinctly serous, which is always bedewed with a serous fluid, lines the cavity of the chest, and forms the outer covering of its organs. The other is clearly fibrous in the costal pleura, and, together with that of the pericardium, seems to be a continuation of the deep-seated cervical fascia. Dr. Stokes has succeeded, after removing the serous coat and a part of the adherent sub-cellular tissue investing the lungs, in demonstrating the transparent though strong fibrous coat beneath. This is in direct apposition with and invests the whole of both lungs, covers a portion of the great vessels, and the pericardium seems to be but its continuation, but endowed in that particular situation with a still greater degree of strength for purposes sufficiently obvious. It covers the diaphragm, where it is more opaque, and, in connection with the pleura, lines the ribs, and, turning, forms the mediastina, which thus are shown to consist of four layers—two serous, and two fibrous.

The pleura is susceptible of inflammation of the adhesive kind, which is accompanied merely by pain; and by the pouring out of serum, coagulable lymph, pus or blood.

Anatomical Lesions. — Pleurisy gives rise to textural alterations of the pleura, to alterations in its secreting function, and to modifications in the condition of the lungs, such as compression, displacement, changes of volume, of situation, and connexions.

The pleura is sometimes reddened by a delicate injection, but more commonly this redness is owing to the injection of varying intensity in the sub-serous cellular tissue. In many cases the membrane itself preserves its transparency, and exhibits no marks of vascular ramification. Inflammation of a more intense kind, continues M. Andral (*Pathologie Interne*), gives rise to a vascular plexus in the serous membrane, filled with blood, and of more or less closeness and distinctness; sometimes dotted, at other times striated, or in laminæ in sinuous bands; or, a rare occurrence, the

whole diseased surface is of a uniform red hue. Whatever may be the colour, or opacity, or transparence of the pleura, it is seldom thickened, softened, or ulcerated.

The changes of secretion are more numerous and diversified than all its other abnormal peculiarities. According as the secreted matter is air, or chiefly serosity or purulent fluid, it is called *pneumothorax*, *hydrothorax*, and *empyema*. As regards *quantity*, this may vary from an ounce to several pints. In the latter case, the lung is protruded from its place, and occupies less room than common; the diaphragm is pressed downwards, and causes a prominence outwards of the liver to the right and the spleen to the left: the ribs are more widely separated than in health, and the intercostal spaces more prominent; the skin of this side is also preternaturally smooth. The mediastinum is pushed to the side opposite that of the effusion; and when the effusion takes place in the left side, the heart may be pushed to the right, and its apex at the same time brought so near the sternum that its pulsations thenceforward are only heard behind the bone and in the right side of the thorax. The protrusion of the intercostal spaces and diaphragm results from a paralysed state of these expansions — in the opinion of Dr. Stokes. Effusion may take place in a few hours (*Hodgkin — Morbid Anatomy of the Serous Membranes*).

The *quality* of the pleuritic secretion is various; sometimes colourless, or of a citron hue, limpid, and transparent; at times, in the midst of this limpid serosity float some albuminous flocculi; or these are partly dissolved in the serosity and impair its transparency. In some cases the fluid is turbid, or green, or yellowish-brown, or ash-coloured; sometimes thick, and as it were, muddy. In other cases the secretion is truly purulent; or resembling on occasions half liquified animal jelly; and it may even consist of blood.

These liquid products of secretion from the pleura become concrete in part, and pass into a solid state; and in this way *false membranes* are formed, varying, as regards organization, in their figure, colour, extent, consistence, and thickness. They are the most common products of pleural inflammation. The more immediate material for this membranous formation is coagulable lymph. This is at first soft, of a grayish-white colour, sometimes like paste. It soon acquires an increase of consistence, puts on an albuminous appearance, and is gradually organized. Red points show themselves. few in number at first, but after a while increasing, and gradually running into lengthened lines or streaks along the surface of the effused matter. These streaks soon become distinctly vascular, and the newly formed vessels inosculate with those of the pleura. The adhesions thus made are of very different forms and sizes; being sometimes merely miliary granulations, separated from each other; at other times large concretions of a cellular texture uniting the two surfaces of the pleura by various bands. The thickness of the newly formed membrane is sometimes no greater than that of the pleura itself; but more commonly it exceeds this latter: the thickness of the new formation is made, however, of several laminæ

resting one upon another. Sometimes these false membranes are formed after a few days sickness; and again, not after a period of three weeks from the invasion of the disease. These membranes and their adhesions are more frequently in a line with the inferior lobes and at the base of the lung. As a general rule, it may be said, that coagulable or plastic lymph and early adhesion are most to be expected in young, strong, and healthy persons; while curdy and unorganised lymph, or granular deposits with permanent serous effusions, are met with in the old, the feeble, and the scrofulous.

These false membranes may pass into a fibrous, cartilaginous, or even osseous tissue.

Tubercles are not unfrequently met with in the inflamed pleura; in the midst of the false membrane they are quite numerous, and are evolved with great rapidity. Twice M. Andral has seen the pleura the seat of cancerous bodies of considerable size.

The lung which is displaced and compressed by the effusion is reduced sometimes to a very small size; and when covered with false membranes we might suppose that it had been entirely destroyed. On cccasions, it is only a lobe that is thus displaced; and the lung itself has sometimes been pushed towards the side of the thorax backwards or laterally, in place of on the vertebral column. It is never found to crepitate unless the effusion be quite inconsiderable; it is denser than natural, and sinks when put in water. We sometimes meet with pleuritic effusion and inflammation of the pulmonary parenchyma at the same time. The effusion may either precede or be subsequent to hepatisation of the lung.

Seat. — Simple pleurisy occurs most frequently on one side alone, or is single; and rather oftener in the right than the left side. Pleuropneumonia is also mostly single, but more generally in the left than the right side.

The *causes* of pleurisy are identical for the most part with those of pneumonia; and particularly those which produce a sudden chill and stoppage of perspiration, such as atmospherical vicissitudes, cold drinks in the stomach, or the sudden application of cold to the surface of the body. Early spring is the chief season for pleurisy. Organic lesions of the lungs, as pneumonia and tubercles, are frequent causes of the disease. But while pneumonia readily produces pleurisy, this latter is not so apt to produce pneumonia. A rupture of the pulmonary vesicles, which establishes a communication between the cavity of the pleura and bronchia sometimes causes partial pleurisy. A particular distemperature of the air will give rise to epidemic pleurisy, which generally is of a more asthenic nature than isolated or sporadic cases are. Sometimes the digestive apparatus is much more deranged at the same time, and then we have that which has been denominated *bilious pleurisy*. The disease described by Cleghorn (*Diseases of Minorca*), was most probably of this nature, unless we class it under the head of bilious pneumonia.

"Those pleurisies began commonly like an ague fit, with shivering and shaking, flying pains all over the body, bilious vomitings and purgings, which were soon succeeded by quick breathing, im-

moderate thirst, inward heat, headache, and other feverish symptoms. In a few hours the respiration became more difficult and laborious; the most part of the sick being seized with stitches in their sides, striking upwards to the clavicle and shoulder blade; obliquely downwards along the cartilages of the bastard ribs; or else darting across from the breast-bone to the vertebræ of the back; so that they could neither cough nor make a full inspiration without great pain. Many complained chiefly of a load and oppression in their breast, as if a millstone had been laid upon it; some of a heaviness and fluttering about the heart, which at one time seemed to glow with extraordinary heat, at another to be chilled with cold, as if it had been dipt in ice-water. In a few of the sick those complaints preceded the fever, in others they did not come on till the day after.

"In the progress of the disease it was not uncommon for the pains to move about in the thorax from one place to another. Sometimes they would shift from the breast to the limbs, and of a sudden return to the bowels; and I have seen cases wherein, after leaving one side, they have attacked the other unexpectedly, and proved fatal in a very short time. The left side of the thorax was not near so liable to be affected as the other; forty-two out of sixty patients who were seized about the same time having had the disease in the right. But whichsoever side was affected, the sick lay easiest on the opposite; though the generality were obliged to lie upon their backs, or to sit up in bed with their heads erect. Many were drowsy and inclinable to sleep; but they raved at intervals, or were much disturbed with extravagant dreams. Some laughed in their sleep; others would awake in a fright and start out of bed, imagining that the house was in flames; and that those about them were endeavouring to push them over a precipice; to pierce their sides with daggers; to bind them down with cords, or iron hoops, and things of the like nature."

Physical Signs. — First among these, as the sign which more obviously meets the eye of the physician, is the altered conformation of the thorax. The side in which effusion has taken place is full and more prominent than the opposite one; but as we may be deceived in this particular, by merely looking at the chest, we ought, in order to prevent mistakes, to take the measure of the two sides, by means of a ribbon, one end of which is to be held on a spinous process of the dorsal column and the other brought to the middle line of the sternum, or we use a graduated arc for the purpose. The enlargement on the diseased side is seldom more than an inch and a half. The ribs and cartilages preserve their relative position, as they would during a very full inspiration; the intercostal spaces are increased, protruded beyond the ribs, and allow of a fluctuation being felt within. But there may be considerable effusion without external dilatation, — the space for the fluid in the chest being made at the expense of the lung, which is excessively compressed and reduced to an embryo size and character, and as such is impermeable to air.

When, on the other hand, the effusion is absorbed, and the lung is prevented by any cause from resuming its former expansion, the side which was before morbidly dilated is now smaller than natural, and contracted.

Percussion indicates the presence of an effusion, however slight, in the thoracic cavity, by a diminished resonance on the side diseased. At first the dulness of sound is heard only at the lower part; but afterwards over the whole of the affected side, from the subspinous fossa of the scapula and the clavicle to the base of the thorax. In cases of double effusion the proper resonance of the chest is diminished or lost on both sides; and under such circumstances, as there are no contrasted sounds between the two sides, especially if the effusion be inconsiderable, percussion may seem to indicate only a physiological state. When the effusion is circumscribed within narrow limits, the dulness is only at one spot, and at other times it is not perceptible at all. It may happen again that, owing to the pain being so acute, percussion cannot be practised.

The signs furnished by *auscultation* in pleurisy are generally of the most satisfactory kind, as regards the aid which they give us in forming our diagnosis. At the outset of the disease, when the pain is still very acute, but before effusion takes place, we discover, either by the ear applied to the chest or through the medium of the stethoscope, that the customary respiratory or vesicular murmur is less than common. This depends on the patient's instinctively dilating his chest less, and of course expanding less his lungs also, owing to the violence of the pain. So soon as the effusion takes place, the respiratory sound is heard less distinctly than on the affected side; and in proportion as the effusion increases, the respiratory murmur becomes more and more feeble, while on the other side it acquires unusual force. If the effusion is very great, the respiratory sound is lost entirely in every part of the chest. In most cases, the lung being protruded towards the spinal column, the respiratory sound ceases, progressively from below upwards, both behind and in front. A different direction given to the lung by the effused fluid, as where it is drawn against the walls of the thorax, will cause an extinction of the sound in front, but allow of its being still heard, though feebly, behind.

When the effusion which extinguishes the respiratory murmur is considerable, it sometimes happens that no other sound takes its place; but, at other times, it is replaced by bronchial respiration.

The resonance of the voice is singularly modified in those persons whose chests are the seat of pleuritic effusion. The ear applied to the chest on the diseased side, at this time, is sensible of a quality of voice which resembles the bleating of a goat, and which, for this reason, has been called by Laennec œgophony. Often, in place of this bleating, it is a quivering, thrilling, cracked, and discordant sound, resembling the voice of Punch; an apt comparison, for whoever has heard this distinguished character, and whoever has not, will hear it in perfection, be it said parenthetically, on the Mole at Naples. At other times, it seems as if the voice passed through a tube, or it is muffled, and the articulation of each word seems to be in a peculiar whisper. In many cases these various slides of œgophony are only heard at intervals, and are only perceptible in the enunciation of certain words; even of a monosyllable, as of *we*, which will serve to illustrate the case referred to by Andral, who

only detected this sound when his patient uttered the word *oui*. Œgophony is not heard when the effusion is inconsiderable; and it ceases after the effusion becomes very great. There are other sounds discovered by M. Reynaud and further explained by Dr. Stokes, which indicate a moderate degree of lymphatic effusion. They are called the friction sounds, and are represented to be characteristic of *dry pleurisy*.

M. Reynaud points out another easily recognised sign of pleuritic effusion. It is the absence of vibrations of the parietes of the thorax when the hand is placed on it, during the time in which the patient speaks. In a case in which pneumonia coexisted with pleuritic effusion, and in which, generally, the symptoms indicating parenchymatous inflammation are generally wanting, one of these, *crepitation*, may be removed by causing the patient to lie on his face. At this time, also, the œgophony becomes bronchophony.

General Symptoms. — For the most part pleurisy is accompanied by fever. In the first or acute stage, the skin is hot, and pulse hard and frequent: indeed a tense pulse is one of the most characteristic symptoms of the disease. In a more advanced period, either from an abatement of the inflammation, or by the passage of the disease into a chronic state, the skin loses its heat, but the pulse retains its frequency with less resistance. Profuse sweating only comes on when tubercles are developed either in the pleura itself, or in the false membranes formed on it. When pleurisy becomes decidedly chronic, the pulse loses all its frequency, at the same time that the breathing becomes free and regular. Not, as M. Andral remarks, that the disease is cured, for the effusion still exists, as is proved both by percussion and auscultation; but the circumstances are favourable for a cure; showing, he adds, that the ancients were in error in supposing that fever was necessary to the resolution of chronic diseases.

The blood taken from a vein, in pleurisy, is cupped, and almost always exhibits on cooling a coagulum covered with a thick buffy coat. Unless in cases of complication, such as bilious pleurisy, the digestive organs are not disordered. As happens in other phlegmasiæ of the serous membranes, the secretion of urine is diminished, and deviates from its natural properties. Nutrition is profoundly affected; chronic pleurisy with effusion giving rise almost always to marasmus.

M. Andral, to whose admirable descriptions of the disease now before us, as well as of pneumonia, I am so largely indebted, sums up the leading features of pleurisy, in its different stages, under the head of *progress*, *duration*, and *termination*.

Pain, commonly seated beneath one or other of the mammæ, preceded or accompanied by fever, and a dry cough, dyspnœa, fever, and often a weaker than ordinary respiratory murmur on the side in which there is pain, are the first symptoms which indicate the invasion of pleurisy. If no effusion is formed, these disappear at the end of a few days, and the cure is complete. But if an effusion in the pleura is formed, the sound on percussion is dull and flat; the respiratory murmur, at first weak, ceases entirely, or is replaced by a

bronchial breathing; different varieties of œgophony are heard, and the parietes of the chest on the affected side present a more or less obvious dilatation. Death may be the result of this state of things in a short period; and it is more to be dreaded when the dyspnœa and fever are great. If these leading symptoms of pyrexia and laboured breathing are abated in violence, the disease is prolonged and passes into a chronic state; in which case it may either end in death or restoration to health. Death is generally preceded by decay and marasmus, which are the consequence both of the imperfect hematosis, owing to the complete inertia of one of the lungs, and of the presence of inflammation with copious suppuration and the production of accidental tissues. In other cases death takes place in consequence of the sudden return of pleurisy in an acute form, which, supervening on the chronic, proves speedily fatal. Finally, death sometimes occurs as the result of an opening between the cavity of the pleura and the external air, either by perforation through the bronchial cells or the walls of the thorax. But even under these alarming circumstances there may be a favourable issue. Critical discharges, such as metrorrhagia, copious sweats, or a bronchial flux, sometimes announce the absorption of the effusion.

The two chief kinds of pleurisy are the *primary* and the *secondary;* the last is the most frequent. The *varieties* of pleurisy proceed either from the symptoms or the seat of the disease. There are pleurisies, with, as there are those without effusion, and unaccompanied by pain, cough, dyspnœa, or accelerated pulse. There are others, again, that do not give rise to any dulness of sound, nor to any modifications of the respiratory murmur or of voice. Some, most pleurisies, are manifested by characteristic symptoms; some are latent. There are double or single, general or partial pleurisies. When the pleurisy is *interlobular*, nothing is revealed by either percussion or auscultation; although sometimes a collection of pus is found simulating pneumonic abscess. Dyspnœa may be evident, with slight pain; the fever is hectic and death closes the scene. If the disease be *mediastinic*, the sound is dull on striking the sternum. When it is diaphragmatic the pain is no longer referred to the thorax; the breathing is purely costal; there is orthopnœa; the patient sits up in his bed, or leans forwards and presses on as if to support his hypochondria; the dulness is extreme, with hiccup, nausea, and sympathetic vomiting. If the pleurisy is on the right side there is jaundice, owing to transmitted irritation of the liver. This last form presents a very difficult diagnosis, since it simulates hepatitis, partial peritonitis in the hepatic region, gastritis, and finally rheumatism of the diaphragm. I had occasion, when a student in Virginia, to watch a case of this nature, in which, with all the symptoms of pleurisy, there were jaundice and irritable stomach. The subject was a young man, a farmer, of robust and strong constitution, but somewhat addicted to drinking ardent spirits. He recovered under the antiphlogistic course, — venesection, purging with calomel and appropriate adjuncts, antimonials, and subsequently blisters.

The most frequent *complications* with pleurisy are, pneumonia, pericarditis, and pneumothorax; and, but less seldom, bronchitis, and

even peritonitis. Laennec describes three varieties of the complication of pneumonia with pleurisy. The first is the ordinary one of pneumonia with slight dry pleuritis. In the second, inflammation of the compressed lung may occur, producing that variety of hepatization which he has denominated carnification: while in a third, severe inflammatory action affects both the pleura and lung. This, says Dr. Stokes, is by far the rarest case. In children, pleurisy is complicated with and occurs during hooping-cough and scarlet fevers, and is occasionally met with in typhoid fevers. In the diseases of this class of subjects, secondary pleurisy is sometimes replaced by convulsions or other cerebral disorder.

Prognosis. — Pleurisy must always be regarded as a serious disease; the prognosis in which will vary, however, according to the nature and intensity of the causes, the extent of the pleuritic inflammation, and the presence or absence of effusion. Pleurisy induced by tuberculous irritation most always furnish a bad augury; so does double pleurisy, even before effusion has taken place. The gravity of the disease will be heightened by its being seated in the diaphragmatic portion of the pleura, and, still more, by the extent of the effusion: if double, and of any extent, it is generally fatal. An effusion of pus is more sinister than one of serum; but we have no evidence to show that blood effused gives rise to more alarming symptoms than either of the fluids just mentioned. The persistence of the fever and dyspnœa is always bad; nor can we hope for absorption of the effused fluid until these two symptoms have been abated or have disappeared. Marasmus and profuse sweats must induce suspicion of tubercles in the inflamed pleura.

Typhoid Pleurisy. — Resembling typhoid pneumonia so much in its causes, general phenomena and the circumstances under which it appears, as regards the habits and constitutions of the patients, typhoid pleurisy calls for no amplitude of description nor minuteness of therapeutical detail for its treatment, after what has been said on the subject of typhoid pneumonia.

Puerperal Pleurisy. — There is, however, yet another variety of pleurisy of which mention has been seldom made. I refer now to the supervention of pleuritic disease in puerperal fever. Next to peritonitis and inflammation of the lymphatic vessels of the uterus, pleurisy ranks as the most frequent complication of organic disease with this fever, but more particularly puerperal typhus. M. Cruveilhier (*Diction. de Med. et de Chir. Pract.*) states, that he has seen puerperal pleurisy occurring both sporadically and epidemically.

This variety of pleurisy is seldom simple and primitive; it occurs as a sequence to peritonitis, though sometimes it precedes this latter. Both come on usually at the same time, viz., at the epoch of milk fever. Analogous to the puerperal variety is the pleurisy which attacks some females just before delivery, and which, M. Cruveilhier asserts, is always aggravated by this latter process. This is too sweeping a dogma. I had during the last summer under my charge a lady whom I visited in the course of the day, and had freely bled for pleuro-

pneumonia, and whom I was called upon to attend in labour on the following morning. She had been a patient of mine on two former occasions for pulmonary inflammation of long duration and great violence; but in the present instance she was soon relieved, nor did labour interpose any difficulty or complication to the pleuro-pneumonia, or this latter interfere with the progress of convalescence after delivery.

So much importance did the author whom I have quoted attach to the occurrence of pleurisy in puerperal women, that at the large Lying-in Hospital (*La Maternite*), he percussed all the subjects in whom feverish movements were protracted beyond the common limits, or in whom there was any symptom of an unusual character. Increased frequency of breathing and redness of the face are premonitions of the approach of pleurisy that ought not to be disregarded.

The prognosis of puerperal pleurisy is bad, as few of those attacked with it survive. The *treatment* cannot be arbitrarily laid down. We shall feel justified, however, when our diagnosis is sufficiently made out, in having recourse with more freedom than in simple puerperal fever to sanguineous depletion. Whether this is to be done by the lancet, or by cups or leeches, will depend on the strength and habit of the patient, and the state of the system at the time, as well as the amount of natural evacuations, such as of the lochia antecedently. The rest of the treatment will merge itself into that of puerperal fever, in which tartar emetic and opium should not be forgotten.

LECTURE XCIV.

DR. BELL.

TREATMENT OF PLEURISY—Bloodletting by venesection the first and chief remedy—In feeble habits and in advanced stages, cupping or leeching—Cupping followed by saline purgatives—Tartar emetic—Opium in full doses after venesection—Blister to the side—Purging most useful in complicated and epidemic pleurisies—Diuretics; nitre, digitalis, colchicum—Calomel with nitre and a little opium—Treatment of children—CHRONIC PLEURISY—Not always resulting from the acute form—Symptoms and physical signs—Dilatation of the side—Diagnosis—Absorption going on—Contraction of the chest—*Treatment*—Calomel—Iodine—Hygienic measures.—PNEUMOTHORAX—Causes, symptoms, and treatment—HYDROTHORAX, its causes, symptoms and treatment.

TREATMENT.—Universal experience, I believe I may say, is in favour of early and large bleeding in sthenic or sporadic pleurisy. The sooner after the invasion of the disease we bleed, and the more copious the depletion, the greater will be the probability of early convalescence. It would avail little were I pretend to specify the quantity of blood to be taken from a vein on this occasion. You must be regulated by the violence of the symptoms, and the relief afforded. The pulse, which is generally frequent, hard, and resisting, ought to be abated in these particulars, especially in the quality or hardness of tension, by the abstraction of blood; but the state of the heart will cause modifications in this respect, and the pulse is less our

guide than the dyspnœa and pain, in the freedom with which we are to bleed in pleurisy. As a general rule, the blood ought to be allowed to flow until the patient can make a full inspiration without catch or pain. The repetition of venesection will be regulated by the renewal of the pain and dyspnœa, more than by the febrile symptoms. As regards mere frequency of pulse, it is of little moment in the case before us; it can never alone indicate the propriety of depletion. Indeed, it will rather indicate a fear of this having been pushed too far. It is desirable that, within the first twenty-four hours, an abiding impression should be produced on the inflammation; and hence, if the first symptoms return in even a few hours after the bloodletting, you should repeat the operation. As our object is not simply to weaken the heart's action, but to abstract a considerable amount of blood, and withdraw in this way the material of vascular excitement and engorgement, the patient need not be invited to sit up; but he should be bled lying down, so that there will be less probability of the coming on of syncope to interfere with the free flow of blood.

In weak habits of body, either from original constitution or excesses, although the phlogosis of the pleura be intense and will, if not checked, be followed by the changes already described, yet we cannot continue to abstract the desired amount of blood, without weakening beyond measure the heart's action and inducing a degree of prostration, which, if it do not actually endanger the patient's life, would prolong excessively the convalescence. We are fain, in such cases, to accomplish our end by free cupping or leeching over the seat of pain. In general you will not have the choice in the country, but must be content with cupping. After this is over, a large warm poultice should be applied and covered with flannel.

Adjuvants to bloodletting are purgatives and diuretics. The former will consist of salines with antimonials, so as to produce large evacuations, and thus diminish the quantity of the circulating fluid. Preceding these, a full dose of calomel will be of service, both as itself an evacuant, but still more from its revulsive operation on the liver and gastro-intestinal follicles, and its decidedly sedative impression. Its continuance will be under the same belief, and not in reference to what the English writers persist in regarding its specific, that is, its sialogogue operation, or at any rate the production of a slight soreness and inflammation of the mucous membrane of the mouth and throat. Tartar emetic as a counter-stimulant does not stand as high in the estimation of British practitioners in pleurisy, as it does in pneumonia and bronchitis. My own experience leads me to a different opinion. I have, in some of the milder but yet well-marked cases of pleurisy, trusted almost entirely to tartar emetic, either mixed with cream of tartar in powder, or dissolved with it in water. Opium may be given with more freedom in pleurisy, as it may in phlegmasia of the serous or sero-fibrous membranes generally, than in those of parenchymas and mucous membranes, with whose secretory function it is more apt to interfere unseasonably at this time. A full, or rather a large dose of opium, two

to three grains, may be given at once after a large bleeding, and the patient be left undisturbed by the administration of any other medicine for the next twelve hours.

Pain or stitch in the side still remaining after the subsidence of fever will be met by leeches to the part; or if full venesection has been previously practised, a blister. More especially is this remedy useful when effusion is about to take place: it has been known to arrest this latter, and in other respects to exert a most salutary effect on the progress of the disease. The blister should be large, and allowed to remain on only until the skin be vesicated: with this view about eight hours will commonly suffice. It is not necessary that the cuticle be raised with serum to any extent; for if at all separated from the cuticle beneath, it will soon rise into large serous bags after the application of simple cerate or of basilicon ointment. Once discharging, this effect ought to be continued; first by the dressings just mentioned, or if there be much cutaneous sensibility, by a large poultice of flax-seed meal, or of bread and milk, between two pieces of muslin, and afterwards by the occasional application of weak blistering or tartar emetic ointment. The latter is preferable, if the disease assume somewhat of a chronic form.

Purging was thought by many of the older writers to be prejudicial in pleurisy; nor was the opinion without foundation, for the necessary interruption to the respiratory movements during defecation, the occasional straining at the time, must operate prejudicially. These objections, however, were derived chiefly from a belief that diarrhœa or natural purgation, when it occurred spontaneously, was injurious, and that intestinal evacuation interfered with the crisis by expectoration. In complicated pleurisy, or in that of an epidemic and, as it will be found generally, of a mixed character, purgatives, with calomel for their basis, are of unquestionable efficacy, and must often take the place of bloodletting. Diuretics have acquired more reputation in the cure of pleurisy than purgatives. The antiphlogistic action of many of them, apart from the amount of renal secretion, will go far to explain their superiority in this particular. Nitre may be mentioned as displaying these two effects in a notable degree. Its operation is made more efficient by free dilution; in fact, by its being dissolved in the patient's drink. I have at other times generally added to it tartar emetic, as in the following prescription:—

℞. Nitrat. potass., ℥iss.
Potass. tart. antim., gr. i.
Aqua fluvialis, ℥iv.
M. ft. solutio, et adde,
Lin. sem. infus., ℥xii.
M. Sum. pro haustû.

Of this half of a large teacupful, sweetened and flavoured with lemon-juice, if required, will be taken by the patient at intervals of an hour or two through the day. If the inflammation run high, two or three grains of tartar emetic may be directed, and the quantity of the nitre increased to two drachms, or even half an ounce, in the twenty-four

hours, suitably diluted in a mucilaginous vehicle. Mucilage or syrup of gum-arabic may be substituted for the flaxseed tea, in the prescription which I have just given you, if required by the palate of the patient. It is not uncommon for vomiting to follow the first dose or two of this mixture, but I have seen no disadvantage from this, although it is deprecated by many writers, and is made a ground of objection to the contrastimulant use of tartar emetic in pleurisy.

Other diuretics of the sedative class will be had recourse to in pleurisy, more particularly when it assumes the subacute or chronic form. Of these, digitalis and colchicum are entitled to our chief confidence; the first in infusion or tincture; the second in vinous tincture of the seeds. Laennec speaks highly of the infusion of digitalis. Calomel in small doses is often one of our best diuretics, and the more so when combined with squills, and opium enough to make the combination sit well on the stomach.

The preceding treatment is that which the largest experience has shown to be more serviceable in the pleurisy of adults whose constitutions have not been greatly debilitated or perverted by prior diseases and vicious excesses. In children a less vigorous course is demanded. Some indeed would persuade us that the expectant method is the best with them: but this is going to the other extreme. The first indication is the same in infantile pleurisy as in pneumonia and bronchitis; viz., to abate the inflammation by bloodletting, and in the class from two to five years of age it will suffice to apply from ten to twenty leeches over the affected side at the lower part of the chest, allowing the bites to bleed for about two hours. In children somewhat older the lancet may be had recourse to, and four to six ounces of blood abstracted. We are not called upon to follow out the other indications in pleurisy, as in bronchitis and pneumonia, by giving expectorants; but restrict ourselves at first to counter-stimulants and afterwards to the remedies that may be supposed to promote absorption of the effused fluid in the cavity of the pleura. Of these latter diuretics are entitled to preference, and especially in secondary pleurisy following the exanthemata, and in which the breathing is greatly oppressed. We direct at this time squills and digitalis, either in tincture or, preferably, an infusion with some aromatic in addition. Given alternately with calomel, their operation as a diuretic is rendered more active. Purging is not recommended by MM. Barthez and Rilliet: nor do they think well of blisters in the pleurisy of children. They advise, however, the application of a diachylon plaster over the side with a view of keeping up a grateful and uniform warmth and protecting the skin against the access of air.

Chronic Pleurisy. — The term chronic is less applicable in literal signification to the modification of pleurisy than to many other diseases denominated chronic, in which there is not only duration but a notable difference in the degree and sometimes nature of the organic lesion. Chronic pleurisy sometimes developes acute symptoms, as *e converso* acute may prevail with little or no irritation or notable disturbance of function. In the former we have effusion and false membranes, displacement and condensation of the lung — symptoms all of which are met with in the latter. More usually, it is true,

there is less general disturbance with these symptoms in the chronic than in the acute. Chronic pleurisy may come on gradually if not insidiously. We may suspect its existence when there is cough, a remittent fever with evening paroxysm, an habitually frequent pulse, shortness of breath after any exertion, inability to lie on the healthy side, and emaciation. If with these symptoms we meet also the physical signs of accumulation, compression and displacement, we may safely allege that we have before us a case of chronic pleurisy with effusion. In certain instances, Dr. Stokes remarks, with a view to show the paramount value of physical signs when most of the symptoms are wanting, he has repeatedly known persons with copious effusions to look well, to be free from fever, pain, or any local distress; to be equally well on both sides, to have good appetite, which they could indulge without apparent injury; and all this when the heart was pulsating to the right of the sternum.

Displacement of the heart occurs at a very early period when the effusion is on the left side, and long before any protrusion of the intercostals or diaphragm. Among the signs of eccentric displacement we may expect to meet with dilatation of the side to the extent of from one to two inches. This sign is more valuable in the left than the right side, as this last is habitually the more developed of the two. Associated with dilatation of the side is obliteration of the intercostal spaces and smoothness of the affected side. The diaphragm is also displaced, and causes in consequence a protrusion and resistance of the upper portion of the abdomen. If the effusion be in the right side the liver is pushed downwards; if in the left the spleen is displaced.

The sound on percussion is dull in chronic pleurisy with effusion. But in this respect we find considerable differences according to the posture of the patient, provided adhesions have not yet been formed. When the patient turns on his face the postero-inferior portion which had been dull becomes clearer, and in few instances it has been observed that there was a return of clearness in the lateral portion when the patient turned on the opposite side so as to allow the fluid to accumulate along the median line. Respiratory murmurs are totally suppressed except close to the spine and under the clavicle, where the sound is harsh, bronchial, or even slightly blowing. Friction sounds are inadmissible.

A different series of phenomena are observable when *absorption* of the fluid in the pleural cavity begins and is continued. The respiration, from having been inaudible as high as the scapular region or even the clavicle, now gives out a feeble murmur at this region, which gradually increases in extent downwards. In proportion as the respiratory or vesicular murmur is heard at increasing distances from the surface, the bronchial becomes more circumscribed until it is only sensible at the root of the lungs. The sound on percussion also gradually recovers its customary clearness, first at the upper then at the lower part of the chest. Friction sounds reappear and continue audible for a length of time. The dilatation of the chest is removed by degrees, and the semicircular and vertical measurement fall to the natural standard; the distance between the nipple and median line decreases gradually to

the normal extent. The heart, diaphragm, liver, and other abdominal viscera are restored to their natural position. The return of a dilated side to its natural circumference is sometimes exceedingly rapid. Dr. Stokes has known it to lose as much as an inch and a half in eight days.

If the effusion have been considerable and the chronic pleurisy of longer duration the absorption is accompanied by *retraction* of the chest, and the lateral circumference of this latter is much less than natural. Sometimes the contraction is confined entirely to the lower part of the chest, and is unaccompanied by depression of the shoulder. One of the first signs of absorption with contraction is the increased prominence of the inferior angle of the scapula. In many cases the retraction or depression of the chest is accompanied by projection and depression of the shoulders, ribs, and nipple; the scapula is tilted towards its inferior angle: there is lateral curvature of the dorsal spine, with the concavity turned towards the diseased side; distortion of the ribs; intercostal spaces unnaturally narrow; diminished motions of expansion and of elevation, especially of the former, while the latter is effected in the same way as during the period of effusion with dilatation; motions of ribs on each other much impaired (Walshe, *op. cit.*). On mensuration we find the semicircular and the antero-posterior measurement diminished.

At times pressure is exerted by the sound side and after absorption, causing displacements the very reverse of that which obtains when the effusion was going on, and corresponding dilatation on the diseased side. In this way, after absorption of an effusion on the right side, the heart was drawn over to that side, so that its pulsations were felt to the right and not to the left of the sternum. So, likewise, after the removal of pleuritic effusion in the left side, the heart was protruded upwards to the left, so that its pulsations were distinct from the fifth to the third rib near the axilla.

An anomalous state of things is mentioned by Dr. Stokes to prevail in some rare cases of empyema. It is a coincidence of effusion and dilatation with contraction on the same side.

The diseases with which a pleuritic effusion is commonly confounded are tubercle of the lung, pneumonia in the stage of hepatisation, and enlargement of the liver. For the diagnosis in these cases, and farther abundant interesting details on this subject, generally, I must refer you to the Section on Diseases of the Pleura, in Dr. Stokes's admirable Treatise.

The *prognosis* in chronic pleurisy with effusion and subsequent contraction of the chest is more encouraging than appearances would seem to justify. In young and previously well constituted subjects, the chest often recovers its normal proportions, and respiration and the functions generally are carried on as well as ever. M. Chomel (*Elemens de Pathologie Generale*) states, that in the case of a physician of his acquaintance, in which chronic pleurisy of the left side with dilatation and subsequent retraction had existed, he found on inspection and measuring the circumference and antero-posterior dimensions of the chest, that it had recovered not only the normal development but was actually fuller than the right. "Perhaps," he adds, "that it was originally so."

This writer relates an instance of a phthisical girl, in which, consequent to pneumonia, there was pneumothorax, and afterwards effusion of fluid with dilatation and subsequent retraction of the left side: but in proportion as this increased the right became more dilated, as if the lung of that side expanded to compensate for the deficient size and function of the other.

Treatment. — The indications in chronic pleurisy are to remove existing local irritation or the remains of inflammation in the chest, and to support the strength of the patient. The extent to which a preference will be given to the measures for carrying one or other of these indications into effect, will naturally depend on the presence of fever, some pain, dyspnœa, and cough with quickness, and any resistance of pulse, as regards the former and general debility, and suspended hematosis as respects the latter. We must suppose that the time and necessity for venesection are past; but it may still be proper in cases to apply a few leeches or cups to the diseased side of the chest, as much with a view to their derivative and absorbent effect as to direct depletion. If we find reaction after their use and still much functional derangement of respiration, we may have recourse to them with advantage even a second time. Less doubt will be entertained generally of the propriety of blisters applied in succession to different parts of the affected side.

The bowels are to be early acted on by moderate but not often repeated purging. Diuretics are of more value, and rank still among the means of directly reducing irritation. Of these some give the preference to digitalis; others, as Laennec, to certain saline preparations, such as the acetate of potassa and the nitrate of potassa; the former in doses of half an ounce to two ounces, the latter of two drachms to half an ounce, and occasionally adding to them muriate (hydrochlorate) of ammonia and some preparation of squills.

Doctor Stokes is partial to mild mercurials "steadily exhibited till a slight but decided ptyalism is induced." The use of this remedy, of so much power, for good or evil, must be governed by the constitution of the patient; who, if of a sanguine or sanguineo-lymphatic temperament, will be benefited by it, but if a scrofulous diathesis prevail it should be withheld; at any rate, short of its producing ptyalism. I have so often seen the salutary remedial effects of calomel as a diuretic and promoter of absorption when it is given in small doses, as a grain two or three times a day, that I should have little hesitation in giving it in chronic pleurisy, — at the same time that I would deprecate its sialogogue operation.

Still better adapted to the circumstances of the case, and a safer remedy in purulent formations, is iodine, and more especially the iodide of potassium in doses of two or three grains three times a day; where the debility is considerable and the habit cachectic, iodide of iron is well adapted to the case. Dr. Stokes indicates a preference for Lugol's solution, and recommends, at the same time, that from two drachms to half an ounce of iodine ointment be rubbed every day on the chest. Friction alone, in conjunction with exercise, is a good means of promoting absorption.

To the full as important as the whole medicinal treatment is a well

regulated hygienic course. In the early period of the disease we enjoin entire quietness in bed and restriction for a few weeks to a diet of farinaceous food and vegetables with milk. After a time, as the symptoms of irritation subside and the pulse become tranquil, light animal broth or even a little meat, are allowable. Restriction to an antiphlogistic regimen for some time is laid great stress on by Broussais, and it is justly remarked by Dr. Townshend, in his article on empyema (*Cyclopedia of Practical Medicine*), that so long as there are recurring paroxysms we must abstain from the tonic treatment. After absorption of the fluid, the tonic course, of which the best part is exercise in a pure country air, is to be more fully carried out. Moderate gymnastics may be regarded as a useful auxiliary to the main treatment. The use of an opiate is strongly recommended by Dr. Stokes.

Pneumothorax (from πνευμων, the lung, and θωραξ, the chest), *Air in the Pleura.* — This morbid state may occur in three different ways:— 1. It may be the consequence of partial pleurisy, the effusion in which being absorbed leaves a void which is sometimes filled with air secreted by the membranes. This kind is very rare. 2. Pneumothorax of an idiopathic kind arises from the effusion or secretion of air into the sac of the pleura without perforation, in a manner analogous to the secretion of air from the peritoneum, constituting tympanites. This is, also, an unusual occurrence. 3. The most common kind of pneumothorax is that caused by some unnatural communication between the pleural sac and the external air; and this may be by a perforation either of the external parietes or of the pulmonary pleura. The latter is the now usually recognised kind of pneumothorax, and constitutes a great majority of the cases met with in practice. The perforation depends on the progress of ulceration, which is generally of a tuberculous character, and, but rarely, of gangrenous abscess, through the pleura.

The *causes* of pneumothorax are detailed by M. Andral (*op. cit.*). Its idiopathic origin is rare. Most commonly (if we except traumatic pneumothorax, or that proceeding from a penetrating wound of the thorax and costal pleura) the cause is external to the cavity of the pleura, and consists in a pulmonary lesion. Sometimes it is owing to a fistula which opens a communication between a tuberculous cavity and the pleura; sometimes an abscess, the consequence of pneumonia, opening in the pleura; pulmonary apoplexy destroying the lung and the pleura; a cancerous ulcer of the lungs, or, as M. Andral has twice seen it, a simultaneous rupture of some of the pulmonary vesicles and the pleura.

Symptoms. — These consist in — 1. A dyspnœa of greater or less severity, according to the quantity of gas, and the rapidity with which it is formed. 2. A convexity of the thorax; but this is not a constant symptom. 3. An unusual sonorousness, on percussion, through the whole extent of the diseased side, or only at the upper region, for, lower down, a dull sound indicates a liquid effusion. 4. The absence of the respiratory sound, coinciding with the sonorousness. 5. Sometimes an amphoric or cavernous respiration. 6. If there are air and liquid effused, a gurgling at first not very

sensible, but augmenting each day, in the inverse proportion of the amphoric respiration and the sonorousness. 7. A metallic tinkling, the cause of which is not hitherto known. 8. If there be at the same time liquid effused, succussion causes a noise of displacement, or a splash of the liquid against the walls of the chest.

The *diagnosis* is well summed up, in its main features, by Dr. Houghton (*Cyclop. of Pract. Med.*).

1. The sensation of something giving way in the chest, and of air entering the pleural cavity. Very variable, but often absent or unnoticed.

2. In a phthisical individual the sudden supervention of overwhelming dyspnœa and pain. Rarely absent, therefore very valuable; still more so if succeeding last sign.

3. Comparison of auscultation and percussion. Nullity of respiration over one side, together with tympanitic clearness of sound, which below terminates abruptly in complete dulness. If accurately established, amounting to positive certainty, but sometimes not easy to establish. Œgophony rare.

4. Fluctuation on succussion. Positive certainly, but should be unquestionably verified.

5. Metallic tinkling. Positive certainly, but should be unquestionably verified. This metallic tinkling is audible during coughing, speaking, and sometimes during respiration, or, more correctly expressed, after these movements. Besides this, adds Dr. Houghton, it is often heard independently of these, observing a certain periodicity, and finer in its tone.

The *duration* of pneumothorax may be from a period of a few hours ending in death, or it may extend to several days, and even more than a month.

Its *termination* may be favourable, and brought about by the absorption of the effused air; but most generally death is the result.

The *treatment* of pneumothorax promises but little more than merely to palliate some of the worst symptoms, by the alleviation of pain and making the respiration somewhat easier. Its first and sudden occurrence, causing, as it often does, great prostration and irritating cough, may require a full dose of opium combined with antimony or calomel. Subsequent reaction with fever will be treated by venesection, if the patient be not much reduced by long prior disease; and in other cases by leeches or cups to the chest. In fact, as perforation of the pleura and consequent pneumothorax are, in the larger number of cases, additions to a previously existing disease, such as phthisis, the treatment must necessarily be modified not a little by the stage of the chief and primary diseases, and the remedies which have been employed or were in use at the time. Blistering and other means of counter-irritation will generally be allowable in the emergency.

The immediate indication, where, in consequence of the smallness of the perforation or its valvular condition, air accumulates in the chest and becomes a cause of oppressive dyspnœa, is, as Dr. Williams justly observes, to give vent to the air by puncturing the chest. Tem-

porary relief has been afforded in several insiances by this means; but before this operation is performed, it should be considered whether, as it can give only temporary relief, the condition of the patient be such as to make this likely to outweigh the pain and risk of the operation. These certainly are not great, but when added to the dubious view in which the friends of the patient may regard an operation which proves but imperfectly successful, they are enough to deter us from the responsibility of recommending it in many cases. The circumstances are different when the accident occurs before the consumptive disease has advanced far, when there is still much flesh and strength, and the physical signs have shown that there is a considerable quantity of sound lung. The operation may be repeated if the air accumulate again. As it is impossible to avoid the continued introduction of air into the chest, the mode of performing the operation is a matter of much less consequence than in empyema. It is more desirable to puncture low down in the chest, to permit the discharge of the liquid as well as the air.

The following case, recorded by Dr. Stokes, in his *Treatise*, &c., will be to you a good clinical lesson: —

Gangrene of the lung, empyema, and pneumothorax—Paracentesis—Gangrenous destruction of the costal pleura—Passage of the fluid behind the peritoneum.

A gentleman, æt. 36, generally very healthy, with a large, well-formed chest, had occasionally complained, for the last few months, of pain in the chest, at one period very severe; he had been cupped and blistered, but without relief: at length hectic symptoms set in with restless nights; soon after, he felt as if something gave way in his side, and immediately expectorated a horribly fetid matter. A similar attack occurred in a few days, with the same fetid discharge, but accompanied by prostration, lividity of the countenance, and dyspnœa. I saw the patient along with Dr. Marsh and Mr. Crampton. We found the chest to contain air and fluid; and in consultation made the diagnosis of gangrene of the lung, and advised paracentesis. The operation was performed between the seventh and eighth ribs, a little below and external to the right mamma; the withdrawing of the trochar gave issue to a quantity of fetid air; a probe was introduced, and met by an elastic resisting substance; this was apparently perforated, and about three quarts of dirty, grey-coloured, fetid fluid given exit to. Great relief followed the operation. The patient, however, passed a wretched night, with hectic paroxysms; no discharge occurred from the wound.

17th. The trochar and canula were introduced, and a quart of the same fetid matter came away — patient felt easier; passed a bad night.

18th. A pint of fetid matter was taken away; spent a most uneasy night, with incessant cough and frothy expectoration; the act of coughing sending the fetid air and matter through the external opening in great quantities.

19th. Much exhausted; said he felt as if there was a well in his chest; he was sensible of a constant dropping of fluid; pulse 120; great weakness; heat and soreness in the side.

20th. Mr. Colles saw him, in consultation with the other attendants. Anodyne enemata and stimulants were ordered; he passed a better night, but had great dysuria; ordered mucilaginous drinks.

21st. Passed a bad night; pulse 144, and weak; during a fit of coughing, which brought on the usual discharge from the wound, about a cupful of blood gushed out.

22d. The introduction of a gum-elastic tube gave exit to no fluid, but a great quantity escaped while the patient coughed; the abdomen became tense and tympanitic, with exacerbation of all the symptoms, and the patient died in about thirty-six hours.

Dissection. — Externally the body presented some livid marks at the right side, and a slight fulness in the right inguinal region and side of the scrotum. The right pleural sac contained above a quart of fetid purulent fluid; the lung was of a dark greenish hue, smeared with a creamy substance; its lower and back part destroyed by gangrene, leaving a large greenish-coloured cavity, the size of the hand. The substance of the lung near this was easily broken down, and the vessels and bronchial tubes were seen passing through it; the remainder was gorged with a frothy, dark sanies; the whole lung was reduced to half its size; some adhesions united it to the mediastinum, almost forming a circumscribed cavity: the costal pleura was in some places highly vascular; in others, covered with lymphy secretion; in some places very tenacious. In one patch, destroyed by gangrene, the intercostal muscles were laid bare for the space of several inches, and were in one part sloughy, forming an opening at the inferior and posterior part, at which place nature had attempted an outlet for the fluid — the latter having made its way into the cellular tissue, beneath the skin, and between the peritoneum and abdominal muscles, down the side of the abdonmen to the scrotum. The general cavity of the right side was much diminished by the liver having been displaced upwards by the flatus of the intestines; the liver was in such close apposition with the lung, as to be in danger of being wounded by the trochar; thus accounting for the fluid not coming off by the canula in the first instance.

Hydrothorax (from ὑδωρ, water, and θωραξ, the chest), *Water in the Chest.* — We may restrict the term to serous effusions in the cavity of the pleuræ. One among the many evidences of an amended pathology deduced from morbid anatomy is our better knowledge of the causes and real character of dropsies of the chest, including both hydrothorax and hydropericardium. No longer regarded as, in general, a primary disease, we see in these effusions, as indeed in all those of serous sacs, an effect, or symptom in fact, either of inflammation of their membranes or of impeded circulation. Recognising these two as the chief if not sole causes of hydrothorax, we see in the first variety, or that from inflammation of the pleuræ, active hydrothorax, while the second variety, which may be called passive, is caused by interruption to the circulation, either by organic diseases of the heart or congestion of the lungs, and tumours at the root of these latter. Sometimes hydrothorax results from diseases of the kidneys, from a febrile state connected with the exanthemata, particular-

ly scarlet fever; and from a sudden suppression of cutaneous exhalation. In some of these cases it may be associated with, if it do not proceed from, œdema of the lungs, increasing greatly the distress and the danger.

The symptomatology of hydrothorax is so little satisfactory that some of the best modern writers on the subject assert, that if we except oppressive dyspnœa, there is really no symptom of the disease. That there must necessarily be variation in this respect is very evident from a survey of the organic causes,—as to whether they consist in obstructions to the regular action and circulatory function of the heart, or in prior inflammation to the pleura, or pulmonary obstruction. Still it is well to be aware of the common association of morbid phenomena in these particulars, even if we are not able to reach a very exact diagnosis.

The hurried breathing and panting on mounting the smallest ascent, the oppression and dyspnœa increased by lying down, the starting during sleep so commonly spoken of as symptoms of hydrothorax, are, in fact, evidences of disease of the heart which preceded the effusion, and which would be manifested even if these latter were not present. The effusion will, however, no doubt, aggravate the original symptoms, and complicate the cure.

One of the earliest symptoms of hydrothorax, whatever may be the origin of the latter, is œdema of the eyelids; and, although the precursor of swelling of the feet and ankles in the evening, is often not noticed until in connection with the latter. The dyspnœa at first may excite but little attention and cause but little inconvenience; after a while, however, its increase becomes marked, and goes on until orthopnœa is established, and the patient cannot sleep except in a chair. The occasional, and, at times, periodical recurrence of paroxysms during which the oppression and anxiety of the patient are extreme, are not well accounted for. Great disorder of the circulation is evinced by the blue and almost livid colour of the lips and cheeks.

The physical diagnosis of hydrothorax is more precise than that derived from the general symptoms. Succussion can only be of service where there is a communication between the effusion in the pleural cavity and the air of the lungs, or where gas is mixed with the effused fluid. Percussion, as may be readily supposed, yields a dull sound over the whole region corresponding to the effusion. On auscultation we hear, if the effusion be yet slight, œgophony; but more commonly the information afforded by the stethoscope is negative. No respiratory sound is heard except at the root of the lungs.

The distinction to be drawn between hydrothorax or simple serous effusion and empyema, are attained with some show of accu racy. Thus, we commonly see serous effusions in other parts of the body, as at the extremities and sometimes under the whole subcutaneous cellular tissue, and also in the lungs, associated with that in the chest: they, also, in general, precede the latter. In empyema there is, indeed, not unfrequently, similar effusions in other parts; but they follow at some intervals the purulent collection of empyema. In this latter the respiratory sound is good on one side, whereas in hydrothorax it is deficient in both sides.

The recommendation of Bichat to make, in doubtful cases of hydrothorax, while the patient is lying on his back, pressure upon the abdomen, so as to throw the viscera upwards and thus diminish the capacity of the chest, is worth a trial, as an additional means of diagnosis between the disease in question and empyema. When pressure is made on the affected side no result follows; but if made on the healthy one, the expansion of the lung is prevented; and as this is the only one left for the performance of the function of respiration, this is impeded and much distress ensues.

The *prognosis* of hydrothorax, with our knowledge of its causes, must be always unfavourable; nor can we say that at any moment death may not take place suddenly after a slight additional effort, of which respiration and the action of the heart are more tasked than common.

The *treatment* of hydrothorax will be regulated very much by a knowledge of its cause. If the effusion have ensued on inflammation of the pleura, either simple or combined with pneumonia, our remedies should be the same as those directed for sub-acute or chronic pleurisy and pneumonia. Accordingly, we direct a few cups on the affected side or a blister kept discharging, and calomel with squills and nitre; or, if the bowels be irritable, opium may be used with good effect, both towards removing the morbid secretory action and promoting absorption. Hypertrophy of the heart and a full hard pulse, and pulmonary congestion depending on valvular disease of the heart, states of the organ associated with hydrothorax, are sometimes to be met by venesection, followed by calomel and nitre, and digitalis with colchicum. In cases of irregular circulation, with much oppression and symptoms of venous congestion, digitalis, with the alkalies and tonics, will constitute the outline of treatment. Active hydrogogue cathartics, which are well represented by the compound powder of jalap or gamboge with cream of tartar, often give great relief in hydrothorax. When in an enfeebled or cachectic state, efforts at spontaneous relief are made by expectoration, this should be encouraged by the use of polygala senega with carbonate of ammonia. When we have reason to believe that hydrothorax is caused by diseased kidneys, mercurial purgatives, the blue mass with some narcotic, and diaphoretics, will be of most service.

Counter-irritation must constitute a leading part of the treatment of hydrothorax. Blistering has been already mentioned, but in order to be efficient the discharge must be kept up by the repeated application of some vesicatory substance. Setons have been highly recommended with similar intent.

Pleurodynia (from πλευρα, rib, and οδυνη, pain) — *Bastard Pleurisy.* — Pleurodynia, formerly applied to all pains of the chest, is now restricted to those which affect either the intercostal and other muscles of the thorax or the thoracic fasciæ, and which are believed to be analogous to rheumatism, and still more to neuralgia. This affection acquires more significance and importance when it constitutes a part of general rheumatic disease, and may then be converted into real pleural or even pericardiac inflammation.

Pleurodynia is distinguished by a local pain in some part of the

thoracic parietes, of an acute and lancinating nature, increased by pressure and movement either of the trunk or arms, and by coughing or even breathing. The causes are sudden atmospherical vicissitudes, damp lodgings, exposure to currents of air and cold drinks when the body is perspiring. Sometimes it has resulted from an excessive strain on the respiratory muscles, as in violent gymnastic exercises, carrying heavy burdens, &c. Men are more subject to it than women, and adults and old persons than young ones. Like rheumatism, it assumes at one time an acute, at another a chronic character — and again, from the rapidity of its onset and sudden disappearance, we can only compare it to neuralgia.

Pleurodynia, originating from many of the same causes and manifesting to a certain extent similar symptoms as pleurisy, we are required to establish for it a correct diagnosis. In the former affection there is little or no fever, and the cough is transient; the pain, though pungent, is increased by pressure and the movements of the trunk and arms. In pleurisy, on the other hand, there is fever with a hard, resisting pulse and dry cough, and often colouration of the face on the side corresponding with the pleuritic stitch. The physical signs give negative results in pleurodynia, whereas in pleurisy they are of a positive character, such as dulness of sound, œgophony, friction sounds, &c. Reference being had to the neuralgic character of the former disease, we may expect to find associated with it spinal, or, rather, intercostal nervous irritation. Pressure on the space between two vertebræ has been, in cases coming under my own observation, productive of severe lancinating pain of the chest, similar to, if not identical with, pleurodynia. On other occasions, pain felt under the sternum and shooting through the chest arises from gastric indigestion, as those in the shoulders from disordered liver and disorder of he colon.

The *treatment* of pleurodynia will be modified by the age and constitutional vigour of the patient. Venesection is in some cases decidedly beneficial. More frequently leeches will suffice, and they, when used, ought to be applied, in the instance of females, to the inside of the thighs. Sinapisms, or hot fomentations and stimulating plasters to the pained part, the warm and even hot bath and warm pediluvia, are so many means of counter-irritation or of revulsion, which are often sufficient to remove the pain. In chlorotic females, or those of an anemic habit, it will be desirable to establish an afflux of blood and nervous excitement in the uterus, by the hip-bath, and warm aloetic purgatives, to which after a while we add some preparations of iron. I have found great and early relief procured in cases of a neuralgic nature by the application of a few leeches to the tender spot, at one or both of the spino-intercostal spaces. A blister to the same place has produced the like beneficial results.

LECTURE XCV.

DR. BELL.

PHTHISIS PULMONALIS.—The diseases caused by *tubercles* in the lungs—*Pathological Anatomy of Phthisis*—Tubercles—their stages and characters—*Granular or crude stage*; accompanied by consolidation—*Second stage, or that of elimination and softening*—How brought about—*Third stage, or that of ulceration*—Rokitansky's description of these successive changes—Vomica—Infiltrated tubercle—Order of change in tuberculous lungs—Description of vomicæ—Associated lesions of other organs with tuberculous lungs—The mucous surface of the larynx and bronchia and that of the small and large intestines most commonly diseased by inflammation, ulceration, and formation of tubercle in phthisis pulmonalis.

PHTHISIS PULMONALIS — PULMONARY TUBERCLE, or TUBERCULAR PHTHISIS. — *Phthisis Pulmonalis*, or *Pulmonary Consumption*, is now almost everywhere among medical men understood to designate a disease caused by the presence and development of tubercles in the lungs, and by tubercles alone. This proposition, distinctly affirmed by Laennec, has been confirmed by M. Louis.

Pathological Anatomy of Phthisis, and first and chiefly as respects *Tubercle*. — On examining the lungs of persons who have died of consumption, we find them greatly changed from their natural condition, in their being consolidated into irregular masses; and on cutting into them they are generally also excavated in parts, which are either empty, or contain a thick liquid matter. A closer examination reveals to us more precisely the morbid structural changes which thus present themselves as it were in mass. We discover, on pressing the softer part of the lung between the finger, a number of little hard bodies, and on cutting into it we see that they are roundish granules, of a light, semitransparent, reddish-drab, or skin colour, sometimes more grey or ash-coloured; more rarely devoid of colour, and quite transparent; of sizes varying from a pin's head to a hemp-seed, unmarked by vessels, insoluble in water, and, if mixed with it, quickly subsiding to the bottom. These bodies are tubercles, which, in their different sizes, appearances, intimate structure, and products, offer three distinct stages of growth; viz., 1, of incipient development or of crudity; 2, of elimination or softening; 3, of excavation or of cavity.

The tubercles of the first period correspond with those already described when a soft part of the diseased lung is examined. They are hard, destitute of organization, and disseminated in masses of more or less size, or intimately combined with the pulmonary parenchyma which is in a state of infiltration; sometimes they occupy only some lobuli, or again a whole lobe, and even the entire lung itself. Their number is variable. Sometimes they are found singly, studding a tissue otherwise healthy; but more commonly they are in groups of several together, and then they are either clustered in branches like berries, or they form a considerable mass, with the interstitial tissue consolidated and indurated between them. They are most commonly distinct in the inferior lobes; in the upper parts and near the root of the lung they are usually conglomerated in masses. Their chief seat, as pointed out by M. Louis, is at the sum-

mit of the lungs; and when they are met with at the same time in the inferior tubes, they are always at a less advanced stage than those of the upper lobes.

Before describing the stages of tuberculous growth and change, consecutive on those in the first or crude stage, we may naturally pause and ask, what is the primitive state, which, again, involves the question: What is the origin of tubercle? On this point I shall not detain you long. Laennec believed that tubercles began like small transparent grains, of a grey colour, but sometimes almost colourless, and of a size varying from a millet to a hemp-seed. These he denominates *miliary granulations — gray tubercle.* In the middle of these diaphanous and colourless bodies, Laennec describes, as visible, a slight opaline or grayish tint: if cut into, they exhibit in their centre a yellowish and opaque point, which indicates their transformation into *yellow tubercles.* According to this celebrated teacher, we can find, at times, yellow and opaque tubercles in the lungs as small as granulations, and they are sometimes softened too. If one of them be bruised between the fingers it feels like cheese; this is tubercle proper. The lungs which are the seat of granulations exhibit, also, tubercles proper, or those of a more advanced growth, and, like them, the granulations are disseminated or agglomerated in other tissues and organs, and with the same variety of colour and transparence, — as in the pleura and peritoneum, and in the intestinal ulcerations of consumptive persons.

M. Louis (*Researches on Phthisis*, translated by Dr. Walshe for the Sydenham Society), and in his article *Phthisis* (*Dictionnaire de Medecine*), adds the weight of his own observations to those of Laennec: he says, that he has seen almost always the granulations larger, more numerous, more yellow and more opaque in their centre in proportion as they approached the apex of the lungs, where tubercles most commonly have their seat; and that in a great majority of instances, tubercles and gray semitransparent granulations co-existed in the same organs. The facts appear to establish incontestably the transformation of the gray semitransparent granulation into tuberculous matter.

The gray semitransparent matter does not always appear under the form of granulations. It frequently is exhibited under another aspect — that of shapeless masses, occasionally of considerable size, as large, for example, as a hen's egg. In several cases, a variable number of miliary spots of yellowish-white colour and dull aspect — in fact, essentially tuberculous — were discernible in the midst of the masses referred to. In others, the transformation was almost complete, and a few particles only of gray matter appeared in the midst of a mass of tuberculous substance. Thus, continues M. Louis, whether the gray matter presented itself under the form of granulations or of irregular masses, which had attained more or less considerable bulk, it sooner or later underwent the tubercular transformation.

In the other organs of the body, tubercles are met with disconnected or unassociated with gray granulations, and even sometimes in the lungs. Tuberculous granules, however, enter into the composition of these granulations.

M. Andral, after expressing his dissent from the views which I

have just presented to you of incipient tubercle, adds, that there is not that uniform co-existence, alleged by Laennec, between the miliary granulations and tubercle in other parts of the body than the lungs, since they are only seen uniformly together in the pulmonary tissue. M. Andral then proceeds to give his own views. He regards granulations not as accidental formation, but as the result of modified nutrition, and made by indurated and hypertrophied pulmonary vesicles, constituting one of the anatomical forms of pneumonia (*vesicular pneumonia*). The granulations of serous membranes he believes to be nothing more than the rudiments of false membranes, and those in the mucous membranes hypertrophied follicles. Constantly he has found these granulations to be red and soft before they became gray and hard. Finally, the appearance of the granulation is displayed artificially after the incision or laceration of pulmonary lobuli.

Second Stage of Tubercles. — This is the stage of elimination or softening, which succeeds that of development or crudity, in a period of more or less duration. Generally, the softening takes place in the centre and proceeds to the circumference. The tuberculous matter becoming softer and moister, assumes an unctuous and soft, cheesy appearance, and at last resembles pus, or a colourless liquid mixed with opaque shreds of tuberculous matter. Of the cause of the softening of the tubercles, pathologists entertain different opinions. Some, as Bayle and Laennec, believe that tubercles have an inherent power of softening, as they had primarily of developing themselves. Broussais and Bouillaud attribute the change to inflammation. M. Andral adopts the opinion of M. Lombard, and believes that tubercles acting as foreign bodies on the tissues to which they are adherent, or in which they are imbedded, irritate them and give rise to a secretion of pus which mechanically separates the tuberculous matter. M. Louis thinks that the change is brought about by the new organization of vessels in the tubercles themselves. The process of softening having been gone through, other phenomena occur which constitute another stage.

Third Stage, or that of Ulceration. — This is begun by changes analogou sto those by which the skin in contact with an abscess is rendered thinner and is finally perforated. Around the liquefied tuberculous matter the pulmonary tissue is red and destroyed: the bronchial tubes soon participate in this destruction, and open a free passage by patulous orifices to the tuberculous matter, which is now expelled by expectoration. The cavity left in the lung after the process of evacuation and expulsion of the fluid matter of the tubercle is called *vomica*.

The successive changes of tuberculous matter from its first deposit to the formation of vomicæ, and occasional transformation and removal of diseased action, are well described by Rokitansky, in the summary notice of his *Manual of Morbid Anatomy*, contained in the *Brit. and For. Med. Rev.*, Jan. 1843, which we shall make use of on this occasion.

"The tubercles in the lungs undergo the same peculiar metamorphoses as in other organs, passing through the state of softening to the formation of the cavity or vomica. Each discrete gray granulation softens from its centre, which becomes turbid, more opaque,

and friable, and at last fluid. The groups present similar softenings at the centre of each of their component tubercles. From the former results a small ulcer; from the latter, when all the tubercles have gone through the same process, a large ulcer or cavity; and Rokitansky dwells particularly on the mode in which these cavities enlarge.

"The cavities thus formed, he says, spread by the successive changes of tuberculization, softening, breaking down, and removal of their walls in a regular eccentric progress; and when these go on rapidly the wall of the cavity consists of nothing but pulmonary tissue infiltrated with tubercle. As they approach, the cavities coalesce and communicate by sinuses or apertures of various size, or all are laid into one.

"But in a slower progress of the disease a more healthy inflammation is set up around the cavity. An albuminous, grayish, white, or reddish product is deposited, which closes, and ultimately produces a wasting of, the air cells. It may be converted into a grayish or blackish layer of dense and tough cellular tissue; and it may be either persistent, or may have tubercles formed within or beneath it, and breaking through it. At the same time, also, with this effusion without the cavity (which constitutes the *infiltration tuberculeuse gelatiniforme* of Laennec), albumen is effused in a layer of soft false membrane within it. But this is probably repeatedly thrown off as tuberculous matter collects beneath it, breaks through it, and carries it away with the pus of the cavity; and it may be assumed that in accordance with improvement or deterioration of the patient's health, and as the disease tends towards cure or towards increase, so either this albuminous product or tubercle is produced upon the walls of the cavity.

"But in certain cases these albuminous effusions, which are always indications of curative processes, proceed to a proper cure. And they are not the only modes in which tuberculous disease may be brought to a favourable conclusion; for in several distinct circumstances, its progress is arrested. 1st. There may be a callous degeneration of the tissue around the cavity, or the formation of a membrane within it like a serous or a mucous membrane; the former being usually found when the disease is tranquil, the latter when there is much irritation. 2dly. The cavity may completely cicatrize, its walls gradually falling in and uniting, with obliteration of the bronchi and sinking in of the surface of the lung, and perhaps of the wall of the chest also. 3dly. The cavity may, after partially shrinking, be filled by chalky matter, from the metamorphosis of some remaining tubercle. 4thly. In the place of the cavity there may be produced a large callous mass of tissue, like that of cicatrices. Or, 5thly. The tubercle may not proceed to the formation of the cavity, but being arrested in its earlier progress, may diminish in size, and be changed into a gray or dirty-white mass of chalky matter, and at last into a hard concretion; changes which may ensue in either the granular or in the infiltration form. And, lastly, at a still earlier stage, the tubercle being arrested in its progress may retrograde and become *obsolete*, shrivelling into an opaque, bluish-gray,

cartilaginous knot, which is indisposed to any further metamorphosis.

"Thus, in any stage of its progress the tuberculous disease may be arrested, and either removed or reduced to a state of inaction: and where, as is rarely the case, these changes occur in all the tuberculous matter that has been deposited, and the diathesis is wholly remedied, the cure of the disease is complete.

"Such is Rokitansky's general account of the ordinary progress of pulmonary tuberculous disease, considered independently of its effects on adjacent tissues."

Reference has just been made to the diffusion of the tuberculous matter through a considerable extent of the pulmonary tissue, constituting the *infiltrated tubercle* of Laennec. In its earlier condition, the lung in this state closely resembles the last stage of hepatization, when the opacity, which precedes suppuration, shows itself. It is very much mottled or marbled; for, besides the yellowish-white opacity which is seen in different degrees in its different parts, there is the black pulmonary matter giving it a gray or greenish colour; and there are, also, the whiter coats of vessels and interlobular septa, and spots of red tissue less affected. When the lung in this state is cut or torn, which it commonly may be with facility, its interior presents a granular surface, like that of hepatization; and except that its colour is more varied, and it has generally more of the light opacity of tuberculous matter, it resembles a hepatized lung more than anything else. But in it are seen what we rarely meet with in hepatized lungs, circumscribed abscesses or cavities, containing a fluid matter. These circumscribed cavities are vomicæ.

Rokitansky, in speaking of the accidents and associated phenomena of the disease, says: that only large bronchial tubes open into cavities, the small ones being closed by the secondary tuberculous deposits around and within them, and by the swelling of their mucous membrane. The openings into them, when recent, are always ulcerated, oblique, and abrupt; but when the wall of the cavity becomes callous they acquire a smooth edge of tough mucous membrane, which they retain permanently, or till, as is rarely the case, they are obliterated. He points out tubercular infiltration as the most frequent precedent of perforation of the pleura; and this result is favoured by the frequency with which it occurs, especially at the surface of the lung, and the rapidity with which it is apt to break down and become fluid before adhesions are produced over it. In these, as well as in other cases of perforation, he well describes how the pleura is first distended by the air passing into the cavity till, having been raised like a small bladder on the surface of the lung, it bursts, or dies and is thrown off, or else sloughs, being involved with a small adjacent portion of the lung in gangrene."

The tuberculous cavities or vomicæ are lined with a pyogenic membrane, the formation of which may be regarded as a curative effort of nature to isolate the cavity from the surrounding tissue and thus to favour its cicatrisation. The vomicæ are traversed by parenchymatous shreds and sometimes by bloodvessels, but which last are rarely eroded or destroyed. When they are suddenly opened in this way hemoptysis even of a fatal nature is sometimes the consequence.

At other times again the vessels may be completely obliterated. The bronchial tubes open into the cavities generally by destructive ulceration. The matter contained in the cavities consists of a mixture of pus, mucus, tuberculous matter, and serosity, tinged or mixed with blood; and even occasionally portions of the pulmonary parenchyma, which at times may be brought up by expectoration.

The situation of tuberculous cavities in the lungs, in a great majority of cases, is at the summit or upper lobes, whence they invade gradually the lower ones as the disease advances. Their size varies greatly, from that of a pea to being large enough to contain a pint or more of fluid. Sometimes the whole of the upper lobe is converted into a cavity of this kind.

Formation and Growth of Tubercle. — Hitherto I have simply described the general appearance and changes, by conversion, of tubercle. A few remarks on its origin and growth will properly enough find place just now.

Dr. Baron believed that tubercles at first consisted of cysts with transparent sides, from the interior of which was afterwards secreted or rather infiltrated the grayish-white matter. Although M. Dupuy at the veterinary school, at Alfort, often found cysts and tubercles existing simultaneously in the same animal, yet this conjunction is not common in the human species, and, upon the whole, pathological inquiry does not favour this view of Dr. Baron. MM. Cruveilhier and Magendie suppose that tubercles were primarily fluid, and consisted of pus which gradually becomes solidified by the absorption of the thinner portion. M. Andral adopts this opinion in a general, perhaps we might call it an abstract sense. It is; that as all the component parts of our bodies are primarily liquid, tubercle must come under this general law. But this admitted, how comes the tubercle to pass from a liquid into a solid state? And besides, this hypothesis is deduced from observations on pneumonia and pulmonary œdema, rather than tuberculous formations. Dr. Carswell believes tubercle to be a peculiar secretion which takes place from mucous membranes; but that it may accompany other secretions, such as that of inspissated mucus in the air vesicles, or of dense false membranes in the pleura or peritoneum. But if we examine the miliary bodies minutely, we fail to find inspissated mucus adequate to account for their hardness, which is in the texture itself, and not merely contained within cells.

Probably the correct view will be, we believe, to regard tuberculous matter as a primary deposit from, and often mixed with, the blood or its fibrin. If we cannot say that it has been seen in the blood itself before this latter was deposited or secreted from the vessels, we have at least a near approach to this state in its being found in the cells of the spleen; forming in the blood at some distance from their walls. In one cell, as we learn from Dr. Carswell, the blood may be simply seen coagulated; in another, it will be coagulated and deprived of its colouring matter; and in another, converted into a mass of solid fibrin, having in its centre a small nodule of tubercular matter.

Anatomy has not thrown much light on the structure and connexions with other contiguous parts of tubercle. As respects their vascular relations, we are indebted most to Schroeder Van der Kolk, a Dutch

anatomist, on the score of originality, and to Natalis Guillot for fuller and lucid description. The researches of these gentlemen have shown that the branches of the pulmonary artery stop or cease to be permeable at a distance of three, four, or five millimeters from tubercles or gray granulations; the length of vessel impermeable increases with the augmentation of the tuberculous masses, so that when these are considerable, or when they have given place to cavities, a sort of investment, two centimeters thick, may be found around them, presenting not a single ramification of the pulmonary artery. By injection and microscopical examination, it is further discoverable that this total absence of vascularity is only temporary; for, after a time, red lines, tapering off at either end, and in their widest part equalling a millimeter in diameter, become discernible. At first these vessels are perfectly isolated, but in process of time communicate with the bronchial arteries, or with those of the walls of the thorax. The latter communication is effected by means of new vessels developed in the pleural false membrane (the particular discovery of Van der Kolk). The amount of new vascularization effected in this way increases greatly with the progress of tuberculous destruction; the rete spreads eventually, it may be, through a great part of the affected lung, and replaces the system of the pulmonary artery which has ceased to be discoverable. An inquiry naturally presents itself, as to the influence on oxygenation exercised by this novel condition of supplementary vessels. It is in truth aortic blood, that by means of the bronchial arteries and new system of vessels spread through the lungs; and M. Guillot has ascertained that this blood must return to the heart by the bronchial, pulmonary, and azygos veins, as he ascertained that the substance of injection thrown in by the aorta is found in these veins. Now this condition of circulation is one that manifestly cannot subsist without materially altering the blood of phthisical subjects, and thereby affecting their organisation generally. The main result in respect of function may be expressed thus, — that in proportion as tuberculisation advances, the lungs acquire increasing capacity for arterial, and loose it for venous blood.

Seats of Tubercle. — The researches of M. Guillot upon the elementary and primary seat of tuberculous matter, lead him to follow the views of Dr. Carswell, and place this in the bronchia as soon as the accumulation is sufficiently great to be distinctly and satisfactorily examined. In the earlier stages he thinks it a just inference from what is thus ascertained in more advanced ones, that the ultimate terminations of the bronchia are the seat of the change. We would refer you for a full critical analysis of this and other questions connected with the growth and changes of tubercle, to a paper by M. Valleix in *Archives Générales*, Fevrier, 1841.

We find tubercles to be seated most frequently in the mucous membrane, then in the serous, and after this in the cellular tissue. Lymphatic glands are frequently affected with tuberculisation in all its varieties in children. Dr. Carswell states that, "in whatever organ the formation of tuberculous matter takes place, the mucous system, if constituting a part of that organ, is, in general, either the exclusive seat of this morbid product, or is far more extensively affected with it than any of the other systems or tissues of the same organ. Thus the mucous system

of the respiratory, digestive, biliary, urinary, and generative organs is much more frequently the seat of tuberculous matter than any other system or tissue which enters into the composition of these organs." In confirmation of this view of Dr. Carswell, and in illustration of the mode of formation of tubercle, I might refer to the interesting account by Dr. Harrison, of Dublin, of tubercles in the air-cells of a bird. He found, on raising the sternum, a great number of yellow, white or grayish tubercles, studding the great air-cell on the left side; and presenting in size, form, and consistence, every variety. Their adhesion to the mucous membrane of the air-cells in which they were deposited was so slight that, after a little maceration in water, they could be easily separated, leaving the subjacent membrane free from any abrasion or abnormal appearance. The connexion of the tuberculous bodies with each other appeared to be mere agglutition, which maceration in water readily dissolved. Still more recent observations teach that the seat of tubercles, in the lungs, is usually the intervesicular elastic cellular or areolar tissue.

Pathologists are not agreed respecting the proportion of tuberculous disease in the lung of each side; Laennec affirming that this is manifestly in the right; the great majority, among whom is M. Louis, contending that the left is the chief seat. The following table exhibits the results of Dr. Hughes's investigations (*Guy's Hospital Reports*, Nos. xiv. and xv.) on this point; from which it would appear that, upon the whole, the left lung is most susceptible of tuberculous diseases, but the difference is too slight to guide us either in diagnosis or prophylaxis.

		Cases.		Per cent.
The left side was chiefly diseased in		116	...	46
The right ditto ditto		89	...	36
The most diseased side was doubtful in		45	...	18
Of the 116 cases on the left side, there were	males	76	...	43
	females	40	...	53
Of the 89 cases on the right side, there were	males	66	...	38
	females	23	...	30
Of the 45 cases, in which the most diseased side was doubtful, there were	males	33	...	19
	females	12	...	16

Of the 48 cases examined after death, of which 11 only were

	Males.		Females.
Tubercles were confined to the left lung in	3	...	1
„ „ right „	1	...	0

As respects the part of the lungs which most suffer from tubercular deposit, there is more concordance of sentiment; the upper portion exhibiting by far the greatest number of instances of disease. Of the 250 cases recorded by Dr. Hughes, the upper lobe of one or both lungs was solely or principally diseased in 237, or 95 *per cent.* Of the remaining 13 cases, of which 11 were males and 2 females, there were 9 or $3\frac{3}{5}$ *per cent.* of the whole number, in which both lungs were universally and uniformly diseased. Of these nine 8 were males

and 1 was a female. Of the remaining 4 cases, the upper lobe in them was at least equally affected with other parts. In only one case out of the whole 250 were tubercles confined to the base, there being none in the upper lobes of the lungs.

These facts, taken in connection with the recorded observations of the greater frequency of pneumonia in the lower lobes (see page 192), will aid us not a little in our diagnosis of phthisis. Perhaps, however, the contrast has been presented too broadly; for Grisolle found that pneumonia attacked more frequently the upper lobe than is generally supposed; and he tells us that, in 19 cases of pulmonary abscess, a morbid condition, liable to be confounded with tubercular cavity, reference being had to the physical signs alone, 9 were in the upper lobe, 5 in the inferior, and 1 in the middle.

Let us next inquire into the morbid changes of structure in the different organs, associated with tuberculous formation and growth, and first in the *Respiratory Apparatus*. — These are emphysema and œdema of various extent and degree, and inflammation of the lung around the tubercles. This last may present the three degrees of acute pneumonia. Chronic pneumonia is quite common around the tubercles, either during their stage of crudity or that of softening. The question, to be answered presently, comes up in view of this conjunction of pneumonia with tubercle; is the inflammation of the lung the cause of this tubercle?

The *larynx and trachea* are quite frequently the seats of inflammation and ulceration in phthisis, a fact of which you are already apprised in my Lecture (LXXXI) on chronic laryngitis. I may now add that, of one hundred and ninety subjects, carefully examined, according to the report of M. Louis, seventy-six presented ulcerations in the trachea; of one hundred and ninety-three cases in which the larynx was examined, it was found ulcerated sixty-three times. The epiglottis was ulcerated in thirty-five out of one hundred and thirty-five cases of pulmonary tubercle. The ulcerations increase in frequency from the epiglottis to the lung. Females are more subject than males to these lesions. "Of one hundred and two consumptive patients noted by Louis, the trachea was found to be ulcerated in thirty-one, the larynx in twenty-two, and the epiglottis in eighteen." The ulcerations of the *larynx* are chiefly seated at the insertion of the vocal cords, — in these latter themselves, especially at their posterior part, at the base of the arytenoid cartilages, upper part of the larynx, and interior of the ventricles. Sometimes one or more of the vocal cords is destroyed entirely. The *epiglottis* suffers from ulcerations, sometimes without any corresponding affection of the larynx or trachea. Their situation is generally at the laryngeal surface of the epiglottis, and commonly at its inferior portion.

The trachea is chiefly ulcerated at its lower and posterior part, and here, also, the redness of the mucous membrane is most manifest. Occasionally the cartilages are denuded and even destroyed by ulceration. Small, round, hard tumours are seen beneath the mucous membrane of the larynx and trachea, which have been called tubercles, and which, after a while, give rise to irritation and ulcerative inflammation. These are regarded by M. Andral as diseased follicles (*Clinique Medicale*). By M. Louis, as by Broussais before

him, the inflammation and ulceration of the trachea are attributed to the irritation of pus and tuberculous matter, in its passage from the bronchia during expectoration.

Upon an accurate analysis of the state of the epiglottis, larynx, and trachea, in subjects dead from other diseases than phthisis, M. Louis found among one hundred and eighty individuals, but one example of ulceration in the larynx, and two of the same lesion existing in the larynx and trachea.

You will not perhaps object to the association between tuberculous lung and ulcerations of the air-passages, which I have recently detailed to you, being presented in a tabular form, for which I am indebted to the source just indicated.

No. of Cases.		Ulcerations in Trachea.		
190	80 Females	21	=	$\frac{1}{4}$
	110 Males	55	=	$\frac{1}{2}$
		76	=	$\frac{1}{3}$ and upwards.

No. of Cases.		Ulcerations in the Larynx.		
193	80 Females	19	=	$\frac{1}{4}$ about.
	113 Males	44	=	$\frac{1}{3}$ „
		63	=	$\frac{1}{3}$ „

No. of Cases.		Ulcerations in the Epiglottis.		
134	47 Females	8	=	$\frac{1}{6}$
	87 Males	27	=	$\frac{1}{3}$
		35	=	$\frac{1}{4}$

No. of Cases.		Ulcerations in the Bronchia.		
49	19 Females	5	=	$\frac{1}{4}$
	30 Males	17	=	more than $\frac{1}{2}$
		22	=	$\frac{1}{2}$ nearly.

The pleura is diseased by adhesive inflammation in a vast majority of cases of pulmonary tubercle. Of 112 cases of this disease, examined by M. Louis himself, there was but one in which both lungs were free from adhesions. These are, generally speaking, in number and extent proportionate to the pulmonary disease. Pleurisy is common during the last period of existence in phthisical subjects; and terminates in the formation of false membrane, serous effusion, and even sometimes true pus.

Tuberculous degeneration of the bronchial glands is common enough in pulmonary tubercles of children, but much less so in that of adults. In the latter there may be tubercles of these ganglions without a trace of pulmonary phthisis (*Clinique Medicale*).

Associated disease of the *circulatory apparatus* is every now and then met with in phthisis. The heart is rarely hypertrophied: the opposite state, or that of atrophy, is more common. Sometimes the heart is soft and flaccid; and at other times it is firmer than natural. When the ventricles are of diminished thickness, this is more commonly found in the left than in the right ventricle. The aorta, for the most part healthy, is sometimes found in a morbid

state, which is manifested by a redness of varying intensity and extent. At its bifurcation we sometimes see cartilaginous laminæ, ulcerations, and osseous points. Often it is contracted in its diameter.

The *spleen* was found, by M. Louis, to be augmented in size sixteen times and diminished fifteen times, and in its normal condition fifty-nine times. It is often found tuberculous, especially in children.

Most constant and remarkable of all the lesions of other remote organs, associated with tuberculous disease of the lungs, are those of the digestive canal. M. Louis reaches the conclusion that they occur in four-fifths of phthisical subjects. The pharynx and œsophagus, except sometimes a thinness and softening of the inferior portion of the latter, are healthy. The stomach is variously altered, in its being sometimes greatly augmented in volume, and more frequently in its mucous membranes being thinner than natural, softened, and even destroyed, or, on the contrary, thicker than in health. It may also be of a lively red colour, and the seat of ulceration. The common seat of softening is at the upper part of the great curvature. The change of tissue in this case may occupy nearly the whole surface of the stomach or it may be displayed in the form of bands. Sometimes projecting bodies are seen on the mucous membranes, of a rounded form, one or two lines in diameter, resembling fleshy granulations or wounds. Ulcerations of the stomach were observed by M. Louis in a twelfth of the cases of consumption. Of 96 cases examined, 77 exhibited a morbid condition of some kind or other of the stomach. M. Andral (*op. cit.*) records, as the result of his observations in the *Charité*, that at least three-fifths of the persons who died from phthisis exhibited a well-marked morbid condition of the stomach. This viscus is seldom or ever the seat of tubercle.

The *duodenum* was generally found by M. Louis to be in a normal state. In sixty cases he saw nine of ulceration of this organ. Very different was the state of things in the small intestine proper, the mucous membrane of which was softened, thickened, and more or less red, and exhibited in addition small abscesses, tubercles, and ulcerations. Tubercles in every stage of development are met with in the entire track of the small intestine, but much more frequently near the cæcum. They were observed by M. Louis to be present in 36 out of 95 cases. Ulcerations were still more frequent, having been met with in 78 out of 95 subjects, and also most numerous and deep as we approach the cæcum. The coat of the intestine has been found to be entirely perforated. In the large intestine the morbid changes, as to the redness, softening, and thickening of its mucous membrane, and the frequency of ulcerations and tubercles are similar to those in the small intestine. Fistula *in ano* was hardly ever met with by M. Louis or by M. Andral.

The *mesenteric glands* were found to be tuberculous and enlarged 23 times out of 102 subjects of phthisis. The meso-cæcal, meso-colic, and lumbar glands, exhibited similar changes. In 8 of 80 cases, the lymphatic glands of the neck were tuberculous. The axillary glands have been almost always in a normal state.

The relative frequency of tuberculisation of the lymphatic glands

in different regions in phthisis is recorded by M. Louis (*op. cit.*), as follows: —

Lymphatic glands.	No. of cases examined.		Tuberculous in
Cervical . .	80	...	8 = $\frac{1}{10}$
Bronchial . .	70	...	$\frac{1}{2}$*
Mesenteric . .	102	...	23 = $\frac{1}{4}$
Meso-cecal and Meso-colon	"a little less frequently than the mesenteric."		
Lumbar . .	60	...	5 = $\frac{1}{12}$
Axillary . .		...	1

In the secreting apparatus, alterations of tissue have been met with in consumptive subjects. Thus, the cellular tissue sometimes exhibits tubercles; the arachnoid and pia mater show false membranes, serosity on the upper surface of the arachnoid, and redness, thickening, and injection of the pia mater. The peritoneum in a fifth part of the cases has a serous effusion, and occasionally false membranes, pus, and adhesions. Ascites is only met with when there is complication of heart disease with phthisis.

The *liver* is morbidly affected by what is called fatty transformation, which reaches the entire substance of the organ. M. Louis has met with this in 40 cases out of 120, or one in every three. The figure of the liver is normal, but its volume is almost always augmented, and especially at its great lobe. We find on these occasions that the liver covers almost entirely the anterior surface of the stomach, fills the epigastrium, goes beyond the false ribs, and reaches as far as the spleen and crista of the ilium. Its consistence is commonly altered; it is soft, and tears easily. This fatty transformation of the liver is confined almost entirely to phthisis pulmonalis; and it is found to be much more frequent among women than among men. It occurs when the disease is of short as it does when it is of long duration. Sometimes the liver is the seat also of tubercles, hydatids, cysts, &c. In general, the bile in subjects in whom this fatty transformation of the liver has taken place is of a dark colour and pitchy consistence. In one case only has M. Andral met with tuberculous formation in the gall-bladder and biliary ducts. The pancreas has always been found healthy. Seldom are the kidneys altered in phthisis. The same remark applies to the bladder. Tuberculous matter has been secreted in the mucous surface of the vesiculæ seminales and vasa deferentia, but in phthisical subjects alone. The muscles are generally atrophied in the phthisical; and the proportion of phosphate of lime in their bones is less. M. Dupuy has

* There is a typographical error in the original, either in the number of cases or the proportional frequency; the context renders it much the more probable if not actually certain that it is in the former, we therefore give the latter. It is to be observed, with respect to the state of the bronchial glands (and, indeed, the circumstance must invariably be borne in mind throughout this article), that the researches of M. Louis refer to the disease as it exists in subjects aged upwards of 15 — younger individuals being excluded from the hospitals in which he observed. Tuberculisation of the bronchial glands is in infancy more frequent even than that of the lungs. — *Ed. Brit. and For. Med. Rev.*

observed that cows affected with pulmonary tubercle secreted milk which contained an unusual quantity of this salt. The peritoneum is frequently observed to be the seat of serous effusions in phthisis, and also, but in less degree, of tubercle. False membranes and tubercles were found at the same time. Analogous changes are met with in chronic pleurisy.

In a majority of cases some anatomical changes in the brain and its appendages has been discovered in those dead of phthisis; but the only morbid changes observed exclusively in these parts in the subjects of this disease are hydatids and tubercles.

After this summary view of the seats of tuberculous disease, we shall be prepared to accord in opinion with Dr. Williams, when he says: If tubercle be, as we suppose, a degraded condition of the fibrin or nutrient principle of the blood, we may expect it to be deposited wherever the nutrition or the secreting process is carried on — wherever lymph or pus is occasionally found — wherever, in short, bloodvessels run.

There is a general law stated by M. Louis which is of the highest importance, viz.: that after the age of fifteen tubercles are not met with in any organ without their being likewise seated in the lungs. Tuberculisation of the bronchial ganglions is most frequent in children.

LECTURE XCVI.

DR. BELL.

Causes of Phthisis Pulmonalis.—*External Causes*—Climate—Difference of mortality in different countries—Consumption, a common disease in the Mediterranean climates,—also in the West Indies, and in the islands of the Indian Ocean—Consumption varies in its rate of mortality in different periods—Close and impure air a common cause—Effects of dust given out in certain trades—Deficient or improper food—Internal causes of consumption—Age—Sex—Hereditary predisposition—Conformation of the chest—Influence of inflammation of the respiratory organs—Tubercle may be formed without inflammation—*Duration* and *termination* of phthisis.

Causes of Phthisis Pulmonalis. — These are external to the individual and internal. Of the former, *climate* is entitled to be first considered. Within a few years a great many important facts have been collected on this subject, and opinion is undergoing a change respecting the sanative properties attributed to certain climates in the cure of consumption. This disease is met with in every region of the earth; but it is less common in extreme northern latitudes than elsewhere. The deaths from it in the region between the fiftieth and sixtieth degrees of north latitude, are only 53 in 1000 from other diseases. Between 45 and 50° N. the disease augments in frequency. Thus, in 1000 deaths, in Vienna, 114 are from consumption; in Munich, 107; in Berlin, 71; in London, 236. In Paris, a fifth of the deaths is from this disease. From 45 to 34° N. lat. the mortality is still considerable. In Marseilles, consumption carries off a fourth of those who die; in Nice, with its boasted climate for phthisical pa-

tients, a seventh; in Genoa, a sixth; at Naples, an eighth; in Milan and in Rome, so comparatively distant from each other and so differently situated, the deaths are a twentieth of the whole number. M. Journé, referred to by M. Louis, says that the Roman hospitals furnish as many cases of tuberculous disease as those of Paris. In Philadelphia, the deaths from consumption are on an average of four years (1834, 1835, 1836, and 1838), in proportion to those from all diseases, as 1 to 7·60: in Boston, the proportion is as 1 to 5½ in a period of twenty years (Shattuck — *Vital Statistics of Boston*); and in New York, 1 to 5·45. In this last mentioned city the mortality from consumption is increased excessively by the deaths among the European part of the population; the proportionate mortality among whom, alone from consumption, is 1 in 3·25, which, if deducted from the whole in New York, would leave for the native population a rate of 1 death in 7·66 deaths. (See *Remarks on Bills of Mortality of New York*, by Dr. Lee, Am. Journ. Med. Scien., vol. xxii.) The mortality from this disease is greater among the coloured people.

Consumption is common enough at Madrid, Lisbon, Gibraltar, Malta, and the Levant: in fine, it commits no small ravages along the whole European shores of the Mediterranean, whereas, on the African side, it is represented, but how truly I know not, to be quite unknown.

The climate of the Mediterranean and of Southern Europe generally, does not merit the reputation which it has hitherto, or until recently, enjoyed for the cure of consumption. On the contrary, it excites with singular and alarming rapidity the tubercular diathesis into actual disease, by promoting the development and softening of tubercle. Dr. Sinclair, one of the surgeons to the British fleet in the Mediterranean, during the long war between France and England, bore strong testimony to this fact, as far as the crews of the vessels of his nation were concerned. Pursuing a course directly in contrast with what would have been thought advisable by his professional brethren at home, he advised the speedy return of the sailors to England, as soon as the critical symptoms of consumption were manifest, as presenting the only prospect of saving the lives of these persons. It was found, on comparison of equal numbers in the fleet in the North Sea and in that in the Mediterranean during a winter, that there were fewer cases of consumption among the former, notwithstanding their exposure to a most inclement season, than among the latter with a so much more genial temperature. In Malta and Gibraltar the cases of consumption among the British troops in garrison, on an average of twenty years, are as numerous in proportion as they are in Great Britain among the same class of persons, viz., 6 *per annum* in every 1000 men. In the Ionian Islands the proportion is 5 in 1000 (Major Tulloch's *Statistical Reports*, &c., p. 35ª.) Throughout all England the deaths by this disease were, in 1837, 3·96, and in 1838, 3·93, in 1000. Equally prevalent and destructive in most of the Mediteranean stations are catarrhal affections and inflammations of the lungs. In the document just referred to, it is stated that this class of diseases is " nearly twice as prevalent as among the

same number of troops in the United Kingdom; and that in the mild climate of Malta they are nearly twice as fatal." Bearing directly on our present subject is the following remark: — "These facts, combined with a careful examination of the Abstracts in the Appendix, lead to the inference that residence in the Mediterranean, though so often recommended to patients labouring under pulmonary affections, is by no means likely to be attended with beneficial results: in some cases, no doubt, change of air, change of scene, and the sea-voyage, may have benefited a patient, and led to a partial recovery; but the same would in all probability have taken place wherever he had been sent, it being by no means likely that any beneficial influence can be exerted by the climate itself, when a body of selected soldiers, subject to no severe duty, and exposed to no hardship, lose annually a larger proportion of their number by consumption than in the United Kingdom. This inference, however adverse to generally received opinions, is strikingly corroborated by the prevalence of consumption and other pulmonary affections among the civil inhabitants of Malta, — as shown in Appendix III. of this Report." On referring to this Appendix I find it stated that, during a period of thirteen years, with an average population of 100,270 persons, the deaths from all diseases in Malta were 33,501; and of these, 6664 were from pulmonary diseases. Consumption alone numbered of the deaths 4149, or 1 in 8 of the whole number of deaths, — a rate nearly as high as that of Philadelphia, including all classes of her population, — natives white and coloured, and foreigners. In all England the deaths from this disease in 1838 were, in the whole number from all diseases, as 1 to 5·55. A scarcely more favourable representation of the climatic influence of the whole Mediterranean coast can be made than that of the insular posts. The mortality at Naples is, as we have seen, the same as at Malta. Dr. Journé's tables (*Bulletin de l'Acad. Royal de Med.*), show conclusively the prevalence of phthisis in the chief towns of Italy. Dr. Young declared consumption to be as common a disease in Marseilles as in London; and Smollet, who wrote it as true as a querulous invalid might be supposed to do, declared, nearly a century ago, the climate of Provence to be anything but favourable to the consumptive invalid. No physician at the present day at all conversant of the facts in the literature of the subject, will be found to speak of Montpelier in the terms of eulogy once so commonly applied to it as a residence for the consumptive. Phthisis is quite common there, and the physicians of the place do not hesitate to direct their patients to a more genial location.

If we look still further south, but yet short of the tropical latitudes, for a home for the consumptive, our embarrassments are not removed; for we find phthisis prevailing at Madeira and the Canaries, as it does in the southern portion of our own country, particularly among the coloured part of its population, in connexion with if not dependent on a scrofulous diathesis. In the Southern States the complication of intestinal disease is more common, and ulcerations and tubercles of the bowels, added to those of the lungs, cause the disease to go through its course with sometimes fearful rapidity.

Great is the surprise or still manifest incredulity of many persons,

who have learned for the first time, through the Reports of Major Tulloch, that consumption is a common disease in the West Indies. But if their inquiries had led them as mine did in preparing, some twenty years ago, lectures on general pathology, including of course the influence of climate, they would have ascertained this fact from other sources. Among these was the testimony borne by Dr. John Hunter (*Observations on the Diseases of the Army in Jamaica*); as when he tells us, that "pulmonary consumption rarely originates in the island, but those who come from England with that complaint already begun, are not benefited by the warmth of the climate; on the contrary, the disease is precipitated, and proves fatal sooner than it would have done in a more temperate air. Of this we have repeated examples among the soldiers, several of whom arrived on the island with beginning consumptions, and were all quickly carried off by that disease." Hillary (*Observations on the Changes of Air, &c., in the Island of Barbadoes*) speaks frequently of peripneumonia and pleurisy prevailing among the inhabitants of the island. More direct and express is the information on the subject communicated by Dr. Colin Chisholm, whose long residence in the West Indies, and chiefly in Grenada, enabled him to speak with knowledge. He declares consumption to be a quite common disease in these islands, and that the chief difference between the disease there and in England is the greater rapidity of its progress to a fatal termination in the tropical than the northern islands. Pneumonia also, he tells us, occupies a distinguished place during the spring and winter months among the tropical endemics (*A Manual of the Climates and Diseases of Tropical Countries, &c.*). The deaths in an aggregate strength of 86,661 British soldiers during a period of nineteen years, on the Windward and Leeward Islands, was 6803; of which 906, or 1 in 7·5, were from pulmonary diseases, and 580, or rather more than 1 in 12, from pulmonary consumption. Among the black troops the deaths from pulmonary diseases were 676; the whole number being 1646 in an aggregate strength of 40,934 for nineteen years, or 1 death in about 2·60. The cases of deaths from consumption were 390, or 1 in 4 of the deaths from all other causes. Major Tulloch, after pointing out the very small mortality among the officers in the West Indies from pulmonary consumption, which contrasts so strongly with the number of deaths among the soldiers, thinks that there is some other cause than climate operative in the production of consumption among these latter. He indicates as a probable cause confinement to close and illy-ventilated barracks; but the difference in this respect between the lodging of the officer and the men is not so constant and marked as to explain the difficulty.

M. Rufz (*Etude de la Phthisie à la Martinique*) shows that similar results were obtained in the French island of Martinique. Of 1954 patients treated by him between 1836 and 1839, 123, or about 13 in 100, were phthisical, — or 11 per cent., setting aside some persons established at St. Pierre. Among those persons there were, however, very few children. In Brazil, phthisis is a common disease among both whites and blacks (Sigaud, *Du Climat et des Maladies du Bresil*).

On the opposite side of the earth, but still in a tropical region, and

in an insular position too, one deemed peculiarly favourable to the procuring of an equable and mild temperature, I refer now to Mauritius, an island in the Indian Ocean, consumption is a common disease. From diseases of the lungs, 5·6 per 1000 die annually, or twice as many as at the Cape of Good Hope. This excess arises from the comparative prevalence of consumption, to which more than one-half of the mortality from this class is due, and with which $7\frac{7}{10}$ of the mean strength is attacked annually; a higher proportion than in the United Kingdom or the Mediterranean.

Dr. Forry (*The Climate of the United States and its Endemic Influences*) has impugned the accuracy of the basis of the British Army Reports, on the ground that their authors have assumed England as the standard of comparison to test the relative salubrity of other countries in regard to pulmonary diseases, and have adopted a classification of climates based on mere latitude. As Englishmen, describing the mortality among English troops in English possessions, and drawing entirely from English documents, and addressing themselves to the English authorities and public, with reference to the probable benefit that might be derived by the inhabitants of England from their visiting the countries referred to in the tables, for the amelioration or cure of consumption, it is not easy to see what other standard of comparison could have been used with any advantage to the parties for and respecting whom the estimates were made, than the one which was actually adopted. In perusing the introductory remarks to the tabular returns, and the summary and deductions which follow, I do not find any attempt at systematic climatology, such as that attributed to them by Dr. Forry. The chief peculiarities of the climate of the Windward and Leeward Command in the West Indies are first described, and then those which are characteristic of each island are subsequently detailed. It was hardly necessary for Major Tulloch to speak of the mean temperatures of winter and of summer in addition to the mean of the whole year, when we learn from him that the difference between the highest and lowest mean range of the thermometer is, even in the most variable of the islands, only 13°, and in some it is not more than 4° throughout the year; whereas, he adds, in Britain it is in most years upwards of 30°. The only notable division of seasons in the Windward and Leeward Islands, into two wet and two dry, and the large quantity of rain in the former, is that one which he mentions. Other peculiarities, such as prevailing winds, hurricanes, electrical phenomena, and limited range of the barometer, are also specified. Dr. Forry in his strictures, says, "Now, it has been demonstrated by the statistics of the United States Army that, in the climates in which the extremes of temperature are moderated, in which there is little difference between the mean temperature of winter and summer, pulmonary diseases as a class exhibit a low ratio." The reply to this is, that in the West Indies generally in which these climatic conditions are fulfilled, pulmonary diseases as a class exhibit a *high* ratio; and, in reference to pulmonary consumption, it may be added, that where the very opposite of the favourable conditions specified by Dr. Forry exist, viz., in high northern latitudes, and extreme systems of winter and summer climates, this disease is comparatively infrequent.

The strictures of Dr. Forry on the error of comparing the highest average in one command with the lowest in another, and in the oversight of bad habits and bad morals operating on the British soldier, as well as the progressively deteriorating influence of prolonged high heat, have a better foundation than the preceding ones. But an invalid visiting any of the West India Islands, and spending a winter or its equivalent season there, need not to be subjected to any of these influences. As relates to the Mediterranean climates, the remarks of Dr. Forry must not be overlooked, on the necessity of separating, in our inquiry, the two systems of summer and of winter climate, by the latter of which an invalid from the north with chronic pulmonary disease may be benefited, while by the former he will be most probably injured.

Tuberculous disease is, on the other hand, readily developed in a native of a warm climate who passes into a cold northern one. Negroes coming into northern latitudes suffer in this way. It has been frequently observed that monkeys and other animals, natives of tropical regions, are soon attacked with enlargement of the lymphatic and bronchial glands, and tuberculisation of these bodies, after coming into a cold climate; and the more readily when pent up in cages and dens, and deprived of exercise.

The influence of seasons, which, like winter and summer, may be said to represent atmospherical extremes, as spring and autumn do atmospherical vicissitudes, is felt in the development and aggravation of consumption. In temperate latitudes so called, winter and spring are most favourable to producing these effects. In southern countries summer and autumn are most detrimental.

Consumption declines for a period in the frequency of its attacks and consequent mortality. In England, from 1790 to 1800, the disease increased, proportionately, to a considerable extent; then diminished, and afterwards increased again from 1818 to 1823, since when, it is alleged, that it is once more abating. In Boston, there has been a marked progressive diminution as designated in three periods, 1811 to 1820; 1821 to 1830; and 1831 to 1839; the ratio being, respectively, 223, 3, 179, and 141·7. (Shattuck, *op. cit.*)

A moist and cold air favours the coming on of tuberculous disease; and hence living on a sea-coast, with an easterly marine exposure, is particularly injurious. Less inconvenience is felt with a western and southern exposure, which is rather deemed to be sanative, and to offer the patient the best prospect for restoration to health.

Impurity of the air, owing to deficient ventilation and the exhalations from men and animals crowded together, is particularly detrimental, and must, in connection with deficient food, be regarded as the most powerfully predisposing and sustaining cause of pulmonary consumption. Illustrations of this fact on a large scale have been furnished in the Annual Reports of the Registrar-General in England during the last few years. In the second Report, or that for 1838–9, we learn that the average deaths throughout the country, from all diseases of the respiratory organs, are, ·605 per cent., and from phthisis ·393 per cent.; but in London the deaths from the dis-

eases of the respiratory organs generally are ·783 per cent., and from phthisis ·414 per cent. In Cheshire and Lancashire, manufacturing counties, and with a population to the square mile greater than any other part of England except London, deaths from the first mentioned diseases show ·783 per cent., and from the latter ·509 per cent. The increase of deaths by consumption in cities over those in the country is 39 per cent. The influence of a confined and vitiated atmosphere is shown in a remarkable manner, says Sir James Clark (*Cyclop. Pract. Med.*), by the fork-grinders confined in the town of Sheffield, and those employed in the same occupation in the country. The former die between the ages of twenty-eight and thirty-two; the latter generally attain the age of forty. In both cases the exposure to mechanical irritation is the same, and the habits of the grinders in and out of Sheffield do not differ; but the rooms in which the country workmen carry on their occupation are much better ventilated. A similar cause, confinement in close apartments, operates on domestic animals. All the milch cows in Paris became tuberculous after a certain period of confinement in the house.

The operation of different trades and other employments towards the production of pulmonary tubercle, has obtained considerable attention from industrious and competent observers; but there is not that accordance of result among them that could be desired in order to inspire us with the necessary confidence in drawing conclusions. It is generally conceded that all they who, in addition to breathing a close and badly renewed air, work in a constrained posture, particularly if it be stooping or bending constantly, are prone to consumption; but the danger is greatly increased if fine particles of metal, stone, or wood, are given off in the processes of manufacturing, and inhaled by the person at work. On this part of the subject we are indebted to the writings of Benôiston-Chateauneuf, Lombard, and Thackrah.

Deficient or improper food contributes its share towards the production of pulmonary tubercle; whether the former consist of crude vegetable or damaged animal matter. Whenever it falls short of furnishing an adequate amount of chyle it does not meet the wants of the economy, which suffers in consequence, and is liable to depraved and morbid secretions of various kinds. Food in excess, or of a kind too exciting for the digestive organs, may also induce tubercular cachexia, in the opinion of Sir James Clark (*op. cit.*) — a circumstance which he believes is not sufficiently attended to, — we may say not generally understood even by medical men: nevertheless, he adds, we hold this to be a frequent cause of scrofula, and believe that it produces the same effects on the system as a deficient supply; the imperfect digestion and assimilation in the one case and the inadequate nourishment in the other, being equally injurious; the form and general characters which the disease assumes may differ, but the ultimate results will be the same in both cases. His closing remark, in the following paragraph, applies unhappily, with peculiar force, to a great majority of the children in the United States, where animal food is so abundant, and eaten beyond measure

by all ages and both sexes. "The adaptation of the food, both in quality and quantity, to the age of the individual, as well as to the powers of the digestive organs, is too little considered; and the evil consequences of this neglect are often evident in the children of the wealthy classes of society, who are frequently allowed an unrestricted use of the most exciting kinds of animal food."

M. Andral very properly expresses his disbelief in vegetable aliment having the deleterious influence attributed to it in the production of consumption. If monkeys, Guinea-pigs, rabbits, cows, &c., which we keep shut up in menageries, or stables and pens, become tuberculous, we must attribute this result less to the kind of the nourishment which they take than to the defect of exercise and pure air. Lions and tigers whose food is exclusively animal, suffer in the same way by their becoming also tuberculous. The food of the inhabitants of London is more decidedly animal than that of any people of Europe, if we except perhaps the inhabitants of Geneva (*Bell on Regimen and Longevity*), and yet phthisis pulmonalis is more common in the English capital than anywhere else.

Internal Causes of Consumption, or those inherent in the individual. — *Temperament* of a particular kind is said to constitute a predisposition to tubercular disease; and hence the lymphatic and the strumous are represented to be peculiarly liable to this disease. Persons who have suffered from scrofula in childhood are predisposed to phthisis in adult life, and even still more during the prevalence of the scrofulous disease itself. Let us not, however, infer that persons thus constituted are the sole, or of necessity, consumptive, for phthisis attacks also those of a sanguine, bilious, or nervous temperament. In general, as M. Andral has remarked, phthisis is of frequent occurrence among individuals who have light or chesnut hair, and a fine and white skin; although we see it also in those with very black hair. Of 298 children, from 2 to 15 years of age, who died of phthisis, there were 74 with brown, 130 with chesnut, and 115 with fair hair. The sclerotica was in general very thin and of a bluish tint, and allowed the choroid to be seen beneath. Most of those children had long eyelashes. We infer from these details that no temperament is exempt from pulmonary consumption, but that the lymphatic predisposes to it in a greater degree.

Age. — Medical opinion has been for the most part coincident with that of Hippocrates, which declares pulmonary consumption to prevail chiefly between the ages of 18 and 35 years. Some have even thought that it could not show itself beyond this period. Modern inquiries have considerably modified this opinion; and we know now that pulmonary tubercles will attack all ages; and they have even been found in the fœtus *in utero*. They are not of frequent occurrence in the early period of life; in the first year they are very rarely met with, and but seldom in the second. The first attack, while they do occur, is about the period of first dentition. From this time their frequency augments yearly, until between 9 and 11 years, at which period they become less common. Of 338 tuberculous persons of the age of from 2 to 15 years, the maximum of frequency was

found to be from three and a half to seven years. M. Lombard makes it between four and five years. Another augmentation was found between 12 and 13 years, and the minimum between 2 and 3 years. In a list of 223 phthisical adult patients, observed by MM. Bayle and Louis, the following were the proportionate ages at which they died, viz.: from 15 to 20 years, 21; from 20 to 30, 62; from 30 to 40, 56; from 40 to 50, 44; from 50 to 60, 27; and from 60 to 80, 13. M. Lombard has collected a table of 9549 phthisical patients whose deaths occurred in the following periods, in a descending series: from 20 to 30 years; 30 to 40; 10 to 20; 40 to 50; 50 to 60; from birth to 10 years; from 60 to 70; from 70 to 80; from 80 to 90. The general inferences from these and other tables of the same kind, although collected under different circumstances of time, place, &c., agree in showing the greatest number of deaths from phthisis to occur between the age of twenty and that of thirty; the next in proportion between thirty and forty; the next, as commonly believed, between forty and fifty; but we must perhaps admit anterior to this the period of ten to twenty years.

"The vastly greater tendency in children than in adults to the diffusion of tuberculous matter through the other organs generally, beside the lungs, is very obvious, as it was found in two-thirds of the males, all the female children, and only in 10 to 11 per cent. of the adults of both sexes. It affected the mesenteric glands in 52 per cent., of the children, the bronchial glands in 33 per cent., the spleen in 25 per cent., liver in 14 per cent., brain in 11 per cent., other organs and parts in 22 per cent.

"The mesenteric glands were the seat of tubercular matter in 3½ per cent. of the adults, the bronchial glands in 2¼ per cent., liver in 2¼ per cent., other organs and parts in 1¾ per cent.

"In addition to the organic changes already enumerated, among the children there was hemoptysis in 2, hooping-cough in 1, measles in 3, diarrhœa in 4, and convulsions in 1.

"Among the adults, hemoptysis in 31, dropsy in 16, paralysis in 3, convulsions in 2, and delirium in 5. — (Boyd, *Observations on Pulmonary Consumption.*)

Sex. — Tubercular consumption is common to both sexes; but seems to commit its greatest ravages among females. In a table consisting of 9549 cases of this disease, there were 5589 women and 3960 men. Bayle, M. Louis, and M. Papavoine, have arrived at similar results in their inquiries. Quite different, however, are those of calculations on this subject made in other places. Thus, at Hamburg, Rouen Hospital, Naples, New York Hospital, at Geneva, Berlin, and in Sweden by one estimate, the deaths from consumption among males and females were in the ratio of 10 to 8·6: while, by another table in Sweden, the excess is slightly against the females, the proportions being as 10 to 10·4; and by another table also in Berlin, they are as 10 males to 11·6 females; and in a third table of boys and girls, the proportions are as 10 of the former to 15·6 of the latter. In England, the deaths from consumption are most numerous among females, being to those among males in the proportion of 19·2 per cent. to 16·0 per cent. This is the more worthy of notice, as the mortality of males throughout the kingdom was in the same period seven per

cent. higher than in males. Mr. Farre attributes the higher mortality of English women by consumption partly to the in-door life which they lead, and partly to the compression preventing the expansion of the chest by costume. M. Louis, on the other hand, does not believe that this undoubtedly healthy fashion of dress can explain the greater mortality of women, by consumption. It deserves to be noticed, says M. Andral, that the men most subject to phthisis are they whose temperament approaches nearest to that of women. The young persons among whom phthisis counts its most numerous victims are tall and thin, and whose growth has been rapid; and who, with a narrowness of the chest, exhibit a delicate skin and complexion, and red and projecting cheeks.

Hereditary Predisposition. — The hereditariness of pulmonary tubercle is generally admitted by medical observers, and the fact cannot well be questioned, although by M. Louis reduced to a narrower basis than formerly. M. Lugol, on the other hand, who regards scrofula and tubercles as analogous and obedient to the same general laws, insists on the hereditariness of the former in its fullest sense. A child born of consumptive parents, or whose father or mother is phthisical, brings with it at birth, not tubercles, but a predisposition to their formation, which medicine, or rather rational hygiene, may sometimes combat successfully. On the point, from which of the parents the child is most apt to inherit this morbid tendency, observers are not agreed. It has been remarked, however, and correctly, that the more a child resembles in external lineaments one or other parents the more certainly will it inherit the diseases of that parent. Sir James Clark judiciously observes on this subject, that there are several diseases besides the tuberculous which may so deteriorate the health of the parent, as to produce a state of cachexia, which will give rise to a scrofulous constitution in the offspring. Of all diseases he regards dyspepsia as the most fertile source of cachexia of every form, for this plain reason, — that a healthy condition of the digestive organs and a proper performance of their functions are essential to the due preparation of the food, and consequently to the supply of healthy nourishment to the body. Sometimes phthisis passes over, as it were, one generation to attack the next succeeding; as when a person dies of consumption, yet his children escape and his grand-children fall victims to the disease.

Conformation of the Chest. — A narrow and compressed thorax has great effect in developing pulmonary tubercles: it is the one so commonly exhibited by phthisical patients.

Influence of Inflammation of the Respiratory Organs. — At one time the belief was almost general, that inflammation of some of the pulmonary tissues preceded and gave rise to consumption. Bayle taught the opposite opinion to this, in which he has been followed by Laennec and Louis: it is, that tubercle is a growth *sui generis*, totally independent of inflammation, although it may give rise to and be complicated with this latter. M. Andral, with his usual accuracy of observation and cautious judgment, which prevent him from giving into extreme opinions, believes that, in a great majority of the cases in which tubercles have seized on the pulmonary parenchyma, their development has been preceded by symptoms of sanguineous congestion. He

points out the circumstance of the symptoms of phthisis following an attack of pneumonia in a person who had previously enjoyed good health. Now, as we have no proof of the prior existence, in these cases, of tubercles in the lungs anterior to acute inflammation of the latter, and as, on the other hand, we see in many instances that tubercles are developed by inflamed tissues, being as it were secreted in place of pus, as in the false membranes of the serous system, as M. Andral has again and again seen in cases of inflamed cellular tissue, why should we not admit that pneumonia produced the tubercles in question? Do we not, every now and then, discover in a lung that is completely hepatised tuberculous granules, in a nascent state, disseminated through its parenchyma. It would not be correct to regard these tubercles as a cause adequate to produce such intense pneumonia. Similar reasoning applies to the occurrence of phthisis after hemoptysis and bronchitis. In general, hemoptysis is an evidence merely and an effect of tuberculous irritation; but can we suppose this to be the case in robust individuals who have lived in the plentitude of health until they have had hemoptysis which was followed by the symptoms of consumption? It is not probable that tubercles should have existed so slight as not to cause even cough, and yet all at once acquire such irritative force as to produce copious hemorrhage from the lungs. Pulmonary apoplexy, associated as it often is with hemoptysis, has been known to give rise to tubercles, since they have been found in different parts of the congested and impacted lung. As regards protracted catarrhal or bronchial irritation, we have both direct facts and analogy to assure us that tubercles actually latent are developed by its persistence. But, and herein consists the strong points of the position of Bayle, Laennec, and Louis, there are circumstances under which tuberculous matter is sometimes deposited in tissues and on surfaces bearing no marks of inflammation or other disease.

Duration of Phthisis. — Pulmonary consumption has always been regarded as a chronic disease, and, in fact, in a majority of the cases its progress is slow and gradual. But, at times, the disease assumes an acute form, and reaches its fatal termination with great rapidity. Occasionally, again, we find it pursuing a very irregular course, and exhibiting periods of remission of more or less duration and distinctness. A knowledge of this last fact will not a little guide us in our prognosis and treatment; as we may every now and then meet with cases in which a suspension of all the unpleasant and sinister symptoms might be regarded as a cure, when, in reality, the disease soon recurs with violence and terminates fatally. It is under such circumstances that percussion and auscultation are of great service in making us acquainted with the real state of things. Laennec believed, and M. Louis joins him in opinion, that the renewal of the disease after a remission is owing to a fresh crop of tubercles, at a time when those advanced which caused the first series of symptoms have reached an stage. These attacks were called by Laennec *secondary* consumption.

M. Louis (*op. cit.*), in remarking that the symptoms of phthisis generally augment in violence as the disease advances, tells us, what indeed is obvious enough to an observer of the progress and complication of phthisis, that hemoptysis is an exception; also that its inten-

sity is in the inverse proportion with the advance of the original or tubercular disease. Pregnancy is commonly believed to retard the progress of consumption; an opinion on which M. Louis confesses his inability to decide. But it is more generally admitted, that after delivery the disease advances with increased rapidity to a fatal termination. All febrile attacks produce similar results. Many cases are on record showing that after an attack of pneumonia, or of typhoid fever, measles, etc., phthisis which up to that time had been chronic assumed a most acute character.

The *duration* of phthisis is very variable. We sometimes see patients carried off in a month, and others live twenty years, although labouring all the time under confirmed consumption. Age seems to exert little influence on its duration, but it is not so with sex. Women in general sink under the disease more rapidly than men, which, as M. Louis suggests (*op. cit.*), may be owing to the fatty degeneration of the liver, and more profound lesions of the mucous membranes of the stomach in the former than the latter.

The mean duration of the acute form, varying as it does with age, is thus set forth by the author:

Years.	Months.	Days.
15 to 30	11	17
30 to 45	16	20
45 to 60	17	7

The course of phthisis is slower in persons of weak constitution than in those who are strong.

The *termination* of phthisis is generally by gradual wasting away of the system and exhaustion of the vital powers, owing to the progress of destructive alterations in the lungs and secondary lesions in other organs. At other times, the termination is owing to perforation of the lungs, or of the small intestines, tuberculous meningitis, &c. In some rare cases death is brought about by a terrific hemoptysis, which, like traumatic hemorrhage, destroys almost immediately. Œdema of the glottis may sometimes accompany ulcerations of the larynx, and bring on suddenly fatal termination.

LECTURE XCVII.

DR. BELL.

Symptomatology of Phthisis Pulmonalis.—Symptoms proper to the lungs, and symptoms depending on associated disease of other organs—Two periods of phthisis—Symptoms of the first period.—Symptoms of the second period—Varieties of phthisis—Symptoms in detail—Cough—Sputa: their microscopical appearances—Hemoptysis—Dyspnœa—Pain—Fever—Thirst—Gastric symptoms—State of the tongue—Diarrhœa—Chronic peritonitis—Symptoms of ulceration of the epiglottis, larynx, and trachea—Pneumonia—Pleurisy—Genital functions—Cerebral disorders—Tubercular meningitis—its symptoms and progress—State of the senses—Emaciation—Perforation of the parenchyma of the lung by bursting of tubercle—Acute and chronic phthisis—Acute inflammatory tubercle without suppuration—Bronchitic, pneumonic, and hemoptysical varieties.

In directing our attention to the symptoms of phthisis pulmonalis, we

take note — 1, of those proper to the lungs, and which indicate more or less disturbance of the respiration; and 2, of those depending on associated disease of other parts. Under the first head we meet with cough and sputa, dyspnœa, and hemoptysis. Under the second we make two subdivisions; — those merely sympathetic, such as follow inflammatory or disorganising action of the lungs in any other disease, and arising from a lesion of organs, similar to that which has seized on the lungs. In the first of these subdivisions or the sympathetic, we meet with irritative fever and its exacerbations, including a morbidly accelerated pulse: while the second furnishes us with symptoms of tuberculous or peculiar lesion of some or more organs not included in and often remote from the respiratory apparatus. Of this kind are ulcerations of the trachea, larynx, and epiglottis, and of the small and large intestines, fatty transformation of the liver, &c. The anatomical changes in these cases cannot, M. Louis thinks, be regarded as complications, but rather as peculiar to and essential parts of the disease.

If we were to make the periods of phthisis correspond with the stages of change in tubercle, they would be at least three in number; but they are better divided by Laennec into two; the one period previous, the other subsequent to softening of the tuberculous matter, and its evacuation through the bronchia. The symptoms belonging to or characteristic of those two periods are so clearly and wisely described by M. Louis, that I shall content myself with repeating his descriptions as I find them in the edition of his *Researches on Phthisis*, translated by Dr. Walshe and lately issued by the Sydenham Society in England.

"*First Period.* In the majority of cases the disease set in without assignable cause. One-third of the patients ascribed the earliest symptoms to sudden changes of temperature from hot to cold, to which they were exposed in following their various occupations, — to draughts of air, — to having plunged their feet into cold water, — or having drunk coldw ater when heated. But the majority — those who referred their illness to draughts of air, and changes from hot to cold, to which they were exposed habitually by their occupations — were far from doing so with any degree of positiveness; in fact, they merely conjectured that such must have been the cause of their malady, in obedience to the popular belief that no disease of the chest can arise without sudden chill. So true is this, that in almost every case, when close inquiry was made into the dates of the alleged chill, and of the outset of the affection, it almost invariably turned out that a period of fifteen days, or a month or more, had elapsed between the two events. A very small number of patients referred (with a fair amount of precision) the occurrence of the first symptoms of *cold* to twenty-four, thirty-six, or forty-eight hours after the action of the cause to which they ascribed it.

"Whether there did or did not exist apparent causes of the disease, the affection commenced by cough, generally a slight one; and the patient at first gave it no attention, believing it the effect of a simple cold, to which many of them were subject. This cough was generally accompanied with colourless expectoration, resembling frothy saliva;

or (as was observed in one-tenth part of the cases) the cough continued dry for one or more months, and, in some subjects, it occurred in paroxysms, and rapidly grew severe. After a variable lapse of time the sputa lost their colourless appearance, and became slightly greenish, and somewhat opaque. They changed completely in aspect with the arrival of the second period.—In some cases the earliest symptoms were preceded by hemoptysis of greater or less severity, or they set in with this hemorrhage, or, as was more usual, were followed by it. The breathing was not obviously obstructed at first; nor did the dyspnœa become troublesome in a certain number of subjects, until a somewhat advanced period of the disease. In many cases pains of variable acuteness were felt in the shoulders, or between the shoulders and in the sides, some time after the outset, or very shortly after this, when the disease ran a rapid course. Pleuritic effusion occurred in some patients. When auscultation was practised during this first period, the respiratory murmur did not always appear altered, at least when there were only gray granulations present. But in a tolerably large number of patients, the respiration was feeble under one or other clavicle, or somewhat rasping and harsh; and in the same situation, within a limited space, there were a few clicks of crackling rhonchus, or some sub-crepitant or sonorous rhonchus heard, and the chest emitted a less clear sound under percussion than on the opposite side.

"With these symptoms, which may be called local, coexisted more or less disturbance of the various functions of the system. Occasionally alternations of heat and cold, or even night sweating, were observed from the outset; but these symptoms did not usually declare themselves so early as this, not indeed until the second period. The pulse was more frequent than natural. With the exception of a few cases, the appetite continued at first almost as good as previously to the appearance of the earliest symptoms; it then diminished progressively. If the cough were violent, vomiting occasionally occurred after meals; but when this was the sole cause of vomiting, that distressing act lasted but a short time. But few patients had diarrhœa; still fewer some abdominal pain, with other evidence of chronic peritonitis. Loss of strength advanced with variable rapidity; emaciation began to exhibit itself shortly after the outset, and at first made but slow progress.

"*Second Period.* The cough now became usually more frequent and distressing than before, more especially by night; the sputa greenish, streaked with yellow opaque lines, free from air, assumed a peculiar (more or less globular) form, and became ragged at the edges. It was a tolerably frequent occurrence, to observe the majority of these characters disappearing under the influence of regimen and diluents; but, sooner or later, they returned again. During the closing days of existence, they not uncommonly exhibited the appearance of a greenish and grayish *purée;* and lastly, they were often accompanied with sputa of the character noted during the first period. Hemoptysis was of rather common occurrence, but, generally speaking, was of slight amount; the increase of dyspnœa was slow or rapid according to the progress of the disease; there was frequently sharper

pain during this than the first period. Sometimes, indeed, intense pleuritic symptoms, requiring very active treatment, supervened. The patients almost always lay with their heads low; their mode of decumbency varied, though in a pretty large number of cases they lay exclusively on the side opposite the large cavities. By auscultation, pectoriloquy more or less perfect, gurgling rhonchus or tracheal respiration were detected in one or several spots of the summit of the chest; and in one-third part of the cases, percussion elicited no sound over a space, generally of considerable extent, under one or other clavicle. It was during this period also that the symptoms proper to the various lesions of the mucous membrane of the stomach, and to ulceration of the epiglottis and larynx supervened, — lesions which are too often the sources of protracted and inexpressible anguish.

In the majority of subjects the fever was continued with exacerbations. These exacerbations occurred in the evening, and consisted generally of rigors more or less violent, followed by heat and perspiration. Unless when the progress of the disease was very slow, thirst to an urgent degree was felt; the appetite decreased as the strength, and was irregular, or in some cases a state of complete anorexia came on, although the mucous membrane of the stomach was perfectly healthy, or exhibited only slight and recent lesions. In a small number of individuals also the alvine evacuations continued regular to the very close; several had no diarrhœa until the last twenty or thirty days of life; but in the majority of instances this symptom set in at a period long anterior to the final catastrophe. In some subjects symptoms of chronic peritonitis were observed, as we have already seen to be the case during the first period. Emaciation made rapid progress, and unless some particular accident occurred, such as perforation of the lung, &c., the patients died in the last stage of marasmus; they retained to the last the full exercise of their intellectual faculties, unless in certain cases where the development of serious disorders in the meninges modified materially the symptomatic characters of the disease, and hastened its final termination."

If we speak of varieties of phthisis it ought to be understood as expressing varieties or variation in the course of disease, rather than of seat and symptoms. Hence we hear of acute and latent phthisis. The varieties as laid down by Dr. Stokes are based rather upon differences of physical signs than of rational diagnosis. He enumerates: —

1st. Acute inflammatory tuberculisation of the lung without suppuration.

2d. Acute suppurative tuberculisation.

3d. Chronic progressive tubercle, with signs of local and general irritation; pulmonary ulceration.

4th. Chronic progressive ulceration succeeding to an unresolved pneumonia.

5th. Tuberculous ulceration succeeding to chronic bronchitis.

6th. Tubercle consequent on the absorption of an empyema.

7th. Chronic phthisis complicated with pneumothorax from fistula.

8th. Tubercle complicated with disease of the larynx.

9th. Latent progressive phthisis.

10th. Chronic latent but partial tuberculisation.
11th. Chronic general tuberculisation.
12th. Cicatrisation of cavities.

We now proceed to note the symptoms in detail, and in doing so shall follow very closely M. Louis, whose descriptions, in addition to their admitted accuracy, have the additional recommendation of sententitious brevity.

The *cough*, in its early or late appearance, and degree of violence and frequency, varies greatly in different subjects. In most of them the cough is distressing, especially at night; in some it comes on in paroxysms, in others it is slight, and again, in some, does not appear till the last days of existence. The cough is readily increased in frequency and severity by mental excitement and violent or unusual movements of any kind; and, also, by lying on the side in which the tuberculous cavity exists.

Changes in the appearance of the sputa indicate, as already remarked, the transition from the first to the second period. In place of being white, mucous, and most commonly containing bubbles of air, they acquire a greenish and opaque appearance, cease to contain air, and become streaked with yellow lines, sometimes giving the sputa themselves a variegated aspect. If auscultation be practised at this time, we shall discover more or less marked resonance of the voice, pectoriloquy, or very strong tracheal-like respiration, often accompanied with gurgling, and sometimes with a large, dry, crepitant rhonchus, at the apex of the lungs. Among the sputa are occasionally found particles of white opaque matter, resembling, as Bayle has remarked, boiled rice; but these particles were of rare occurrence, and existed in a much less number of cases than the streaked variety of sputum.

After some time the striated appearance and the occasional fragments of white substance cease to be observed. The expectoration becomes uniform in composition, and separates into rounded, distinct masses, with their edges as if torn and flocculent. These masses are heavy, more or less consistent, and either sinking or floating on the surface of the clear liquid which was expectorated with them.

After presenting some time a greenish yellow tinge, they assume a grayish dirty appearance, very analogous to what we find in old tuberculous excavations; this takes place towards the close of life, from fifteen to twenty, or, most frequently, only a few days preceding death. They then diminish in consistence, spreading out on the sides of the spitting box, resembling the pulp of boiled peas, and were occasionally streaked with blood or surrounded by a pink areola. This latter colour would no doubt have been observed more frequently, if the patients had continued to expectorate during the last twenty-four hours, for we generally found, after death, the bronchial mucosities more or less tinged with blood.

The union of *all* these characters is sufficient, without other examination, almost certainly to indicate tuberculous excavation in the lungs. We lay stress upon *all*, for green, opaque, homogeneous sputa exist in chronic, sometimes also in acute catarrh; but they are not then striated, they do not contain those white particles we have

described, and are not usually in distinct masses as in phthisis. The *rounded form* (nummulated) of the sputa is certainly one of their most valuable peculiarities with regard to diagnosis, and in two very remarkable examples, both for M. Chomel and ourselves, it was the first indication of a tubercular affection.

It is, however, right to mention, that a few days before death, we have in two instances seen the sputa in separate masses and opaque, although no tubercles, tuberculous excavations, or dilated bronchi existed in the lungs.

The expectoration we have described, with the exception of three cases, was constantly present. In these instances it always continued mucous, spumous, white, or slightly yellow, or even grayish, semitransparent, as if vitrified, without ever presenting that separation into distinct masses, which we have shown to be so important.

In the majority of instances, the greenish, opaque, striated sputa, were associated with a mucous, spumous, more or less viscous expectoration, retaining the characters observed in the first stage; or, instead of this, they floated in a clear thin fluid, like saliva. Sometimes they were unaccompanied by either.

The quantity of expectorated matter varies in the different periods of phthisis. During the first, when the progress of the disease was rapid, the sputa were sometimes very abundant; during the second period, they were less copious, unless a considerable quantity of those of the first period co-existed with the expectoration more peculiar to the second. At other times, under different circumstances, the sputa scarcely covered the bottom of the vessel. Many only void a few sputa in the twenty-four hours.

During the second period patients are occasionally observed to discharge an enormous quantity of sputa in a short time under circumstances that do not permit us to suppose that a mass of softened tubercle can have suddenly made its way into the bronchia, and been the source of the expectoration. It is more likely that a momentary increase of secretion into the cavities and the communicating bronchia (which are commonly the seat of violent inflammation), suffice for the production of these attacks of abundant expectoration that gave origin to the belief in the so-called vomicæ.

After having been of a greenish colour and opaque aspect, &c., for a greater or less length of time, the sputa generally lost some of their bad characters under the influence of repose, regulated diet, or abstinence and diluents; they became less opaque, had occasionally something of a vitreous look, and retained or lost their globular form. But after a variable period they recovered their previous qualities.

After all, M. Louis, somewhat in contradiction to the opinion antecedently expressed of the diagnostic value of all the characters of the sputa, admits that the violent inflammation of the bronchial mucous membrane, at this stage of the disease, considerably modifies the expectoration; that at a certain period, the opaque, greenish, and grayish sputa are equally the product of bronchial secretion as of the cavernous parietes: and that little or no difference exists between the matter furnished by one or the other.

Dr. Stokes, in speaking of the characters of expectoration (*Treatise, &c.*, p. 403, 2d Am. edit.), arrives at the same general conclusions as M. Louis. He tells us that there is no constant relation between the appearances of the expectorated matter and the state of the lung. But he adds, after speaking of the contrasted characters of the sputa without corresponding diagnostic value, if there be any kind of expectoration more peculiarly allied to phthisis, he would say it is that described by Dr. Forbes, in which globular ragged masses are expelled. He does not recollect a single case in which he observed this character that did not turn out to be phthisical.

Dr. Stokes speaks, also, of calculous expectoration, in which a great quantity of tubercle seemed to have undergone the cutaneous transformation. The subjects of this kind of expectoration, after having suffered from an attack of severe bronchitis, affecting the small tubes, become hectic and discharged purulent matter. These symptoms continuing for several weeks, small calculi began to appear in the sputa, and gradually increased in number until a vast quantity was expelled. Their size was generally about that of a large pin's head, and often two were connected by a stalk, so as to have an hour-glass form. The discharge of these calculi continuing for a month or six weeks, the patients began to recover, and ultimately regained their flesh and strength, until a new attack. This modification of disease is more likely to affect middle-aged than old persons. It will engage our attention again, when we have occasion to speak of prognosis of consumption, and the question, coming under this head, of the curability of the disease.

Hemoptysis, the next chief symptom, occurred, to a greater or less amount, in two-thirds of the cases investigated by M. Louis, or in fifty-seven out of eighty-seven individuals. The hemorrhage ought to be regarded as a symptom, disclosing the actual presence rather than a harbinger of tubercles. Hemoptysis is exceedingly rare in tuberculous subjects under the age of fifteen years. In some instances, severe hemoptysis occurred only once in the course of phthisis; in rare cases, on the contrary, it recurred three, four, or a greater number of times.

Dyspnœa, apart from the co-existence of pneumonia, pleurisy, or inflammation of the pericardium, is generally but little complained of by phthisical patients.

Pain does not often much distress these persons, although at some time or another, and generally in the earlier stage of the disease, they complain of pain either between the shoulders or in the sides of the chest. They were proportional in severity to the extent of the pleural adhesions in each case, and frequently to the number and size of the cavities. The wandering character of the thoracic pains of phthisical subjects is worthy of notice; so, also, the fact of percussion of the walls of the chest being often productive of pain, more especially of the side chiefly affected, and generally speaking at the summit of the chest.

Fever declares itself along with the earliest symptoms of phthisis, and attended the progress throughout in more than one-fifth of M. Louis's patients, or in twenty out of ninety-five, whose history was

satisfactorily ascertained on this point. In all, however, fever appeared in some period of the disease, although in three-fifths of the whole it was at the second period. Rigors ushered in the fever in a majority of the cases, and recurred every evening about the same time. Even when the chills were suppressed the heat of the skin always remained above the natural standard. These attacks of shivering were usually followed by heat and perspiration. Such is the abundance of this last that some patients dread to go to sleep. Generally, perspiration co-existed with diarrhœa, contrary to the common idea that one of these discharges at this time is supplementary to the other. Sudamina, so frequently observed after perspiration in the course of typhoid fever, are much less frequent, but still occur in phthisis.

Thirst is common in phthisis; but there is no uniform connexion observed between it and the state of the stomach, of the intestinal canal, nor of the diarrhœa.

The gastric symptoms next occur in the greatest frequency in phthisis. They are met with under different states of the mucous membrane. In some subjects this membrane is softened and attenuated; and then they lose their appetite, and suffer more or less pain at the epigastrium. To these symptoms, after a period varying from days to months, succeed nausea and then vomiting. Sometimes these last precede the pain. The matters vomited were almost always bilious. In the midst of these disturbances, some patients digest light food without particular difficulty. Others could take nourishment only at a certain hour in the day, generally in the morning.

Gastric symptoms were evinced in other phthisical subjects, fewer in number, in connexion with inflammation of the mucous membrane of the anterior surface of the stomach. They consisted of pain and heat at the pit of the stomach, and occasionally nausea, and more seldom again vomiting. In others, again, the fundus of the stomach was found red and softened.

Simple ulcerations of the gastric mucous membrane were met with alone in two cases of the disease by M. Louis. With these lesions was associated a mammillated or thickened state of the mucous membrane between the ulcers. No symptom was noticed referrible to this lesion.

The tongue is sometimes red, sometimes pale, and at other times, again, is covered with an albuminous exudation; no one of which are dependent on the state of the mucous membrane of the stomach; nor can they be regarded as evidences of inflammation.

Diarrhœa is almost of as common occurrence in phthisis as fever is. Five only of one hundred and twelve subjects were exempt from it. There was an exact correspondence between the symptoms and the lesions to which they were ascribable. In order to enable us to predict with any confidence the existence of extensive and numerous ulcerations, the diarrhœa must not only have been protracted and continuous, but the stools must, besides, have been very numerous.

Chronic peritonitis finds a place here, because M. Louis declares it is an affection which he has only seen in tuberculous subjects. Different, however, from those disorders antecedently mentioned, which constitute so many symptoms of phthisis, chronic peritonitis is itself

the chief and fatal disease; the pulmonary tubercles being small and in their crude state. I shall not repeat here the description of chronic peritonitis, as I have already placed it before you in a preceding lecture.

The symptoms of ulcerations of the epiglottis, larynx, and trachea, are worthy of notice. Most of them, however, have been detailed to you in my lectures on chronic laryngitis.

Ulcerations of the epiglottis are signified, symptomatically, by fixed pain at the upper part or immediately above the thyroid cartilage, difficulty of swallowing and escape of fluids by the nostrils — the pharynx and tonsils being, meantime, perfectly sound. But even in cases in which the epiglottis has been in part destroyed, these symptoms were not always present — a fact which was stated in my first lecture on chronic laryngitis.

Symptoms from the Genital Functions. — In males, M. Louis tells us that, in every instance their amative propensities appeared to have failed in proportion to the loss of strength, the general uneasiness, and the other symptoms — very much in the same manner as in individuals affected with any other kind of chronic ailment and enfeebled to a similar extent. In an early period of tuberculous disease, when there is yet but slight diminution of strength, yet enough to prevent the person following his usual avocations, there may be some stronger sexual desires than in a state of perfect health. This would, however, be easily explained as an effect of idleness, by which room is given for the play of imagination in such cases.

In females it is observed that the menstrual discharge ceases at a more or less advanced period of the disease. In only one case did it continue, to M. Louis's knowledge, to the fatal termination. When the total duration of the pulmonary disease was under a year, the suppression of the menses took place, on an average, in the middle of this period. If the disease do not complete its course in less than from one to three years, the discharge did not cease till the last third.

M. Louis has not been able to satisfy himself whether pregnancy is or is not capable of retarding the progress of phthisis.

Cerebral symptoms may occur at any period of the disease—when cavities have been formed, or when crude tubercles, or semitransparent gray granulations, constitute the amount of change. They are almost always connected with the development of tuberculous granulations in the pia mater. These symptoms were first made the subject of study in children, subsequently in adults. M. Louis derives his chief and first information on this point from M. Lediberder's essay on the acute tuberculous affection of the pia mater in the adult. This disorder, termed tubercular meningitis, begins with headache, generally of great severity, especially in the forehead, which the patients often seek to relieve by holding their head in their hands. The face becomes alternately pale and red; the intellectual faculties fail; but symptoms of paralysis are rarely observed at this time; repeated vomiting occurs almost invariably from the first day at which cephalalgia declares itself. The almost consistent connection, from the outset of these two symptoms, in subjects known to be phthisical, constitutes in itself ground for suspicion of the existence of a certain number of tubercles in the meninges.

The cephalalgia continues for a space of time varying from three to twelve days; and is often marked by paroxysmal exacerbations, which draw cries from the patients — cries of the kind termed hydrocephalic, with their mournful and shrill piercing character. The face assumes a bewildered expression, soon replaced by total absence of expression, reminding the observer, as M. Rufz remarks, of the countenance of idiots.* The look becomes slow; the pupils, contracted the first few days, cease to be so, and soon dilate. The patients cease to be aware of their own sufferings, and from the fourth to the sixth day from the commencement of the headache, sometimes later, they are seized with quiet delirium, — sometimes, however, attended with agitation, which is, in the majority of cases, connected with an excited state of the general sensibility. Somnolence, and then coma, occurs in the intervals between the attacks of delirium. Hemiplegia, when it exists, generally sets in some days after the headache. Instead of affecting an entire side of the body, the paralysis sometimes implicates only a part of the face, or one of the eyelids; and persistent contraction is observed in some cases for a certain time — from two to six days before death — instead of paralysis. Vomiting generally continues three or four days; more rarely eight or nine, — very rarely also, twenty-four hours only.

Changes of a remarkable character take place in the functions of respiration and circulation. The respiration becomes less deep, and less frequent, the dyspnœa diminishes or disappears, except during the closing days, when it generally increases much, proportionally too to the somnolence. The fever diminishes, or even ceases almost completely, even when extensive cavities exist in the apices of the lungs; but at the close it returns with great violence; the pulse is very rarely irregular; the temperature of the skin falls and rises with the pulse; the strength fails daily, and the stools are eventually passed involuntarily.

The duration of the disease varies most commonly between eight and fifteen days, — rarely more or less. Intermittences in its course are of unusual occurrence, and when they do occur, of more or less perfect character, they do so only (according to M. Lediberder) during the three or four last days of life.

Although the course of meningitis is not always the same, it may in the majority of cases, in adult age as in infancy, be divided into three periods. The first (the duration of which may vary from three to twelve days) is characterized by headache, vomiting, the peculiar alteration of the features referred to, a more or less marked modification in the intellectual faculties and functions of the organs of sense, the suspension of some of the symptoms of phthisis, diminution of fever and of strength, occasionally somnolence, and partial paralysis. The second period (the duration of which is not less variable than that of the first) has for its principal phenomena restlessness, with more or less increase of sensibllity, obtuseness of the senses, and diminution of the febrile symptoms. Lastly, the final period is dis-

* The look is, in those cases, says M. Rufz, extremely slow, the pupils extremely wide, the globe of the eye sluggish in its movements; or the eyelids are closed, and there is photophobia, especially when the headache is intense.

tinguished by abolition of the intellectual faculties, and by coma, which reaches its maximum the last day.

Hearing is sometimes impaired in a marked manner in phthisis, though it is by no means a frequent occurrence. The cause must be sought for in tuberculous affection of the ear, sometimes by destruction of the membrana tympani.

Perforation of the pleura has already engaged our attention under the head of pneumothorax. It constitutes the subject of a long and highly interesting section in the work of M. Louis.

Emaciation is a common, almost a universal symptom, at one period or another, of phthisis. We may safely say in one-half the cases it is observed among the earliest symptoms of the disease, and this, whether the malady run a rapid or slow course, whether it proved fatal, for example, in five months or three years. Although in some cases emaciation commences at the same time as diarrhœa, yet there is so little uniformity in this respect that we cannot attribute its occurrence to this latter disorder. At the same time it is obvious that after the diarrhœa has once set in, emaciation makes rapid progress. Morbid conditions of the gastric mucous membrane play, also, an important part in producing and increasing this wasting of flesh.

Emaciation will furnish useful hints towards the diagnosis of latent phthisis. Patients, without experiencing any of the local symptom of the disease, are tormented by more or less fever of long standing, accompanied with oppression of breathing and loss of flesh. For the most part, under such circumstances, the lungs are the organs seriously implicated, and this by tuberculisation. There are, however, cases in which the emaciation, and finally death, are caused by tuberculosis of the mesenteric glands.

Almost all the tissues are affected by the emaciation; the cellular tissue disappearing almost completely, and the skin itself undergoing attenuation. The bulk of the muscles, including the heart, is also diminished in a great degree. Even the muscular coat of the stomach and the parietes of the uterus seem, often, to have decreased in thickness.

Phthisis, like most diseases with a distinct organic basis, has its acute and its slow or chronic form. The latter is by far the most common. The former as less frequent, and indeed as comparatively rare, demands more careful investigation, that we may not be at fault in the diagnosis, nor unprepared with remedies for mitigating its violence, even though we may not hope to arrest its course. It will be remembered, that among the varieties of phthisis mentioned by Dr. Stokes, the first two were, acute inflammatory tuberculisation of the lung without suppuration, and acute suppurative tuberculisation. I cannot present these two varieties to you in a more succinct manner than by using the language of the author.

Acute Inflammatory Tubercle without Suppuration. — All the cases of this which I have seen, occurred as sequelæ or complications of the fever of this country. In most, the symptoms supervened after the fever, an interval existing between the crisis and the new attack. In others, the disease, commencing with the symptoms of the ordinary gastro-catarrhal fever, proceeded uninterruptedly to its fatal termination.

The symptoms are undistinguishable from the more violent forms of bronchitis. High inflammatory fever, with severe cough and extremely hurried respiration, sets in; the expectoration is scanty, viscid, and often tinged with blood; the face is swollen and livid, and the nares dilate; the action of the heart is violent, and the pulse extremely rapid; there are shooting pains in the side, and the patient has often copious sweatings and delirium. In some instances, these symptoms are complicated with others referrible to the abdomen; the tongue is dry and red, the abdomen swollen and tender; extreme thirst, drawing up of the knees, and diarrhœa. It is singular that in a case where these symptoms were best marked we found the gastro-intestinal tube healthy, while all the parenchymatous organs were filled with granular and miliary tubercles. In another instance, peritonitis from numerous perforations had occurred, yet the abdominal were nearly masked by the thoracic symptoms. — See *Transactions of the Association*, &c., vol. iv.; also the *Clinical Reports of the Meath Hospital, Dublin Hospital Reports*, vol. v.

In a second class, the symptoms are more pneumonic, while in a third, which may be termed the hemoptysical variety, the first symptom is a copious discharge of blood, followed by a rapid development of tubercle, but without the violent signs of irritation which occur in the two former instances.

In the two first cases the diagnosis is difficult, for the tubercle being often equally developed, comparison cannot be employed, and the want of the signs of ulceration add to the difficulty. There is nothing characteristic in the symptoms, and the stethoscopic signs, taken alone, or considered without reference to time, are insufficient. In the first variety we have the most intense sonorous, sibilous, and muco-crepitating *râles;* every part of the bronchial system seems engaged. In the second, the musical *râles* are comparatively wanting, while the crepitating and muco-crepitating are extensively audible; yet, by successive observations, and considering the phenomena with reference to time, the diagnosis can be made.

I published the first instance of this diagnosis as far back as 1828. The case was one of a young female who became attacked with violent symptoms of gastro-catarrhal fever, which resisted all means of relief. The stethoscopic signs were of intense bronchitis; yet we found that the chest became rapidly and extensively dull. This could only be explained on the supposition of an extensive crop of tubercle, which diagnosis was made at the time.

On dissection, both lungs were found completely stuffed with small granular and miliary tubercles, in such quantity as to obscure the condition of the intervening tissue, but they were generally crepitating, and nowhere presented complete solidity.

This progressive general though not complete dulness, consequent on the signs of bronchitis, has led me in many cases to announce the acute general development of tubercle.

In the second or pneumonic variety, the patient, though not suffering so much from dyspnœa, is in equal danger. The musical *râles* are either absent or very slight; but an intense and extensive crepitating *râle* is to be heard. As in the former case, dulness advances, and the phenomena are only distinguishable from those

of ordinary pneumonia by the absence of the signs of hepatisation. The *râle* continues to the end, and bronchial respiration is not observed.

The third or hemoptysical variety is never so rapid as the two former, and hence we can often avail ourselves of the signs of ulceration.

LECTURE XCVIII.

DR. BELL.

SYMPTOMATOLOGY OF PHTHISIS (*Continued*).—Symptoms not clear in some cases of acute nor in latent phthisis—Proportion of cases of latent tubercle—Cause of latency not known.—DIAGNOSIS—Two periods—General symptoms in first period—Order of physical signs—Points to be ascertained before physical examination—Percussion—Auscultation—Mensuration—Contraction of the chest—Diagnosis in second period.—PROGNOSIS—Almost always unfavourable—Alleged proofs of cure of consumption—Rogée's observations—Louis's commentaries—Boudet's confirmatory experience.

SOMETIMES death occurs from phthisis with such suddenness as to take both patient and physician by surprise; or, a state of things embarrassing from another cause, the disease may run its course without being accompanied by the majority of symptoms usually attending it. M. Louis gives the case of a girl, aged eighteen, of tolerably strong constitution, with chesnut-coloured hair, firm flesh, and tolerably full person, which only lasted thirty-five days, and in which the cough appeared but twenty-five days before death. The severity of the symptoms was no less remarkable than the rapidity of the course of the affection. At first, febrile action of extreme intensity set in, followed after ten days' duration by symptoms of catarrh, cough, expectoration, and oppressed breathing; on the sixth day of the cough, respiration was repeated forty-seven times in the minute, and this remarkable acceleration increased still further afterwards; the skin became exceedingly hot, the pulse very frequent. All these phenomena indicated the existence of acute disease of the lungs. Nevertheless, the sound of the chest continued clear; auscultation furnished almost negative results, did not give evidence of intense pulmonary catarrh, and simply justified a suspicion, a few days before death, of the existence of the first stage of pneumonia, incapable in itself of explaining either the previous or existing symptoms. In this state of things, was it matter of possibility to detect the nature of the affection?

In another case the duration of the disease was but twenty days only. The subject was a water carrier, aged thirty, of tolerably strong constitution, generally enjoying good health, with the exception of occasional colds of short duration. The period of twenty days was in this case sufficient for the development of a great number of tubercles in these organs, for the formation of cavities, and the production of a completely tuberculised false membrane in the pleura, and gray semitransparent granulations under the peritoneum. These lesions it is true, serious in character and extensive as they may have been, do not of themselves produce death; pneumonia hastened the

fatal issue, and the inflammation of the pulmonary parenchyma was excited by the tuberculous affection.

Another case is related by M. Louis, in which the patient in the midst of perfect health was seized with acute phthisis and died in fifty days. It was ascertained that the tuberculous matter was deposited throughout the entire of the left lung almost at one and the same time, a mode of deposition which is extremely rare and which may be regarded as proper to the acute form of the disease.

If we inquire into the causes tending to hasten or retard the course of phthisis we are at a loss to assign the true ones. Sex exerts no influence in this matter; age seems to have more power: youth, which so obviously favours the development of tubercles, also hastens their progress, which latter is more rapid before than after the age of thirty. As regards strength and weakness of constitution it would seem most probable that phthisis is slower in its progress in weak than in robust persons. It is presumable, also, from the date in which an inquiry has been based, that persons of feeble constitution are not more prone to the development of phthisis than others.

Sudden death, occurring in phthisis, is, in some cases, explicable in a more or less plausible manner by the state of the organs after death, but in other cases admits of no such explanation.

Phthisis is sometimes latent, at least there are not the customary evidences of the presence of tubercles for a period varying from six months to two years before cough sets in, and in some cases there was fever, emaciation, loss of appetite, &c., long before there existed cough or expectoration.

Diagnosis. — The signs which constitute the diagnosis of phthisis are easy of recognition in the second period of the disease; less so in the first. It is in this first period, however, that diagnosis is most valuable, for it is only then that we can hope to arrest the progress of the disease by a sage combination of hygiene and therapeutics. In the pages of Dr. Stokes and Louis you will find the most clear and comprehensive analysis of the symptoms with a view to a designation of their value as signs towards diagnosis.

By a careful collation of all the circumstances of the case, we shall generally be able to make a near approach to certainty in the diagnosis of even the first period. In a majority of cases of incipient phthisis the *cough* originates without any appreciable cause while the patients still appear in the enjoyment of perfect health; and, in a considerable number of cases a period of varying duration, from one week to five weeks, elapse before expectoration follows. The dryness of the cough without appreciable cause for its existence, and its not being preceded by coryza, rare things in pulmonary catarrh, are calculated to increase suspicion as to the true nature of the disease.

Expectoration, whether it occur at the outset or at a more or less advanced period of the disease, furnishes sputa at first clear, frothy, and white, for a period of variable duration.

Pains in the Chest scarcely occur in pulmonary catarrh except behind the sternum; whereas, in tuberculous disease, they affect the sides of the chest and are felt between the shoulders; resemble pleuritic stitches, which in fact they actually are. In combination with the

previous symptoms, these pains establish a strong presumption in favour of the actual presence of pulmonary tubercles.

Hemoptysis, if at all valuable, is specially so as a symptom in the diagnosis of tubercles during the first period. "Hence this symptom, combined with the symptoms previously enumerated, and the combination is sufficiently common, places the existence of phthisis beyond a question." How often are we convinced of the truth of this remark.

Fever, at any rate some paroxysmal movement with acceleration of pulse, is common at the outset or very soon after the invasion of phthisis, more especially in the evenings. *Emaciation* occurring at the same time without our being able to refer it to abundant discharges of any kind, places the nature of the case beyond doubt.

Recourse to physical signs will remove all remaining difficulty which the general symptoms may have still left. Dr. Stokes has enumerated the orders of physical signs of pulmonary phthisis as follows: —

1st. *Signs of Irritation.*
- *a.* Of the mucous membrane.
- *b.* Of the air-cells, or parenchyma.
- *c.* Of the serous membrane.

2d. *Signs of solidification.*

3d. *Signs of ulceration.*

4th. *Signs of atrophy.*

5th. *Signs referrible to the circulating system.*
- *a.* Action of the heart.
- *b.* Of the arteries.
- *c.* Displacements of the heart.

Before proceeding to an examination by percussion and auscultation, &c., the following points as enumerated by Dr. Stokes, demand attention, viz.: —

1st. The age, habit, and diathesis of the patient, and whether phthisis or scrofula have existed in his family.

2d. The exact date of his illness.

3d. Whether this has been the first attack, and how far he has been liable to bronchitis.

4th. Whether the disease commenced by laryngeal, tracheal or bronchial irritation, or followed a pneumonia, a pleurisy, or a continued fever.

5th. Whether there has been hemoptysis, and if so, its nature and repetitions, and whether it preceded or followed the other pulmonary symptoms.

6th. Whether the cough was at first dry, or followed by expectoration.

7th. The nature and quantity of expectoration, and whether there has been a change from a mucous to a purulent character, coinciding with the symptoms of ulceration; whether any calculous matter has been expectorated.

8th. Whether there has been pain; if so, its seat and nature; whether it has affected the shoulder, side, or calf of the leg.

9th. The existence of hectic, emaciation, and acceleration of breathing; the state of the pulse, and decubitus.

10th. The condition of the digestive system.

11th. The state of the pharynx, larynx, and trachea.

12th. Whether there be any syphilitic taint, if so, examine for periostitis of the chest. Secondary syphilis simulates phthisis when the syphilitic hectic exists with the bronchial irritation which I have described. If, as is often the case, there be also periostitis of the ribs or sternum, the symptoms are almost identical.

13th. Whether the patient (if a female) be hysterical; the state of the uterine system.

14th. Whether, if there has been any external disease of a scrofulous nature, the symptoms have succeeded to its removal or diminution.

The following advice and directions by Dr. Stokes will merit your attention, even though in part a repetition of what has been already placed before you. The practitioner must not build too much on the complication with hysteria. Nothing is more common than to attribute the symptoms of tubercle to this affecton — an error injurious to the patient and to the reputation of the physician. The complication of the hysterical cough with fever should always excite alarm. In phthisis, if there be any cause of spasmodic cough, this character often continues to the end. Thus, where tubercle succeeds to pertussis, the original character of cough may continue long after great cavities are formed. There is, however, a singular hysterical affection with violent cough and hemoptysis, excitement of the pulse and respiration, and copious sweatings. The respiration is intensely puerile; but though the symptoms continue for months, defying all treatment, there are no signs of consolidation.

With the information thus obtained, we may proceed to the physical examination, which must be conducted in as delicate and rapid a mode as possible. It is almost never necessary to uncover the whole chest — the baring of the upper portion is sufficient. Before percussion, gentle pressure should be made on the sub-clavicular regions, to discover whether any tenderness exists, which would render its use painful. Percussion must then be performed, the patient being in the erect position, and without the head being inclined to either side. It is always to be comparative and strictly so, and we get much better results by the most delicate than by forcible percussion. The best pleximeter is the index finger, the back of which is laid on the chest. In this way the clavicles, subclavicular regions, and ridges of the scapulæ, are to be explored. If necessary, we may use percussion at the end of a forced inspiration, and compare the sound of the upper and lower portions. For the active signs the stethoscope is absolutely necessary, for the results of immediate auscultation are not sufficiently accurate; the respiration, cough, voice, and sounds of the heart, are to be explored rapidly; and an observation being made of the external appearance of the chest as to contraction, the examination is completed.

In the nervous female, and in cases in which there has been recent hemoptysis, the examination must be performed as expeditiously as possible; and in the latter case, all fatigue to the patient, and forced inspirations, are to be avoided, lest a new hemorrhage should be induced.

I proceed with the analysis of M. Louis's observations. This gentle-

man well remarks: "The importance of auscultation and percussion in the diagnosis of tubercles arises especially from the fact that these productions are, as we have already seen, almost invariably developed from the apex to the base of the organs, — while the various metamorphoses they pass through must of necessity produce changes in the sonorousness of the chest, and in the character of the respiratory murmur."

Percussion of the chest will not always give out a dull sound, even when there are tubercles in the lungs, provided they be slowly developed, scattered over a considerable surface, and about the same extent in the right and the left lungs. The chest will still continue for even a length of time to be sonorous under both clavicles. After a time, however, the sonorousness diminishes, and as it is commonly different under the two clavicles, this difference, whatever be its degree, denotes the existence of a morbid state of the apex of one of the lungs; and as it is in this situation that the development of tubercles begins, our first suspicions naturally turn to phthisis as the cause of this difference.

Unequal sonorousness of the infra-clavicular regions may be the result of old standing pleurisy (which has brought contraction on one side of the chest), or of vesicular emphysema of one of the lungs. But comparison of the results of percussion and auscultation will remove all such doubts.

In practising percussion it should be frequently repeated, the observer placing himself sometimes on the right and sometimes on the left side of the patient, while the latter himself successively assumes the standing, the sitting, and the recumbent posture, in order that the slight difference of sonorousness between the two sides may be ascertained beyond question. With diminished sonorousness on the region corresponding with the seat of tubercle, there is, also, decrease of elasticity in the part percussed.

In proportion as the disease advances, and the number of tubercles increases, the results of percussion become more distinct and decisive. They are also valuable in determining, with more or less accuracy, the extent of the local disease.

Auscultation, like percussion, may be incapable of leading to any positive result, even in cases wherein the general symptoms, and those already enumerated, leave but little doubt as to the existence of tuberculous disease. But, in the majority of cases, even before the sonoroushess of the chest undergoes changes, the character of the respiratory murmur is distinctly altered. This latter is feeble, imperfectly developed and obscure under one of the clavicles; and when pain has existed on the side of the chest only, these morbid conditions are detached under the clavicle of that side. This character of the respiration becomes particularly obvious, if both sides be auscultated comparatively, — a precaution which should never be neglected. Or, again, instead of a weak respiratory murmur, incomplete in inspiration, the latter is harsh, strong, blowing, and the expiration harsh and as it were bronchial; all these differences from what exists in the natural state.

There are some natural differences in the intensity and character,

of the respiratory murmur in the two lungs, which should be borne in mind at the time of auscultating to establish a diagnosis of pulmonary tubercle. As to intensity, Dr. Stokes remarks, that in many individuals there is a natural difference, and in such cases, with scarcely an exception, the murmurs of the left is distinctly louder than that of the right lung. This character is particularly evident in females and nervous individuals. Dr. Gerhard, on the other hand, points out as the result of his own observations, which have been since verified by others, the fact that the respiration is always somewhat blowing at the apex of the right lung, and not at that of the left. M. Louis, as the result of observations on twenty-two young females from 15 to 20 years of age, found, except in two of the cases, the sound of inspiration gentle and soft under both clavicles, and to the same amount under each. The sound of expiration was nearly inaudible under the left clavicle in the majority of cases — thirteen out of twenty-two ; whereas the contrary was the case in the right side where the sound of respiration was inappreciable in five cases only. This sound examined on the posterior surface was inappreciable on the left side in fourteen cases, and on the right side in five only. He infers that slightly prolonged expiration at the upper part of the right side of the chest, is, considered in itself, of little value as a diagnostic sign of tubercle ; and that it is much more significant on the left.

I ought not, however, to terminate these remarks without adverting to the counter statement of M. Fournet, who has satisfied himself that in persons presenting all the characteristics of healthy lungs, the sounds of inspiration and expiration are precisely identical in all corresponding points ; in the few individuals in whom he detected a slightly greater development of the *expiration* under the *right* than the left clavicle, there were some motives for a dubitative opinion respecting the state of the lungs.

The *resonance of the voice* also undergoes modifications by the presence of a certain nnmber of tubercles in the parenchyma of the lung. The alteration, at first slight, gradually increases in such a manner that, after the lapse of a period of variable length, actual bronchophony may be detected. The vocal resonance varies, however, on the two sides of the upper part of the chest, just as we find the character of the respiratory murmur to vary in these regions.

The disease may have set in before the respiratory sound, either of the vesicular or bronchial variety, is altered. But, after a time, dry or humid crackling, or a few bubbles of subcrepitant rhonchus becomes discoverable at the apex of the chest. These phenomena denote the presence of a certain quantity of mucus, which may be secreted long before the softening of the tubercle, and while gray semitransparent granulations constitute the only existing lesion.

The simultaneous existence at the apex of the left lung, of slightly prolonged and slightly harsh expiration, slight bronchophony, and a few cracklings, in a case where the rational symptoms are far from being conclusive, would almost place the existence of tuberculous disease beyond question. Slight alteration in the sonorousness of the chest would do so completely.

In conclusion of this part of diagnosis of pulmonary tubercle, I shall

introduce to your notice the following synopsis of M. Fournet (*Recherches Cliniques sur l'Auscultation des Organes Respiratoires et sur la Premiere Periode de la Phthisie Pulmonaire*), preceded by this good advice.

"The observer must, while investigating the local signs, carefully guard against being influenced by any preconceived opinions, originating in the external appearance, or in the commemorative or general symptoms of his patient. If dominated by an opinion, in great measure already formed, the very best auscultator is not unlikely to become so careless and inattentive in his examination, that the impressions received by the senses are, without his being aware of it, converted into so many confirmations of his preformed judgment. This is the more likely to happen, because the phenomena appreciated by the senses and the mind are very numerous, and only distinguishable by very delicate differences from others of wholly distinct diagnostic force. When a first examination has been made, under circumstances like these, we are sometimes astonished at the variation in the result of a second."

First Stage.

First Phasis. — A few small tubercles scattered through the lung.

- Inspiration, dry, rough.
  - intensity increases to 12.
  - duration falls to 9, 8.
  - quality, natural.
- Expiration, dry, rough.
  - intensity } rise gradually to 8.
  - duration }
  - quality, clear, ringing.
- Commencing bronchophony in rare cases.

Second Phasis. — Infiltration of crude tubercles in groups.

- Pulmonary crumpling sound.
- Dry crackling rhonchus.
- Sonorous, sibilant, rhonchi (symptomatic of bronchitis).
- Inspiration—intensity = 12, 14.
  - duration = 9, 8.
  - quality, clear, ringing.
- Expiration, intensity } = 6, 10.
  - duration }
  - quality, blowing, rarely bronchial.
- Dryness and roughness of respiratory murmurs are now masked by change of quality.
- Slight bronchophony, frequently.
- Slight obscurity of sound on percussion.
- Diminished vocal fremitus.
- Unnaturally distinct transmission of cardiac sounds.

Third Phasis (or of transition from first to second stage). — Commencing softening.

- Humid crackling rhonchus.
- Sonorous sibilant rhonchi, as before.
- Pulmonary crumpling sound disappears.
- Inspiration — intensity = 15, 18.
  - duration = 7, 6, 5.
  - quality, blowing, or slightly bronchial.
- Expiration, intensity } = 12, 15, 18, 20.
  - duration, }
  - quality, bronchial.
- Strong bronchophony, or imperfect pectoriloquy.
- Sound more obscure, or even dull.
- Vocal and tussive fremitus much diminished.
- Diminution of partial movements of ribs corresponding to indurated mass.
- Transverse retraction of corresponding part of the chest.
- Subclavicular flattening .

The normal intensity and duration of the inspiratory sound being represented by 10, the extreme degrees of increase and decrease mark 20 and 0; between the maximum point of elevation and that of total cessation, all intermediate grades are observed. A remarkable difference in the mode of production of increase and diminution is, according to M. Fournet, that the former change never springs directly from any physical alteration in the pulmonary structure, and is produced, not in diseased parts, but in circumjacent healthy tissue; in a word, it announces the general fact, that a part of the lung supplies, by increased action, the functional incapacity of another, and characterizes *supplementary* respiration. On the contrary, the diminution of the murmur is the direct effect of some physical obstruction to the entry of the air, and represents the intensity of that obstruction. The importance of this modification, which, in the great majority of cases, affects both the intensity and duration of the sound, is apparent from the fact, that there is scarcely an organic disease of the larynx, trachea, bronchia, pulmonary tissue, and pleura, which, as well as certain spasmodic affections, is not productive of it to a greater or less amount.

In health, the inspiratory sound is uniform and continuous; this condition constitutes, according to M. Fournet, its normal *rhythm*. In cases of sharp pleurodynia, he states, this rhythm changes; the murmur becomes abrupt, jerking, and divides into several successive and unequal parts. In incipient pleurisy, in the dry stage, a similar state is, however, observed; so that this observation throws no new light on the diagnosis of these two complaints. During the alteration of inspiratory rhythm the expiratory remains unchanged; a fact easily intelligible.

The expiratory murmur is subject to much greater increase in point of intensity and duration than the inspirato y: if we credit M. Fournet, the maximum increase in these respects may be represented by the number 20, that already employed to designate the corresponding condition of the inspiratory sound. Now, as in the normal state, the former and the latter murmurs are made respectively equal to 2 and 10, it follows that while inspiration is only capable of acquiring double its healthy duration, expiration may attain ten times the natural proportion. And again, as it is elsewhere stated, that while the expiration undergoes this enormous rise, the inspiratory sound may fall to 1, it follows that instead of the expiration being only one-fifth as intense as the inspiration, it may be twenty times as intense as the latter; and hence, that it may actually bear one hundred times a higher proportion to the inspiratory murmur than natural. We are almost persuaded there is exaggeration in this expiratory estimate; at least we have never, ourselves, observed a degree of prolongation in cases of vesicular emphysema (wherein the abnormal extension has to us appeared to reach its utmost limit) which could be rated at more than five or six times the natural amount.

Augmented expiration may either coexist with a proportional increase in the inspiratory murmur, or the healthy ratio of the two phenomena may be destroyed by an accompanying fall in the inspiration. The former condition occurs in puerile or supplementary respira-

tion; the latter in the early stage of phthisis, and in emphysema; these are indeed the only affections in which the disproportion exists to a very large amount, and hence its special value in their diagnosis.

M. Louis is silent respecting another part of physical diagnosis, viz., mensuration of the chest. I cannot do better than give you the observations of Dr. Stokes on this subject, under the head of *Signs from Atrophy of the Lung.* "That the volume of the lung is diminished in phthisis, was recognised by Bayle, but the subject has never been sufficiently studied. Laennec states, that a contraction of the chest may be observed in very chronic cases, when large cavities are tending to cicatrise.

"Numerous observations, however, have convinced me, that the contraction of the chest, resulting from atrophy of the lung, begins and may be appreciated, at a much earlier period, than has been supposed; and further, that in chronic cases, great falling in of the chest may occur from interstitial atrophy, *without the formation of any cavity whatever.* Atrophy of the lung I believe always to attend the earlier stages of tubercle, and is probably produced by the operation of that law by which an organ loses its volume when its functions are rendered less energetic; and thus, as the obliteration of the minute air tubes described by Reynaud advances, the cells become useless, and ultimately disappear.

"But whatever be the mechanism of the change, we can recognise it at an early period by accurate measurement of the antero-posterior diameter of the thorax, and in this way measurement is found a most important means of diagnosis in the earlier stages of phthisis. It should never be neglected. By means of spring callipers, one knob of which is fixed on the scapula, and the other below the clavicle, the comparative depths of the upper lobes can be at once determined, and the most minute difference detected. The circumference of the chest above the mamma, and the distance of the clavicle from the nipple, must also be observed. In the earlier stages, the difference varies from the eighth of an inch to half an inch, and there is no visible alteration, except a flattening or slight hollowing under the clavicle.

"But in the more chronic cases distinct deformity takes place. The antero-superior region becomes extensively flattened or concave, the shoulder depressed, the clavicle flattened, and its lower edge everted, the ribs closely approximated or even overlapping, and the apex of the scapula tilted out, as in contraction from empyema. The heart ascends in the thorax, and in one extreme case I have found it to pulsate under the second rib. All these signs are more connected with the chronic solidity than the suppuration of the lung, for the latter, by permitting some expansion to take place, may delay the process of contraction.

"This condition may exist with complete dulness of sound and *bruit de pot felé*, but without the signs of cavities, or may coincide with gurgling and cavernous respiration in their different modifications."

There are materials for diagnosis furnished indirectly which are far from being unimportant. Thus, double pleurisy denotes, almost

with certainty, the existence of tuberculous disease. Of the same signification are ulcerations of the larynx, for, setting aside cases of syphilis, they are almost exclusively observed in tuberculous subjects. As tubercles are developed simultaneously in a multitude of organs, and as after the age of fifteen they are not formed in any organ without their existing in the lungs, it follows that the moment special symptoms of their presence in an organ are met with, we may infer the existence of pulmonary tubercles. Thus, when we see chronic peritonitis or tuberculous meningitis in any subject, we are sure that the lungs are suffering from tubercles. Protracted diarrhœa, as from six to ten months or more, accompanied with emaciation, and persisting in spite of abstinence, opiates, and the blue mass, and blisters to the abdomen, is almost peculiar to phthisical subjects.

Still, as M. Louis frankly acknowledges, despite all the aids furnished by a better knowledge of pathology, and a close analysis of the value of symptoms, the most observant and the most experienced may sometimes be at a loss to form with certainty an opinion as to the presence of tubercles in the lungs.

Diagnosis of the Second Period. — The lesions in the second period of phthisis are of a more serious character and greater extent than the first, and in consequence more easily recognisable. We meet with pains and hemoptysis in both periods: but the *sputa*, more or less thick and yellowish at the close of the first period, become greenish and striated with whitish lines at the beginning of the second. The *sound* of the chest becomes gradually less clear under the clavicles, or one only of them, until it lapses into absolute dulness. Not unfrequently the extent of dulness includes the whole upper lobe.

Changes in the phenomena of respiration are going on at the same time. This is not only rough, harsh, and prolonged in expiration, but it becomes bronchial or perfectly tracheal under the clavicles where the percussion sound is dull. It is also commonly accompanied by crepitant rhonchus, composed of large bubbles, more or less moist. The *resonance of the voice* is much louder than during the first period; the bronchophony strong and sometimes very noisy, so much as to be disagreeable; and pectoriloquy accompanied by respiration becomes audible. Independently of tracheal or cavernous respiration, which exists opposite tuberculous cavities, that modification of respiration, known under the name of amphoric, together with metallic tinkling, may also be pretty frequently detected.

Prognosis. — The question of the prognosis of phthisis soon receives a melancholy answer. This disease almost invariably terminates fatally, after a space of time varying from a few weeks to several years. It may be advancing from five to fourteen, and even twenty years. By some enlightened physicians phthisis is declared to be incurable. Dr. Chapman, in his published lecture on Phthisis Pulmonalis (*op. cit.*), in which he had just before been speaking of the alleged curative powers of mercury, declares: — "Never have I had the good fortune to witness a single case of this form of disease or to know of one well authenticated, though in private practice, and that of the public institutions I have attended, mercury was employed by myself or others in several hundred cases." It may still be not with-

out instruction if I place before you a brief outline of the prominent reasoning and observations to show the curableness of phthisis.

Laennec states, as the result of personal observation, that cicatrisation or healing of a tubercle has taken place. M. Andral declares that he has seen several cases of this healing of tubercles; and adds, that it may take place in various degrees. The interior of a cavity being completely emptied of pus, its walls are lined by a cellulo-vascular membrane. After a while this cavity disappears, and we meet with nothing but a simple cellulo-fibrous line at which abut abruptly large bronchia; or, there may be a larger mass of cellulo-fibrous or of calcareous or cartilaginous structure at which abut the bronchia. This is commonly the appearance of things at the apex of the lung, which is shrunk, puckered, and adherent to the pleura costalis; and which, in its shrinking, leaves between it and the pleura a space that is afterwards occupied by a cartilaginous tissue of new formation. Such, says M. Andral, are the changes which take place in subjects who, after having exhibited all the symptoms of phthisis pulmonalis, have been cured, and afterwards died of some other disease. Dr. Carswell believes in the curableness of tuberculous disease, and points to the indurated matter, like chalk or hard mortar, found in the bronchial glands, as proofs that the tuberculous growth and transformation going on in these parts have been arrested. Simultaneous with these is often the irritation and tuberculous transformation of lymphatic glands in the neck, in scrofula, which are evidently often arrested, and the patient is left for a term of years in tolerable health. He has seen children who had tabes mesenterica entirely recover, and when examined after a lapse of years, and some of them in an adult state, having died from other diseases, hard, dry, chalky masses were found in the mesenteric glands. Dr. Williams (*op cit.*) mentions the healing, by contraction in size, of tuberculous cavities; but he adds, that they are scarcely ever quite empty: they contain more or less of a pale coloured, plaster-like matter, which consists chiefly of carbonate and phosphate of lime, and sometimes contains earthy concretions. "The contraction is evident from the puckering of the pulmonary tissue visible on the pleural surface near the cavity, and the adjoining vesicles are generally dilated to fill up the space. The cretaceous matter is probably secreted by the fibrous false membrane (which lined the cavity of the tubercle); but it may have been originally of the character of tubercle or pus, and being unable to escape, the animal part has been absorbed, and the earthy insoluble salts are left behind and accumulate from successive depositions."

In some cases of tuberculous disease we see the patients cough up chalk-like concretions, which are an evidence of the chronic nature of the disease, and of the restorative efforts of the parts to oppose farther degeneration.

Dr. Stokes describes phthisis to be curable. MM. Barthez and Rilliet make a similar assertion. Dr. S. G. Morton, in his valuable "*Illustrations of Pulmonary Consumption*," distinctly expresses his conviction, not merely the cicatrisation of open tu-

bercles but of their entire removal by absorption. But the most extended investigation of the subject yet made is by M. Rogée (*Sur la Curabilité de la Phthisie Pulmonaire, &c.*). His observations were made in a careful *post mortem*-examination of more than two hundred subjects. Of this number there were a hundred old women, upwards of sixty years of age. M. Rogée noticed more particularly two kinds of lesions at the apex of the lungs, which seemed to him of peculiar interest, viz., cretaceous or calcareous concretions, and cicatrices of the pulmonary tissue.

The concretions were found by M. Rogée in fifty cases out of a hundred; their situation corresponding precisely with that of tubercles as commonly seen in the lungs, viz., at the summit of the lung thirty-nine times; equally distributed through the lung six times; in several parts of the lung, but not at the apex, six times. The relative frequency of the concretions in the two lungs were as follows: —

In both lungs, simultaneously . .	24 times.
In the right lung	17 „
In the left lung	10 „
	51

Very frequently when there were concretions in the lung there were also some in the bronchial glands. In size they were equal to a grain of hemp or a pea; sometimes equal to a hazlenut; and, again, often as small as a millet-seed. They were found in distinctly tuberculous lungs as well as those otherwise healthy.

M. Rogée does not hesitate to regard these cretaceous and calcareous concretions as the result of the transformation of tubercles; in fact of tubercles which were healed. An additional argument in favour of his opinion is adduced by him, in the fact of concretions being sometimes found in the lymphatic ganglions, which are also occasionally the seat of tubercles.

Cicatrices are next noticed by M. Rogée. He divides them into four species: — 1. Cicatrices with the cavity still preserved. 2. Cicatrices with cretaceous or calcareous matter filling the cavity. 3. Fibro-cartilaginous cicatrices. 4. Cellular cicatrices. He details cases of persons at very advanced age, one of a woman eighty-four years old at the time of her death, in whose right lung were found two caverns perfectly cicatrised; a third less advanced containing tuberculous matter, which had passed into the cretaceous form. In the left lung there was a calcareous concretion. In two other cases of women, each seventy-four years of age at the time of death, cicatrised excavations were found, which had no communication with the bronchia. The whole paper of M. Rogée, which is published in three consecutive numbers of the *Archives Générales de Médecine*, 1839, merits an attentive perusal. He certainly must obtain credit for establishing the position with which he set out, that *pulmonary consumption is curable.*

M. Louis comments on these observations of M. Rogée in the fol-

lowing manner. He had a little before admitted "that phthisis may stop short in its progress."

"These facts are assuredly possessed of immense interest; for were they confirmed by others of the same kind, and in greater number, the necessary conclusion would be, that phthisis is still more frequent than is generally supposed, and above all, that it stops short in its course, much oftener than has hitherto been imagined.

"It is, however, difficult to believe that the symptoms dependent on the tubercles, of which Dr. Rogée discovered these traces, could ever have been of a very serious kind; or that the little cretaceous masses described could have succeeded to large cavities. It is more probable that, in the cases in question, the disease always followed a slow, inactive course; and it becomes a question whether in such cases of phthisis, when the anatomical change is so limited in extent, the disease commenced in youth or in advanced age. It also becomes a question whether we are entitled to affirm that an attack of hemoptysis at all severe, not followed by the symptoms of phthisis (which is unfortunately very rare), whether such hemoptysis, I say, could be considered as essential, when the morbid state upon which it almost constantly depends may be extremely trifling in amount and remain latent.

"The study of phthisis under the present point of view — that of its curability — has as yet made but very little progress, and consequently does not at the present day possess all the interest which ought to belong to a subject of such great importance. In the cases of cure, hitherto known, the morbid state has always been very limited in extent, and this limitation has not been the result of any circumstance which, although fortuitous, was still appreciable, and hence, more or less easily producible at will in other cases, — but the effect no doubt of circumstances peculiar to each individual case. The nature of these circumstances is at the present hour utterly unknown, and to the steady investigation of them medical observers should henceforth sedulously apply themselves."

More recently still, M. Boudet has added his experience and observations to those of M. Rogée, in confirmation of the curableness of phthisis. M. Boudet (*Recherches sur la Guereson Naturelle ou Spontanée de la Phthisie Pulmonaire*) indicates five modes of cure, brought about by corresponding changes in pulmonary tubercle; viz., 1, sequestration, by becoming completely encysted; 2, induration, of which there are three varieties; 3, transformation into black pulmonary matter; 4, absorption; 5, elimination.

M. Boudet tells us, that he has examined successively and without selection, the respiratory apparatus of 197 persons, whose ages ranged from two to sixty-three years, and who died in the hospitals of Paris of different diseases, including some individuals who were cut off by accident and wounds in the midst of full health. Of these he found in 45 cases, at ages ranging from 2 to 15 years, 33 tuberculous; and of 135 from 15 to 63 years he detected tuberculosis either of the lungs or bronchial glands in 116. These facts, which,

as the author truly remarks, would seem to be almost incredible, are explained by the readiness with which these morbid products cease to be incompatible with health, owing to certain changes in their intimate structure.

Not only have the transformations of tubercle been noted by M. Boudet on the dead body, but they have also occurred within his knowledge in the living subject. In less than a year he collected 14 cases, of which 6 were softened tubercle or undoubted excavations. In all ages and in every stage of the disease cures, for the most part indeed spontaneous, have been brought about.

Such are the differences, in states apparently similar, in the rapidity of progress and duration of phthisis, that the prognosis even to determine the probable period of its termination in death is a very difficult thing. Sometimes the patient rallies from a condition apparently hopeless, acquires strength and even gains flesh; and congratulates his physician on the success of his treatment. A few months more, however, and the scene is changed. All the bad symptoms return with aggravation, diarrhœa sets in, and death soon closes the scene and terminates the false hopes of the patient and friends, and rebukes the vanity, if he had given it any license, of the *successful* physician.

LECTURE XCIX.

DR. BELL.

TREATMENT OF PHTHISIS PULMONALIS.—Discouraging view of the subject—Systematic divisions of treatment, into prophylactic, palliative, and curative.—*Prophylactic Treatment*—To be begun early in life—Attention paid to the health of the mother, or the nurse who may replace her—The child to have abundant nutriment; exercise, moderate but not violent, in the open air—The warm, and then the tepid bath—Cheerful emotions encouraged, but yet suitable restraint practised—Moderate exercise of the intellect—Watchfulness at the epoch of puberty—Various exercises, including gymnastics; tepid or cool bath; skin protected by flannel; food nourishing; milk, eggs, and meat—For weak appetite, bitter infusions, and for anemia, preparations of iron—Health still delicate, travel is beneficial—Attention to ventilation in the sleeping apartment—Tone to be imparted to all the organs, and equability of functions preserved—*Palliative Treatment*—Complication of phlegmasia of the thoracic organs and disorder of the digestive apparatus to be removed—Antiphlogistics succeeded by tonics—Different ideas of palliative and curative treatment—Practitioner to make his choice—Circumstances determining him—Different forms of phthisis—Localised bronchitic variety; its treatment—Hemoptysis; its treatment—Pneumonia; its treatment—Recuperative measures—Depletion not always necessary—Diarrhœa, remedies in—*Perspiration and Night Sweats*—Additional hygienic measures—Exercise on horseback; travel; change of scene—Benefits from change of climate overrated—Climate of East Florida—Alleged efficacy of residence in marshy countries disproved—Summary of *curative* treatment—Reported remedies against tubercle.

To the subject of the treatment of phthisis, the intelligent physician, whose knowledge of the disease rests on a pathological basis, will approach with a feeling of depression and discouragement. Even though he should admit that phthisis is curable, yet he cannot say that it is so under any known course either of hygiene or of therapeutics, much less by the administration or use of any one article; nor can he imitate the means, whatever they may have been, by

which the fatal result has been warded off in some cases, and tuberculisation arrested by the conversion of vomicæ into calcareous deposit.

The systematic divisions of the treatment is into the prophylactic, the palliative, and the curative. Of the two first alone we can speak in terms of any confidence or indeed of hope.

Prophylactic Treatment. — This to be of avail ought to be begun in early life, even from infancy, when, owing to the disease of the parent and the lymphatic temperament of the child, there exist well grounded fears of the development in it of tubercles. The health of the mother during the period of lactation, or if she is unable to perform this duty, the health of the nurse, are matters of the greatest importance. Abundant nutriment easy of digestion, but to the avoidance of excessive repletion, daily exposure to the outer air when the weather is not damp, wet, or very inclement, and regular bathing, first in warm and afterwards in tepid water, should be the outlines of hygiene for the infant. When old enough to take exercise freely itself, the child should be encouraged to indulge in active sports, if possible out of doors, but not to exert an undue strain on any organ by excessive running, jumping, or lifting weights beyond its strength. With advance of years, mental occupation should keep pace with, but in no instance exclude or materially interfere with a full share of bodily exercise. The cheerful emotions should be encouraged, and depressing ones sedulously prevented, and when they come on, speedily dispelled. Let not this advice, however, be construed into indulgence in appetite for every kind of food, or in caprice or passion, or into a withholding of wholesome restraints on these propensities. Restraining counsel and firm rule, far from interfering with the cheerfulness and pleasures of a child, are found to be signally conducive to a prolonged enjoyment of them, by nurturing a proper and healthful frame of mind.

Parental vanity ought not to prompt the sometimes precocious intellect of the child to prolonged exercise of its faculties and sedentary life in consequence, by which hematosis and nutrition are retarded and on occasions perverted, and a greater probability afforded for the development of scrofulous diathesis and subsequently tubercular formations in the brain and lungs.

The period of puberty approaching, the greatest watchfulness should be exerted but not exhibited to prevent any excitement, which grows out of the new organic developments, from taking a hurtful direction, by the acquirement of bad habits and especially solitary vices, which throw the system open to various derangements of health and disorders of a serious, sometimes of an alarming nature, in which we must include phthisis. Variety of exercise, by alternate walking and riding on horseback, or in a vehicle of any description, and moderate gymnastics, frictions of the skin, and the use of tepid or cool bath, as personal experience may indicate, are now to be regularly and systematically practised. The skin is to be protected from vicissitudes of temperature by a flannel jacket with long sleeves, and drawers of a lighter texture and material, to be changed always at night, and for the most part to be left off during this time and a mus-

lin jacket substituted for the flannel. Abundant and wholesome food, in which a fair proportion of animal matters enter, including milk, and eggs, or meat, should be allowed; and occasional languor of the digestive function remedied by the watery infusion of simple bitters; or if there be paleness and anemia, of either one of the milder preparations of iron.

If early delicacy of frame and constitution continue after puberty, travel and change of climate will be attended with more beneficial consequences than at a later period, when phthisis have been developed or made marked progress.

Both during the period of infancy and in the subsequent period of early life, the sleeping room should be, if possible, of commodious size, well ventilated, and with, especially in winter, a southern exposure. Of late more than formerly, since the increasing use of furnaces and flues to warm houses, open chimney-places are no longer made, or if made are closed up, so that persons inhabiting a room of this kind during the day, or sleeping in it at night, are deprived of the requisite means for ventilation, and for the escape of the impure air generated by respiration and cutaneous exhalation, &c. If this difficulty be obviated, I regard the introduction of warm and sufficiently moist air, into all parts of a house, as decidedly sanitary, and a no unimportant part of prophylaxis, as it is of palliative cure, by its diminishing the risk of catarrhs and phlegmasiæ of the thoracic viscera being contracted in the first, and of rendering them more readily amenable to remedies and less liable to return in the second.

In fine, remembering the greater tendency, we dare not say uniform occurrence of tubercles being formed in consequence of a disordered condition and distribution of the blood, it should be our constant endeavour, by prophylaxis, to impart such a degree of tone to all the organs, and such a rhythmical exercise of the functions, but without stretching them to the highest manifestation of vigour, as shall be most likely to conduce to the elaboration of food into good blood, and then the equable distribution of this blood to all the tissues, so as to insure a healthy deposit of its fibrin and other elements for formation and growth of these tissues and the organs into the construction of which in various degrees they enter.

Palliative Treatment. — Our knowledge of the complications of tubercles, and the circumstances accompanying their increase and growth are sufficient to teach us that they often prove sources of irritation, and develop inflammation, as pneumonia, for example, and that they often follow, on the other hand, the occurrence of this and other forms of thoracic inflammation. In either case, the sufferings and danger of the patient are increased by the occurrence and persistence of these phlegmasiæ, whether it be pneumonia, bronchitis, pleurisy, or hemoptysis; and hence the necessity for our having recourse to measures, which, although they do not reach the tubercles themselves, will contribute to remove the complications, and allow of the organs to perform, with but little comparative difficulty, their appropriate function for a longer period than if treatment had not been adopted.

Disorder of the digestive functions sometimes constituting gastro-

enteritis, sometimes associated with altered states of the mucous membrane, including ulcerations, constitute additional complications, and require correction and abatement, without which the life of the patient is abbreviated to a degree that the pulmonary tuberculization alone would not have caused.

I will first state in a few words in what the rational treatment of phthisis consists, and then offer some explanations and commentaries in addition for the better understanding of the subject. The occurrence of partial inflammation, pleuro-pneumonia, or bronchitis, is to be met by small bleeding, preferably by leeches or cups; the digestive apparatus to be kept in a normal state by plain nutritive food, occasional laxatives, with vegetable bitters; and in lymphatic constitutions, iodine, or the milder preparations of iron: cough will be obviated by small doses of opium, or preferably, in reference to the nervous and digestive system, by hyosciamus, stramonium, or belladonna; and in cases of dry cough with heat of the chest, by the inhalation of watery vapour, in which sometimes narcotic substances may be usefully suspended. Counter-irritants may be used where congestion or pain with slight phlogosis is present.

The concurrent opinion of nearly all those who have most earnestly and carefully directed their attention to the subject, is in favour of antiphlogistic remedies, with a view to remove the local inflammation and abate the number and violence of the constitutional sympathetic actions, such as fever. Nor is this view of treatment abandoned even now that the deterioration and depravation of function growing out of enfeebling causes is admitted and is in a measure understood. But this knowledge is so far usefully applied, that while we adopt measures to restrain and remove promptly the accidentally associated inflammation of the part of the pulmonary apparatus which may happen to be phlogosed, we are still especially mindful to have recourse, as soon after as possible, and even in some cases of very feeble constitutions, simultaneously, to means both hygienical and therapeutical calculated to supply blood and to invigorate the general system.

It may be, when inflammation shows itself early in the disease and is promptly combated and removed, and afterwards judiciously devised sedative remedies are used, while the hygienic treatment already described under the head of prophylaxis is persevered in, that tubercular growth will be arrested, and phthisis remain in a quiescent or latent state for a lengh of time, or for a considerable period of a man's life. Hence the measures which are proper for palliation are those to be used, but with somewhat more freedom in the curative treatment. By some writers, Dr. Stokes, for example, assuming that tubercles actually exist, but without complications except those of thoracic inflammation, the treatment is described as curative; while the palliative is understood to apply to the means adopted for abating the violence of the hectic fever, the cough, expectoration, diarrhœa, and it may be hemoptysis, without any hopes of arresting the disease, but merely of diminishing the sufferings of the patient.

They who deny the curableness of consumption will regard all the alleged cases of Dr. Stokes and others as merely instances of sus-

pended disease, and will of course deny the propriety of the term curative at all to the treatment of consumption. Without adopting this extreme view, I am still disposed to give, as I have already intimated, a large interpretation to the term palliative, in the disease now before us, and to apply it to all parts of the treatment of the phlegmasiæ in other forms of disease of the lungs and other organs ensuing on or associated with pulmonary tubercles—restricting the term curative to that treatment which modifies by removing or even diminishing the number and development of these tubercles themselves. This, I believe, is the light in which the question is viewed by M. Louis in his *Researches*.

With this understanding of the use of the terms palliative and curative, you will be prepared to receive with profit the following observations by Dr. Stokes, which are preceded by a running commentary in proof of the connexion between inflammation on the one side and tubercle on the other. On being called, says Dr. S., to a case of phthisis, the practitioner has to satisfy himself respecting —

1st. The absence of the strumous diathesis, or an hereditary disposition.

2d. The fact of the disease being recent; for, *where physical signs of tubercle exist*, the chance of recovery is inversely as the duration of symptoms.

3d. The want of proportion between the extent of disease as indicated by physical signs, and the duration of symptoms. If the extent be slight, although symptoms have existed for months, it shows a power of resistance in the economy.

4th. The calmness of the pulse.

5th. The absence, or slight degree of emaciation or hectic.

6th. The healthy state of the digestive system. In all the extremely chronic cases which I have observed, the digestive system continued healthy, and I never heard of a recovery after diarrhœa had occurred.

7th. The fact of the disease having distinctly supervened on a pneumonia or bronchitis.

8th. The occurrence of free expectoration from the first period of the cough. An important character, as showing an early attempt to relieve the irritation by secretion.

9th. The healthy state of the larynx. Most important. The combination of even a small quantity of pulmonary tubercle, in laryngeal disease, is always fatal.

10th. The disease, as shown by physical signs, being confined to one lung, and to a small portion of that lung.

11th. The absence of the signs of cavities. This requires explanation. We know that recovery happens after the formation of cavities, but in most cases their existence implies that of tubercle in great quantity, occupying other portions of the lung.

12th. The absence of puerile respiration in the healthy portions of the lung. This character is of value, as showing that a small part of the lung is obliterated, and indicating a quiescent state of the other portions.

13th. The absence of the signs of atrophy.

It is not meant that a case should present all these characters in order to justify our hopes and attempts of cure; any of them are of value. Of course the more of them present the better; and, excluding the first character, they may be all available in any case of phthisis, whether constitutional or not.

Incipient curable phthisis is declared by Dr. Stokes to be met with in one of four forms, which may be designated as the Localized Bronchitic, the Tracheal, the Hemoptysical, and the Pneumonic varieties. I shall give you his advice in his own language as to the management of the first.

Localised Bronchitic Variety.—This is shown by the existence of the signs of bronchial irritation already described. They occur in the upper portion, are combined with vesicular murmur and with slight dulness. The pulse is quickened, the cough is generally dry, but the hectic is not yet confirmed, nor is emaciation decided.

At this stage the experience of a great number of cases enables me to say that a cure can be performed. This is the period for exertion on the part of the physician, but that in which precious time is commonly lost.

There is a local irritation to be subdued; tubercle may or may not have formed. In the first case its quantity is so small, that nature often is able to throw it off; in the second case, it is threatened, and every day, by promoting irritation, increases the chance of its deposition.

The patient must be confined to his room, and all exertions of the lung forbidden. If he be of a robust habit, and the pulse is inflammatory, a single bleeding from the arm is to be performed; the bowels must be kept gently open, and the diet consist of milk, farinaceous substances, and light vegetables.

Leeches are to be applied in small numbers, alternately, to the subclavicular and axillary regions of the affected side. This depletion is to be repeatedly performed, the cupping-glass being occasionally used over the bites. Under this treatment the *râle* will be commonly removed, the vesicular murmur increased in strength, and the dulness diminished, and all this with corresponding relief to the symptoms. We are now to commence the use of blisters, which are to be continually applied under the clavicle and over the scapular ridge. Their size should not exceed that of a dollar, and they must in all cases be covered with silver paper. A blister is to be applied about every three days. This counter-irritation is to be persevered in for several weeks, when the blister under the clavicle may be converted into a superficial issue, by dressing the surface with a disc of felt, and a combination of mercurial and savin ointments. During this treatment the cough is to be allayed by mild sedatives. The following is the formula which Dr. Stokes employs at this stage:—℞. Mucilaginis Arab. vel Tragacanth. ℥iii.; Syrup Limon. ℥ss.; Aq. puræ, ℥iiss.; Aq. Lauro-Cerasi, ʒss.—ʒi.; Acetatis Morphiæ, gr. i. This can be permanently used without deranging the stomach.

As soon as the issue is established, the regimen may be improved. The patient may now commence the friction with the turpentine liniment, and if necessary, use inhalations of the vapour of water impregnated with narcotic extract. From twelve to fifteen grains of the

extract of cicuta may be employed, at each time of the inhalation. In mild weather exercise on horseback should be taken, and the invalid, to perfect his recovery, should remove to a milder climate, and frequently change his situation.

Such is the treatment of the most common form of incipient consumption. We owe the principle of local depletion to Broussais, and among the many boons which he has conferred on practical medicine, there is none greater than this.

Incipient tracheal irritation, regarded by Dr. Stokes as a distinct form of curable phthisis, can hardly serve to designate a state of things requiring separate consideration under the present general head. As far as the trachea alone is implicated, the disease does indeed require, as he judiciously remarks, an active and decided treatment, which will be successful just in proportion as the tracheal disorder is unconnected with tubercle. I need not enlarge on the course to be pursued under either supposition, after the fulness of detail in which I was led when treating of chronic laryngitis, the affinity of tracheitis to which was stated on that occasion. Entire rest of the vocal apparatus, leeches to the windpipe, inhalation of simple vapour, demulcents, narcotic sedatives, and counter-irritants over the trachea, or between the shoulders, constitute the main outlines of treatment. The mercurial treatment in the sense in which it is recommended by Dr. Stokes, viz., to affect the gums gently but decidedly, is of much more doubtful efficacy.

In the early stage, tartar emetic with sulphate of morphia, in solution and mixed with sugar, and in the more chronic the blue mass, with some narcotic extract, will be employed. The first combination, I direct as follows:

℞ Tart. Antimonii, gr. i.
Mist. Camphor. ℥ii.
Sulphat. Morphiæ, gr. ss.
Syrup Simplex, ℥ss.

Dose.—A teaspoonful at intervals of three or four hours, according to the irritation of the cough.

When the attack of phthisis in its first stage is ushered in with hemoptysis, we have recourse to treatment already indicated in its chief outlines and details in my lectures on hemoptysis or bronchial hemorrhage. I had then, however, forgotten that Dr. Cheyne was partial in this disease to the tartar emetic, a remedy of which, from personal experience, I spoke with considerable confidence.

It may be that, in some lymphatic and feeble subjects, the discharge of blood by hemorrhage from the lungs gives of itself the desired relief to the previously congested organs, and reduces the system without any further loss of blood by artificial means. If the hemoptysis ceases spontaneously, and there is no great complaint of heat and oppression in the chest, we may content ourselves with enjoining entire rest and silence, cool and acidulated drinks, warm pediluvia, and sinapisms to the lower extremities, with a mild laxative, or laxative enemata. In more violent cases in which life is threatened by

the great loss of blood, and venesection has been practised without avail, or the subject is scrofulous and weak, cold may be applied directly to the chest. I have in some cases had recourse repeatedly to this remedy by means of a sheet half wrung out of cold water and applied round the thorax; and with manifest relief and comfort to the patient. Ice has sometimes been applied to the chest with similar intention and effect. Emetics, on the strength of the reports of their success by M. Rufz in Martinique, are recommended as worthy of trial by M. Louis. If vomiting were to be brought on by the use of tartar emetic in moderate doses at short intervals, so as to insure decided and general relaxation, we see little risk from the remedy, and I have seen it to be advantageous. But if vomiting be suddenly induced by a single dose of tartar emetic, or, still more, by other emetics which stimulate the stomach more than they depress the general system, bad effects caused by the violent straining and imperfect attempt to vomit will follow, and in some instances, as in that referred to by Dr. Stokes, death itself.

Pneumonia supervening on tubercle, the *pneumonic variety* of Dr. Stokes, demands a treatment nearly identical with that resorted to when the disease is primary, as regards the remedies used, but not the extent to which they are carried. Thus, when the inflammation involves the lung to any extent, or the stage of phthisis and remaining vigour of constitution of the patient justify it, venesection should be employed, and even repeated if the circumstances originally calling for its use still continues. In the more advanced period of phthisis, it will generally be sufficient to draw blood from the surface over the affected spot, by cups or leeches, and follow their application by counter-irritants of blisters or tartar emetic ointment. I have found it necessary even in the advanced stage of phthisis, when cavities were formed, both to bleed from the arm and to apply cups to the chest. In one case, that of a medical student from North Carolina, this treatment certainly saved his life at the time (the spring season), and gave opportunity for him to rally sufficiently so as that he was enabled to return home and take exercise on horseback. He sank, however, as I afterwards learned, under the original tuberculous disease, some time in the latter part of the summer.

In all intercurrent irritation and inflammation of the mucous membrane and parenchyma in phthisis, including, of course, bronchitis, pneumonia, and hemoptysis, Dr. Stokes, and other leading practitioners of the Dublin School, recommend, in decided terms, the free use of mercury, so that it shall give rise to ptyalism. The practice has long been common, quite too common in the United States, where a salutary dread now happily replaces in the minds of many physicians the confidence once entertained of the remedial powers of mercury in phthisis.

If mercury is to be of service, it must be in what are rather vaguely called scrofulous inflammations of the pulmonary organs, in which direct depletion fails us, and which, if not checked, soon end in or rapidly develop tuberculisation. In simple anemia, with scrofula or tubercle, where nutrition is defective, and mere irritation exists with really feeble functional action, the use of mercury ought to be deprecated

in the most decided manner. You will find in the *London Medical Gazette*, 1840, a sensible though somewhat prolix communication from Dr. Munk, setting forth the indications for the mercurial practice in phthisis, and the modifications and subsequent measures of treatment required to give it adequate effect.

Among the means of palliation, and, by the more sanguine, of cure, in phthisis, issues have been highly extolled and not a little used. Dr. Stokes lays great stress on this remedy, as indispensable in many cases; while M. Louis, on the other hand, has seen no benefit from their use. My own experience would lead me to coincide in opinion with the latter.

I now recur to that part of the advice for the treatment of a phthisical patient, in which concurrently with or very soon after the employment of antiphlogistics and revulsives for the removal of intercurrent affections or of complications in phthisis, recourse is had to those measures calculated to furnish blood and keep nutrition up to a point of average activity; for, be it remembered, that it is not a plethoric state of the system and excessive quantity of blood that give rise to the disorders calling for depletion and reduction, but a wrong direction, an afflux of blood to a particular part, consequent often upon the local irritation of tubercle. Our aim, therefore, must be to establish the equilibrium as soon and with as little expenditure of strength as possible. Contributing to this end will be the use of opiates, or if these disagree, other narcotics alternating with simple bitters, which latter of themselves display a sedative much more than a stimulating operation. We shall not unfrequently find that carefully enveloping the patient in warm clothes, after hot pediluvia, and giving him a Dover's powder and some warm diluent, or if there be cough, mucilaginous drink, surprisingly abate and even remove violent stitches of the side and incipient pneumonic or bronchitic attacks; the renewal of which will be prevented by the judicious use of tonic but not stimulating remedies. In pleuritic stitches, which often are transferred from one point of the chest to another, we must rely on moderate counter-irritation or revulsion by fomentation, simple plasters to the chest, and opiates rather than bloodletting, which, if at all tried, ought to be by the application of a few leeches over the pained part.

The food in phthisis should consist of nutrimental substances, in a relatively small compass or quantity, and even in reasonable variety; that is, of change from day to day commensurate with the digestive powers, more than with cravings of appetite of the invalid. When diarrhœa sets in, more simplicity of diet is demanded, and even though we may not admit that the change in the mucous membrane of the stomach and bowels constitutes gastro-enteritis, yet will the alimentary canal be for the most part readily and injuriously affected by commixture of food and highly seasoned or very nutritious articles, and soothed by those of a simpler and blander nature. By curtailing the quantity of bread and milk taken by the patient in the morning, and withholding for a few days the animal food taken at dinner, and substituting in its stead rice and sago, and rice water and gum water for drink, and giving as the only medicines a few grains

of magnesia and a fraction of a grain of ipecacuanha at intervals, I have succeeded in reducing the number of discharges in the twenty-four hours from ten or twelve to two or three. The effect of regimen in this case was the more remarkable, for the lower portion of the small and the beginning of the large intestines must at this time have been studded with a great number of ulcerations, of varying depth and extent, with hard and raised edges resembling those of chancre. That this was then the state of the intestinal canal is undoubted, from the appearances which, on the death of this person a few days afterwards, were presented at an autopsic examination.

In some cases of *diarrhœa* I have found the patient to derive ease for a time from sugar of lead with a little opium; in others lime water and laudanum have afforded most relief. All the remedies recommended for diarrhœa may be tried in succession, and each may suspend the symptoms for a few hours or a day or two, but no one exerts any notably controlling power or materially retards the progress of the disease to a fatal termination.

Perspiration and *night sweats*, so enfeebling to the patient, and sometimes more distressing to him than even diarrhœa, are, like this latter, occasionally mitigated in their extremes, and even partially suspended; but seldom by any remedies directed against them as a mere symptom. All external excitement by undue heat or covering, and all are undue that are not required by the feelings of the patient, should be withheld. Cool and slightly acidulous drinks are to be directed, and of these latter the one longest and most extensively used is the aromatic sulphuric acid, or elixir of vitriol largely diluted with water, to which some patients like the addition of sugar. Cold sage tea, extolled by some for its wonderful anti-diaphoretic powers in these cases, has, within my own experience, failed much oftener than it has proved serviceable. Sponging the skin with vinegar and water, and a strong solution of alum in water, has also been used with temporary advantage.

In addition to the hygienic measures already described, and in connection with a proper diet in phthisis, we may allow the patient carbonated waters, such as the Seltzer; and the condimental addition of vinegar and oil to simple and tasteless articles of food.

As part of the hygienic course, moderate exercise in the open air, and preferably on horseback, if it can be obtained, should be taken by the phthisical patient whenever the weather is not inclement. If adequate inducement could be offered so as agreeably to excite his attention, travel to some extent will be productive of no little benefit in incipient phthisis, provided there be no complication of pulmonary phlogosis nor much irritative fever. Change of scene, with moderate and sustained exercise, are the chief causes of the relief which is attributed so generally to change of climate when this is made. With our now better knowledge of the effects of climate and locality, and of the fact that in nearly all the regions of the earth phthisis is met with, and in warm climates to a very great extent, we can hardly promise our patients any very decided benefit in distinctly formed phthisis, certainly little or no hopes of cure, by sending them to other and distant lands for the recovery of health. That certain states

of bronchial irritation and chronic phlogosis, exceedingly harassing to the patient and by their persistence calculated to develop into destructive activity nascent tubercles, will be relieved greatly by change of air, we are not allowed to doubt; but even in such cases it is easier to state the proposition in general terms than to specify the precise conditions of atmosphere and climate which are to give it a practical value. For many pregnant suggestions on this topic, I must refer you to the two works of Sir James Clark on Climate and on Pulmonary Consumption. Good hints will be found also in the more elaborate and statistical production of Dr. Forry on the *Climate of the United States and its Endemic Influences*, to which reference has been made by me in former lectures.

The climate of East Florida has been highly lauded by many invalids, and more than one professional writer on the subject. Dr. Forry (*op. cit.*) in particular, is warm in his eulogies of a region which seems to have become in a sort endeared to him by the very hardships which, as one of the campaigners in the Indian war, he necessarily encountered. He describes the peninsula of Florida as "possessing an insular temperature not less equable and salubrious in winter than that afforded by the south of Europe." The comparison meant to be advantageous for Florida is not, however, you will have learned from the facts and tenor of my lecture on the "Causes of Consumption," over flattering in fact. If the science of statistics, or, as it is the fashion of the day to call it, "the numeral method," were applied to an investigation into the proportion of cases of, I will not say cure, but of real relief and prolongation of life, I am afraid that much of the favourable opinion now entertained in favour of the countries bordering on the Mediterranean would be dispelled. The reputation of the West India Islands for the sanative influence of their climate is very much on the same deceptive basis — maugre the praises of St. Croix and certain parts of Cuba sounded by both invalids and physicians. The southern portion of the island of Cuba, the one as yet hardly spoken of, is that, however, on which our hopes must rest for a winter residence for the consumptive.

I would not advocate the other view of the subject taken by the late Dr. Parrish, to "rough it" in nearly all weathers (*North Amer. Med. and Surg. Journ.*, vol. viii.); disregarding, at any rate, the winter's piercing cold, or Boreas's rude blast; but I believe that the strongest examples of suspension of phthisis, perhaps of cure, in its incipient stages, have been furnished by those who have been most intent on change of air and scene, by almost continual travel, — now south, then north — one year in the far east, another roaming west. Next to this extended travel will be that course better adapted to the pecuniary resources as well as the feeling of the majority of phthisical invalids. It is to travel for weeks, it may be months entire, on horseback. Even at their own homes this kind of exercise can be taken daily; and who has not seen, by a persistence in this plan, invalids apparently in the last stage of decline battle it out for many months, sometimes years, with the grim tyrant.

Notwithstanding the prejudice, for I believe the adverse opinion

amounts to this, against rooms artificially warmed, I should prefer for myself to reside in a house with equable temperature and moisture kept up during the winter and spring months, with adequate ventilation, and the privilege of sallying out for a short walk, or preferably still, a ride on horseback, whenever a genial sunshine and a southern air would allow of exit from the house. These, with the comforts of home, the prompt use of remedies for removing inflammation or any complication of the disease by one's own physician, and the solace of friends, will give the invalid advantages which neither Nice, nor Pisa, nor Rome, nor St. Augustine, nor Cuba, can procure for him.

Connected alike with prophylaxis and the cure of phthisis, is the question, renewed lately in France by discussions in the Royal Academy and in journals, as to how far the air of marshy countries affords protection from this disease; or, in the present fashion of formalising, — How far is there antagonism between consumption and intermittent fever? That there is no special novelty in the idea, must be evident to those who remember, or who have read of the sanguine hopes once entertained of the cure of the consumptive by a residence in marshy regions. I have, myself, as far back as 1825, when combating the notion of intermittent fever being caused by the imaginary agency of malaria, spoken of the contrasted localities of this fever and of phthisis. "In the same county of Lincoln, in England, the inhabitants of the fens are sufferers from intermittent fevers; those of the wolds or hills are obnoxious to catarrhs, pleurisies, and phthisis. If an exchange be made of habitation in these two cases, there will be an exchange of diseases."

The very conflicting testimony on this subject must prevent our making any immediate conclusion; or ought I not rather to say, that the adverse testimony of many physicians both in France and Italy, resident and practising in paludal regions, the inhabitants of which are continually subject to periodical fevers, and yet suffer from phthisis, is sufficient to destroy the value of the opinion of any decidedly prophylactic virtue in marsh air, and to nullify the general proposition or law that M. Boudin has attempted to establish. Cayenne, proverbially subject to periodical fevers of the worst grade, as might readily be anticipated from the nature of its soil, which is mainly alluvial, and the incumbent atmosphere, has also phthisis among its diseases. The negroes especially, as we learn from Campet (*Traité des Maladies des Pays Chauds*), fall victims in large numbers to the disease. How frequently also are we able to trace in different parts of our own country in which intermittent and remittent fevers are endemic, tubercles developed or brought into activity by the visceral diseases, congestive and inflammatory, associated with these fevers.

After all that we have hitherto learned of pulmonary tubercle and of the attempts made to modify, by either moderating or arresting its development, are we prepared to speak of *curative* treatment of the disease. It would be presumptuous to do so at present, and I shall dismiss the investigation by a summary notice of the measures and means which sanguine hopes have ventured to designate as curative

of phthisis. In doing so, I shall repeat the language used in another place (*Notes in Stokes Treatise*), and to a certain extent some of the ideas advanced in a preceding part of this lecture.

The elements of disease, as well stated by Dr. Williams (*Principles of Medicine*, p. 329,) chiefly to be kept in view in the treatment of phthisis, are: "1, *the disordered condition of the blood, and its causes; 2, the disordered distribution of the blood, and its causes; 3, the presence of the deposit, and its effects and changes.*" In our efforts to correct or remove the first of these morbid elements, small progress will be made unless adequate materials, in the shape of wholesome aliment and pure air, are supplied to regenerate healthy blood; in fact, suitable pains taken to procure for the invalid healthy digestion and improved respiration. Attention to the state of these functions with a view to hematosis, implies necessarily a careful superintendence of all the other organic functions, and especially of secretion and excretion — from the skin, kidneys, &c., and an equable warmth and active vitality of the external surface, maintained by suitable clothing, bathing, and friction. These last act hygienically in the same way as counter-irritants therapeutically.

Whatever good effects are derivable from a change of climate to the phthisical patient, depend on the aid which it gives to nutrition, including, of course, hematosis, more than any directly sanative, or, as some imagine, balsamic influence of the air on the lungs. This truth is beginning to be better understood, now that it is discovered that warm southern climates are never beneficial unless digestion and healthy nutrition are maintained; and hence, also, we can now understand the seeming paradox, that some phthisical patients are benefited by a change from a warm to a cool, even although it be a somewhat inclement, climate. The general health is often better in the latter, and the patient's chances of longer life increased, provided local hyperemia, congestions, and inflammations of the lungs be guarded against. To these the patient is more liable in cold climates; but, as it has seemed to us, he is, on the other hand, more exposed to tuberculous disease and irritation of the bowels, and consequent impediment to nutrition in warm climates. When we speak of the latter, we mean those in which not only the average temperature of the year is considerable, but also the temperature of the winter months, as in the West Indies, is relatively high. In atonic states of the system, and where the appetite is inconsiderable, digestion slow, and nutrition imperfect, I should recommend residence, even during the winter months, in northern latitudes to that in southern and warm ones, — provided that all due attention be paid to the clothing of the patient, and an uniform temperature of the air in-doors, — through a suite of apartments, if not the whole house, be kept up. Precautions of this nature will not be found incompatible with permission to exercise on foot or in a carriage, whenever the weather is not very inclement.

Of the different remedies which are believed to act on the blood and prevent new deposits, and promote the absorption of those already made, preparations of iodine have, in late years, enjoyed the most vogue. The mildest and best is the iodide of potassium, which, as a good alterative, favourable to nutrition and improving the appe-

tite, will often be found to amend the general health even, and unhappily this occurs in the largest number of cases, when it fails to remove the tuberculous deposit. It should be combined with the compound syrup and the decoction of sarsaparilla, or a simple vegetable bitter. More benefit will be derived from its moderate use when largely diluted in water and continued without interruption, than when it is given in full doses at certain intervals, as twice a day, with a risk of its offending the stomach, or producing its peculiar disorder of *iodism*.

From *à priori* reasoning, and even a due share of favourable attestations of its power in scrofulous diseases, the *iodide of iron* has been used with a view both to promote the absorption of tubercle and to prevent its farther deposit. As a useful tonic in debilitated states of the digestive system and of the body generally, this medicine may be used in many cases of phthisis with advantage; but if we believe in its possession of curative powers we shall be disappointed. M. Louis, who, in the last edition of his work on consumption, passes in review the latest recommended remedies, gives his experience of this article (the proto-iodide of iron). He employed it in upwards of sixty cases, occurring either in his hospital or private practice, and, "to his astonishment, in not a single case did he observe any amelioration which could be attributed to the new agent." Still, on the faith of M. Duparquier's positive assertions of its efficacy, M. Louis thinks that it would be worth while to make a farther trial of the medicine.

Common salt has been subjected, by M. Louis, to the same test, that of experimental trials, and has proved to be without any value. In no single case did he observe any appreciable effect produced on the state of the functions. Some patients could not go on with the chloride for more than a few days, the greater number took it for a month or upwards.

Subcarbonate of potass, rather a favourite medicine with Laennec, has been used and praised by some of his successors for its resolvent properties in tubercle; but more on the grounds of analogy than from direct evidence in its favour. M. Louis might have attached some importance, however, to a recommendation from such sources, even though he did not think it worth while to try this article on the faith of M. Pascal's praises.

Dr. Cless, of Stuttgard, lauds sal ammoniac in large doses; and M. Hirzog, of Posen, is equally confident of the powers of chloride of lime. But the truth is, as well observed by the British and Foreign Medical Review, and we introduce the remark as applicable to many physicians both in Great Britain and the United States, a great number of the Germans are in the happiest of all possible conditions for "curing phthisis" readily — in perfect ignorance of the principles of physical diagnosis they trust to the local and general symptoms for their guidance, and their acquaintance even with these is superficial and routine-like, — how often chronic bronchitis, simple chronic induration, chronic pleurisy, &c., must be confounded with phthisis under such circumstances, is sufficiently obvious.

The emetic treatment, once so highly praised and so often practised, but which fell properly enough into disuse, has been again revived with fresh laudations by Dr. Hughes. He gives a preference to the

sulphate of zinc or of ipecacuanha in doses of twelve grains, or a combination of six grains of ipecacuanha and two grains of sulphate of copper. As a general rule, the earlier the stage and the more chronic the character of the disease the greater has been the benefit derived from their operation. The emetic is to be given every second, third, or fourth day, according to the strength of the patient.

There is yet another remedy, and as the last introduced for the cure of consumption, it is, of course, better than all its predecessors. It is *Naphtha*, introduced by Dr. Hastings, and alleged by him to have succeeded in his hands in the treatment of undoubted cases of phthisis. Were we to adopt the views of this writer, we ought to regard it as a specific in this disease. The fashion in which he announces his success is itself calculated to beget suspicion, as when he tells us, that — "From the very first moment I employed naphtha in pulmonary consumption up to the present time, it has been so successful in my hands, that I have no doubt it will be found, upon careful and judicious use, to be little less than a specific in the earlier stages of the disease." This is tolerably strong; but the following places the writer in the forward rank of boasting empirics. "Single-handed, if I may be allowed to use the expression, it has cured pulmonary consumption in almost every case in which it has hitherto been used, when the disease has been treated at an early stage; and from what I have more recently observed, although I do not consider myself justified at present to publish it, I am most sanguine that even in the latter stages of the disease a restoration of health may generally be calculated upon." The dose of naphtha which works such wonders is fifteen drops, taken thrice daily in a little water! As the disease advances, the dose is increased to forty or even fifty drops four times a day. Not many years since hydrocyanic acid was announced by earnest and zealous physicians in terms of nearly equal confidence.

As might have been foreseen, by a knowledge of the pathology of phthisis, the favourable representations made by different writers of the good effects of the inhalations of various gases and vaporised substances have not been borne out by recorded experience. The cases published some years ago, by M. Cottereau, in illustration of the curative influence in phthisis of inhalations of chlorine, have been subjected to analysis by M. Louis; and the result is, that not a single one of them proves the efficacy of the pretended specific. This gentleman, notwithstanding the unfavourable issue of the scrutiny, submitted upwards of fifty phthisical subjects to the action of chlorine, and "without in a single case obtaining a successful result." We have sometimes found it give temporary relief to the patient when oppressed by the accumulation of much muco-purulent matter in the bronchia, and sometimes it seemed to aid in the temporary evacuation of a vomica; but we never found it exert a beneficial influence over the disease by retarding its course, or materially modifying its character. Of the inhalation of iodine we are inclined to think more favourably; but must confess that we have no case to which we can point as having had its course suspended by the medicine. The alleged cures performed both by iodine and chlorine inhalations were doubtless of exhausting chronic bronchitis.

LECTURE C.

DR. BELL.

GANGRENE OF THE LUNGS.—Almost always a secondary disease, and occurring in a secondary disease—Is most common in children—*Anatomical Lesions*—Appearance of the gangrenous matter—Divisions of forms of pulmonary gangrene—Appearances under these divisions—Concomitant lesions in the lungs and other organs—*Symptoms and diagnosis*—not distinct nor definite—*Prognosis*—unfavourable—*Causes* chiefly depending on deterioration of blood—*Treatment*—To correct putrescence, and keep up the tone of the system — Probable connection of morbid growth in the lungs, and of gangrene with pneumonia. — MELANOSIS or MELANOMA — Its generic character — Its divisions into *true* and *spurious* — Varieties of true melanosis — True pulmonary melanosis—Analogous to chronic pneumonia — *Spurious melanosis* — Its chief variety, the pulmonary — Analysis and origin of black matter — Its identity with carbonaceous matter — M. Andral's remarks in opposition — Black expectoration the only characteristic symptom of spurious melanosis—Treatment dependent on symptoms—Prevention by removal from breathing the impure air of coal pits, gas-works, &c.—CANCER OF THE LUNGS—Is a rare disease—Its two different forms, the encephaloid and the scirrhous—Pulmonary encephaloid generally associated with encephaloid in other parts—Scirrhous variety more circumscribed—*Diagnosis*—Dr. Stokes's summary of—DISEASES OF BRONCHIAL GLANDS—Scrofulous affections of—Tuberculosis of—Different forms of—Effect of compression by enlarged bronchial glands in other parts—the vessels, trachea, and bronchia, the lungs, nerves, œsophagus — Communication between the bronchia, glands, and the lungs—Union of glandular and pulmonary tubercles—*Symptoms*—chiefly from compression—Dropsy—Hemorrhage—alteration of the voice—*Diagnosis*—*Prognosis*—*Causes*—Age an influential one—*Treatment*—Iodine a leading article—Palliatives by narcotics.

THERE yet remains some diseases affecting the lungs to be described in completion of the entire circle of those of the respiratory apparatus. These are gangrene, melanosis, and cancer; which, although of rare occurrence, merit a brief notice at this time.

GANGRENE OF THE LUNGS.—This is almost always a secondary disease, and in a majority of cases is coexistent with gangrene of other organs, evincing what may be termed a gangrenous diathesis. It occurs much oftener in children than in adults, being consecutive, in the former, on the exanthemata.

Anatomical Lesions.—Pulmonary gangrene presents itself in two different forms, the *nucleated* or *circumscribed*, and the *diffuse*, to which M. Boudet, who has written a valuable memoir on the subject (*Archiv. Gén.*, 1843), adds a third, the laminated. The pulmonary tissue when gangrenous is softened by conversion into a pulpy *detritus* of various colours, from a yellowish or greenish-gray to a deep green or slate colour; it exhales a characteristic odour, most fetid and insupportable. There is no longer any trace of pulmonary vesicles, bronchia, vessels, or even of cellular tissue; but a mere putrescent mass, removable with the least effort. At first adherent to the adjacent tissue of the lungs, it is gradually detached from this latter, leaving an excavation in it of variable form and size, and filled either with a gangrenous core or an almost liquid detritus. The sides of this cavity are soft and tufted, and formed of gangrenous or sometimes hepatised pulmonary tissue, interspersed with putrid shreds, sometimes, but yet seldom, there is a white or yellow membrane lining

the cavity, of a thick but friable and soft nature; on occasions, it is traversed by strips of different sizes, composed of the remains of pulmonary tissue affected with gangrene, or of vessels.

Pulmonary gangrene exhibits itself under two aspects, corresponding to two different stages—1st. The gangrenous tissue. 2d. The gangrenous excavation or cavity. The parts surrounding and contiguous to the mortified tissue are of diversified appearance; sometimes exhibiting a sanguineo-serous congestion, of a violet or slate and livid colour; and at other times gorged with black blood, and as it were apoplectic. More generally it is hepatised or carnified, and bear marks of a phlegmasia surrounding the gangrenous part. It is very obvious, after a view of the latter lesions, that if the subject had survived a few days longer, this hepatised tissue would have been struck with gangrene.

I have already mentioned the chief forms under which gangrene of the lungs is met with. The appearances under these divisions are numerous and diversified; in there being sometimes only some greenish striæ, formed by a liquid of a gangrenous odour, and situated in the centre of a portion of lung affected with lobular pneumonia, but without communicating with the bronchia; while, again, in other subjects, we meet with a number of portions of lung apoplectic or changed by lobular pneumonia, of a deep red and almost black colour; in the centre of which are seen small excavations containing a sanious liquid of a reddish-brown colour, or else a dark detritus of a gangrenous odour. Many of these abscesses communicate with the bronchia, which latter are of a livid hue, but are not mortified. These gangrenous abscesses are disseminated, in different degrees of advancement, through a lobe or a lung, or even both lungs, showing that they were a part of several successive gangrenous changes.

We also meet with true gangrenous excavations or cavities, sometimes single, sometimes numerous, varying in form and capacity, and surrounded with hepatised lung in the manner before described. In other cases, again, the gangrene reaches the walls of a tuberculous excavation, and even involves them in destruction. In yet another variety, the gangrenous cavity is as near the pleura through which a perforation is made, and a communication established with the pleural cavity.

MM. Rilliet and Barthez, to whom I am indebted for the preceding description of the morbid anatomy of pulmonary gangrene in children, enumerate concomitant lesions in the lungs, and, also, other organs, viz., 1, in the diseased lung or in that of the opposite side, lobular pneumonia or a *splenisation* to a greater or less extent; 2, when there is pleuritic effusion the gangrene coincides with the carnification; 3, œdema surrounding the gangrene and sometimes general, with or without pneumonia; 4, the bronchia were almost always in a morbid state, either around the gangrene or at a distance; sometimes inflamed, sometimes dilated; 5, the bronchial glands are often altered; 6, in nine of sixteen cases, a lesion of the digestive tube, inflammation or softening; 7, conjoint gangrene of other organs, in the proportion of ten out of eighteen cases. M. Boudet gives the number of cases of gangrene in adults as fifteen, of which eleven exhibited itself both in

the lungs and in other organs; whilst of five cases in children, four had pulmonary in addition to other gangrene. The existence of gangrenous with tuberculous lung has been noted, but they have no positive relations either of affinity or antagonism to each other.

Symptoms and Diagnosis. — The symptoms are far from being very distinct, and the diagnosis is not easily made out in pulmonary gangrene. Cough and dyspnœa are sometimes slight, or even entirely wanting. Hemoptysis, so rare a disease in children, is quite common when they are affected with gangrene of the lung. Fetor of the breath, so characteristic a symptom in the adult, is often wanting in the child; or if there be accompanying gangrene of the mouth, its fetor will mask that of the breath. The expectorated matter is often very fetid, exhaling an intolerable stench. There is, also, a thoracic gurgling which is a valuable sign in a subject who never had tubercles. The pulse is generally very weak; there is great prostration, and a peculiar expression of the face, which is of a dark violet hue. M. Boudet speaks of dulness of the chest on percussion, resonance of the voice, mucous rhonchus, and greenish sputa, among the diagnostic signs.

The *prognosis* in pulmonary gangrene, as you will have readily inferred from the antecedent description, is very unfavourable.

Causes. — In inquiring into the causes of pulmonary gangrene, we must bear in mind the fact that it is never idiopathic, never seizes on a person, child, or adult, who is in full health, and that its antecedent even, pneumonia, is secondary in the subjects attacked with gangrene. Its occurrence after pneumonia or during pneumonia does not prove this latter to be the cause, and we are therefore obliged to look for more extended and general influences. Certain diseases, which powerfully impress and derange the whole economy, such as the exanthemata and typhoid fever, predispose to gangrene of the lungs. If we go back a little farther in the theory of causation of the gangrenous diathesis, we must seek for it in the blood itself, which, as we learn from the observations of MM. Andral and Gavarret, loses some of its fibrin in the exanthemata and acquires a more alkaline and dissolved state, with also a tendency to scorbutic disorders. Just such a change occurs in the cases recorded by M. Boudet, who informs us that he never found after death, in any case of children, such diffluent, serous, and non-coagulable blood as in the subjects who fell victims to an exanthemata, a spontaneous gangrene, or a malignant typhoid fever; and of these diseases, measles or scarlatina complicated with gangrene furnished him most frequently with these peculiarities of the blood. A poisoning similar to that in the exanthemata is sometimes brought about by the excessive and prolonged use of ardent spirits. In all the cases seen by Dr. Stokes, the patients had been long addicted to these drinks. This gentleman supposes, but without suggesting in what it consists, that a septic poison is introduced into the system, and gives rise to gangrene of the lungs.

Treatment. — Giving colour of probability to the hypothesis of cause advanced by Dr. Stokes, is the only kind of remedies, viz., those calculated to check putrescence, which he has seen to be of any service. He advises the use of chlorine, exhibited either in the form of chloride of lime or soda with opium; and the strength of the patient to be sustained by wine and nourishing food.

In discussing the *treatment* of pulmonary gangrene, M. Boudet attaches small value to the remedies used under the idea that it is the result either of inflammation or of debility. Regarding it as dependent on a deterioration or depravation of the blood, he thinks the *ratio medendi* ought to be shaped in accordance with this view; and hence the recommendation, first of suitable prophylaxis, such as keeping children out of the way of the contagion of exanthemata, and subjecting them early to vaccination, by which these diseases, if they do make their attack, are, he thinks, rendered of a less virulent character. If measles or scarlatina should, however, unhappily appear, then we are required to watch with the greatest care the progress of the disease; and as soon as we see any serious general symptoms,—hemorrhage, or purple spots, for example, or any precursor of gangrene of the gums, a disease which frequently precedes or accompanies pulmonary gangrene, and which is developed under the operation of the same causes as this latter disease, M. Boudet advises that we should then put the patient on the use of citric or sulphuric lemonade, at the same time that we direct the use of acid and antiseptic gargles, and friction of the limbs with an acid and aromatic liquor. He refers to his having, in common with a great many others, seen scorbutic subjects, reduced to the last degree of weakness and cachexia, emaciated, ecchymosed, and without appetite, who were rapidly cured under the operation of acids, employed both externally and internally. By the use of similar means in the case of children, we might, M. Boudet believes, probably succeed in saturating the excess of alkali in the blood, by which latter cause this fluid loses in a great measure its property of coagulating; and at the same time, by the use of analeptics, we might combat efficaciously its tendency to lose fibrin.

Conformably with this view, although M. Boudet does not allude to the remedy, we might advantageously give, in small but repeated doses at short intervals, the tincture of chloride of iron, or the etherial tincture of iron and the citrate of quinia and iron; whilst following out the other parts of the treatment recommended by Dr. Stokes.

In a natural arrangement, the malignant products or formations, in the lungs, of melanosis and cancer or encephaloid growth, ought either to precede or follow tubercle; and that which separates them in my course, gangrene, ought, if it have any organic affinity, to come after pneumonia. As it is, however, your attention will be, I hope, but little distracted by the separation.

Melanosis, or Melanoma as it is called by Dr. Carswell, is divided into the true and the false or spurious. Melanosis in its generic character is described to be a morbid product, presenting a black colour of various degrees of intensity, somewhat humid and opaque, and possessing the consistence and homogeneous aspect of the tissue of the bronchial glands of the adult. The most frequent seat of true melanosis is the serous tissue, more especially where this tissue constitutes the cellular element of organs. Here the melanotic matter is formed after the manner of secretion, accumulates in the cells of

which the serous tissue is composed, and gradually acquires the form of tumours of various sizes. A similar mode of formation of this matter is observed to take place much more conspicuously in loose cellular tissue, and particularly in large serous surfaces, such as those of the pleuræ and peritoneum. The next variety observed in the seat and mode of formation of melanotic matter is that in which it is deposited in the substance or molecular structure of organs after the manner of nutrition. And, lastly, the melanotic matter found in the blood, contained chiefly in the various capillaries, and under circumstances which show that it must have been formed in these vessels. —(Carswell — *Illustrations of the Elementary Forms of Disease.*)

True melanosis is often met with in the lungs of old persons, either in the interlobular tissue or on the sides of the vesicles; and at a less advanced period of formation it may be seen in a liquid form, infiltrating the pulmonary parenchyma both in its healthy and morbid states. It is sometimes in isolated masses or encysted. This last constitutes the tuberiform variety of melanosis, which includes both the masses and cysts. M. Andral regards it as a form of chronic pneumonia.

Melanotic matter, as seen in the lungs, may also be found at the same time in the liver, spleen, brain, &c. Sometimes melanosis is confounded with the dark matter of the bronchial glands. These latter, it should be remembered, are small, contiguous to the bronchia, with smooth surfaces, and whose interior is seldom of any uniform blackness, nor is the liquid oozing out of a pitchy character. It scarcely colours the finger rubbed against it; and in this respect differs from the colour of Indian ink which melanotic matter leaves on the skin to which it is applied.

Spurious melanosis, however, most interests us at this time, and particularly that variety caused by the introduction and deposit of carbonaceous matter, which is only met with in the lungs. Both lungs present one uniform, black, carbonaceous colour, affecting nearly all the tissues of these organs. The bronchial glands partake also of the same black colour. The pulmonary tissue is more or less indurated and friable, infiltrated with black serosity, and broken down in several parts into irregular excavations, sometimes of considerable size.

Analysis of the black matter taken from a patient who died of this kind of melanosis, exhibited the ordinary products of the distillation of coal. The physical characters of this form of spurious melanosis: viz., the uniform black colour of both lungs, the absence of any similar discoloration of any other organ; the occurrence of the disease in those habitually exposed to the inhalations of the coal-dust always contained in the atmosphere of a mine; and the black matter found in the lungs consisting essentially of this substance, are, Dr. Carswell observes, circumstances which demonstrate clearly the origin of the black matter, and its identity with the carbonaceous powder inhaled with the air in breathing.

M. Andral, on the other hand, who does not draw the distinction between two kinds of melanosis of the lung, adverts to the opinion of its originating from carbonaceous matter introduced into the bronchia by inhalation, and thence into the lungs; but adds that this disease has been met with in all conditions of persons and modes of life, in

the country as well as in town, in the houses of the latter as in those of the former. These remarks must apply to true melanosis. M. Dupuy has observed that it is most frequent in white horses.

There are scarcely any characteristic symptoms of spurious pulmonary melanosis, if we except black or quite dark expectoration. The treatment will be regulated by the symptoms, but will be of little avail unless the patient be removed from the continued operation of the cause which gave rise to and keeps up the disease, and made to breathe a purer air.

Cancer of the Lungs. — This is a rare disease, for the first good description of which we are indebted to Bayle, who calls it *cancerous phthisis*. Of two hundred subjects examined, it has been found but in four of them.

This disease presents itself under two different forms. In the first we find in the pulmonary substance one or more cancerous masses, of variable volume and form, sometimes included in a cyst, sometimes wanting this envelope and deposited in the parenchyma of the organ. Adjacent to these cancerous masses, which can be readily removed, the contiguous pulmonary tissue may be entire.

We seldom see these cancerous productions, which are commonly formed of encephaloid matter, developed in the lungs, except they be met with in other parts of the body.

2. In the second form of pulmonary cancer, a portion of lung is transformed, to a greater or less extent, into cancerous matter of a scirrhous kind. This transformation may occur in one only of the lobes of a lung, or it may include the whole lung.

Pulmonary cancer, of whatever form it may be, is very rarely found in the lungs, and not, at the same time, in some other organ. Bayle only cites a single case in which this coincidence did not exist; but even in this case there was suppurative tumour of the neck, which is badly described. M. Andral, while referring to two cases by M. Bouillaud, of restriction of the disease to the lungs, tells us that he has never seen pulmonary cancer without analogous disease in other parts of the body. It is found coincident with cancer of the liver, uterus, or brain, among the internal organs, and in the nose, mammæ, or tubercle, among external parts.

The symptoms and signs constituting the *diagnosis* of pulmonary cancer are set forth with more fulness by Dr. Stokes than by any other writer with whom I am acquainted, and I shall terminate the present notice of this disease by repeating his conclusions, viz.: —

I. That the facility of diagnosis mainly depends on the anatomical disposition of the disease.

II. That we may divide the cases with a view to diagnosis into those in which isolated tubercles exist, with the intervening tissues healthy; those in which simple degeneration occurs without ulceration and with ulceration; and those in which a tumour of the mediastinum exists, causing compression.

III. That the diagnosis in the first case is difficult, from our being seldom able to avail ourselves of the signs of irritation and ulceration, so important in ordinary tubercles, and the fact of the equable distribution of the disease preventing comparison.

IV. That in some cases of isolated cancerous masses, the diagnosis may be founded on the same general principles as that of acute phthisis.

V. That in simple cancerous degenerations of the lung, the principal physical signs are the gradual diminution of the vesicular murmur, without *râle;* its ultimate extinction; and the signs of perfect solidification.

VI. That the evidences of perfect solidification are better found in this disease than in any other pulmonary affection.

VII. That this form of the disease may exist, simply, or in combination with empyema, and may be secondary to cancerous tumours of the mediastinum.

VIII. That the sides may be symmetrical in this affection, and that either dilatation or contraction of the sides may occur.

IX. That the mediastinum may be displaced, even though the side be contracted.

X. That under these circumstances we may have the signs of perfect solidification, accompanied by imperfect pectoriloquism, and increased vibration to the hand.

XI. That the mediastinum may be displaced and the liver depressed without protrusion of the intercostal spaces.

XII. That the heart may be compressed and dislocated in this form of disease. — *Hughes, Syms, Houston.*

XIII. That the flattening of the upper part of the chest may occur from degeneration of the upper lobe. — *Hughes.*

XIV. That the absence of signs of ulceration is very characteristic of this disease.

XV. That we have observed these signs but in a single case, and that the phenomena, though they might be produced by other diseases causing the same physical conditions of the lung, have never before been met with.

That cancerous tumours of the mediastinum generally co-exist, with either degeneration of the lung, or isolated tubercles in its substance.

That they may be solid or fluid.

That they may co-exist with cancerous infiltration of the lung, or the deposit of cancer in the bronchial tubes.

That they are to be recognized more by the signs of the tumour, then by those of disease of the lung.

That dysphagia, tracheal stridor, feebleness of one pulse, difference of respiratory murmur, from pressure on the bronchial tube, displacement of the diaphragm, and dilatation of the heart, may occur in this form of the disease.

That a cancerous tumour may exhibit pulsation with or without bellows murmur, but that pulsation is not always attendant on it.

That though the previous existence of external cancer may assist in diagnosis, yet that the disease may be all through internal, or the visceral precede the external cancer.

That the feebleness of pulsation connected with the extent of dulness may assist in distinguishing the disease from aneurism.

That in the advanced period, as in aneurism, gangrene of a portion of the lung may supervene.*

That the following symptoms are important as indicative of this disease: pain of a continued kind; a varicose state of the veins in the neck, thorax, and abdomen; œdema of one extremity; rapid formation of external tumours of a cancerous character; expectoration similar in appearance to currant-jelly; resistance of symptoms to ordinary treatment.

That though none of the physical signs of this disease are, separately considered, peculiar to it, yet *that their combinations and modes of succession* are not seen in any other affection of the lung.

Examples of cancer of the larynx are rare. M. Louis relates one case; M. Trousseau another. Albers of Bonn records two examples of primary encephaloid of the larynx.

Diseases of the Bronchial Glands.—Contiguous as they are to the bronchia, these glands in a morbid state give rise to various disorders depending more on their position than on any functional sympathies. Until of late years the diseases of the bronchial glands have not attracted much attention, owing, in a great measure, to their prevailing chiefly in early life and during a period in which minute pathological anatomy was not studied for the illustration of symptomatology and treatment. Even now we must look to the writings of French physicians for the chief and most carefully made observations on the subject; and of these, in a more especial manner, to the elaborate work of MM. Barthez and Rilliet, so often referred to and quoted by me in these lectures.

I. The chief form of disease of the bronchial glands is tuberculosis, which, both in itself and associated with tubercle of the bronchia, merits careful study. Of all the varieties of tuberculous matter infiltration is the most common in these bodies, although we meet with gray and yellow granulations, and the miliary tubercle also.

Commonly the central part of the gland is the first affected, and the tuberculisation extends thence gradually to the circumference; at other times, the tuberculous matter is irregularly distributed in different parts of the gland. We may find even gray granulations in the centre of the organ, whilst the periphery is already converted into tubercle; at a later period the entire gland is affected in its tissue; and it may acquire the size of a filbert, an almond, or even of a chesnut. We are not to suppose, however, that all the glands in the same subject undergo the same enlargement. In some cases there are only five or six tuberculous glands surrounding the bronchia of one of the lungs; but in other cases they are much more numerous, run into each other, and form large masses, equal, in some instances, in volume to a hen's egg, or even to a large apple. Such enlarge-

* Dr. Stokes adds, in a note: My friend Mr. Mac Donnell has shown, that from the anatomical disposition of the nutritive arteries of the lung, pressure upon any part of the main bronchus might cause the death of the lung. Of course, the liability in this is greater in the case of mediastinal tumours than in the simple degeneration. Dr. Greene has met with this gangrene, from the same physical causes, in aneurism. See the Transactions of the Pathological Society.

ments are only acquired, however, by the glands external to the lungs. The internal ones, on the other hand, seldom exceed the size of a small hazel-nut, or of a small almond. We can trace them deep into the lungs on a level with the third and even fourth divisions of the bronchia. Most commonly they adhere to the air-passages in the direction of the length of these latter; while, at other times, they form a kind of arch, surrounding in part the bronchium, the concavity of which is turned towards this latter and the convexity towards the lungs.

These glands are enclosed in a cyst with very thin walls, to which tuberculous matter closely adheres. On removing this latter we often see on the internal surface of the cyst a very delicate vascular arborisation; but in recent tuberculosis this structure is not perceptible. The tubercles which they contain undergo, at different intervals of time, a softening analogous to that which is observed in the tubercles of other organs; and which begins sometimes in the centre, sometimes in the circumference of the gland; and on occasions may be going on simultaneously in both these directions. Abscess may sometimes simulate tubercle of the glands; but the difference is easily detected by a careful inspection of the fluid, which is homogeneous in the former, but grumous and exhibiting the remains of tuberculous matter in the latter. Suppuration of the bronchial glands is, however, a rare disease.

Once softened, the tuberculous matter generally finds exit by a communication established between the cyst and the adjoining organs, although in a few cases there is reason to believe that it is absorbed, but still incompletely.

II. The next branch of inquiry connected with tuberculosis of the bronchial glands is the *pressure* which they exert on adjoining parts. To be able to appreciate properly the symptoms from this cause, we ought to be aware of the two kinds of bronchial glands and their respective distributions. One of these is external to, the other in the lungs. The latter are quite numerous and accompany the ramifications of the vessels and the air-tubes; increasing in size as we trace them from the minute bronchia and vascular branches to the roots of the lungs and the great vessels. Among the glands external to the lungs, anatomists distinguish, situated on the sides of the trachea and in the space between its bifurcation, the tracheal, the bronchial, the cardiac at the base of the heart and in connection with the great vessels, and the œsophageal situated in the posterior mediastinum and the vicinity of the œsophagus. These limits may be passed in disease, so that the cardiac glands fill the whole anterior mediastinum and extend from the base of the heart to the sternum, and even sometimes encroach on the space occupied by the lung. The tracheal and the bronchial divisions in their hypertrophied state sometimes form a complete envelope to the tubes from which they derive their name and which they entirely surround, in place of their being simply in contact with the sides.

It is easy to foresee, after this view of the situation of the glands, that by their enlargements they would compress important organs, and give origin to a great variety of symptoms, generally, it is true

of a physiological nature, as their occurrence is not maintained by any decided anatomical lesion. I shall enumerate the chief organs thus liable to compression and consequent derangement of function.

The Great Vessels. — The superior vena cava, the aorta, the pulmonary artery and vein, and the vena azygos, may be thus compressed; and have their circulatory office much disturbed. Among the secondary lesions produced in this way are hemorrhages and dropsy; the former of which has taken place in the arachnoid cavity and the latter manifested by œdema of the face. Compression of the pulmonary vessels gives rise to pulmonary œdema, and indirectly it may cause dangerous hemoptysis. May we not attribute to this cause some of those alarming and obstinate hemoptysis in young scrofulous subjects, in whom from early life the bronchial glands had acquired an unusual volume and been partially tuberculised.

The Trachea and the Bronchia. — These organs are not so often unduly compressed as the great vessels; although instances are related of the almost entire obliteration of the bronchial tubes by this cause.

The *Lungs*, from the number of bronchial glands distributed through them, are liable to suffer from pressure by the enlargement of these latter, which sometimes assume the appearance of pulmonary tubercles and thrust as it were the lungs aside.

The *Nerves*, particularly the pneumogastric and their divisions, are often compressed. Reference has been made in my lecture on *croup* to the hypothesis of Dr. Ley, that compression of these nerves by enlarged cervical and bronchial glands give rise to this disease, or at least to some of its dominant symptoms.

The *Œsophagus* has been compressed, but without our having learned the accompanying disorder, if any, that was manifested.

In farther prosecution of the subject of the effects of changes by the bronchial glands on adjoining parts, we have to note the communications between the glandular cyst and the thoracic organs. The chief example of this morbid connection is in the bronchia, which, unable to yield much to the pressure of enlarged glands, form adhesions to these latter, at first by loose cellular tissue which afterwards becomes so dense that it is impossible to detach the gland without bringing away a portion of the bronchium itself. This intimate union is but the prelude to farther changes, which end in a softening of the tuberculous gland and a communication between it and the bronchium through a perforation in the cyst and the sides of the latter. At times, the accumulation of tuberculous glands is so great around the bronchia as to form a tuberculous investment of some degree of thickness.

The appearances of the perforations in the bronchia vary; sometimes they are well defined and without any traces of inflammation. At other times they are deeply injected on both sides, and the borders of the opening are irregular. The cystic investment of the gland, after having been emptied of its tuberculous matter, through the opening into the bronchia, shows in its interior a false membrane, which is not, as some have alleged, analogous in general appearance and colour to the bronchial mucous membrane, although it must be acknowledged that it is not readily distinguishable from this latter at the line of junction. There may

sometimes be seen, intermediate between the tuberculous gland and the bronchium, portions of pulmonary tissue traversed by cavities, the sides of which are formed by the parenchyma; the cavities themselves being a medium of communication between the bronchium and the gland. But when the bronchial gland is deep in the parenchyma of the lungs, and communicates with the bronchium or causes an ulceration of adjoining tissues, it is very difficult to determine the nature of the case; and it has doubtless happened that those tuberculous cysts situated deep in the interior of the organ have been described as true pulmonary cavities.

Perforation of the vessels is a rare occurrence, — and the same may be said of that of the *œsophagus*.

An union of glandular and pulmonary tubercles may take place — at first when they are in a state of crudity, and afterwards of softening. A similar junction is formed between the primitive bronchial tuberculosis and that in the bronchial glands. The coexistence of tuberculosis of the bronchial glands and of tuberculous meningitis has been noticed.

Symptoms. — It is not easy to give the symptoms of a disease which is seldom met with alone, or uncomplicated with other lesions, before the primary ones or those of the bronchial glands have attracted attention. MM. Rilliet and Barthez, after an investigation of this branch of the subject, recapitulate as follows: Compression by the vena cava may cause œdema of the face, dilatation of the veins of the neck, violet colour of the face, hemorrhage into the arachnoid cavity. Compression of the pulmonary vessels may give rise to hemoptysis and pulmonary œdema.

When the glands compress the pneumogastric nerves, there may supervene, alteration in the tone of the voice, kinks, like those in hooping-cough, and paroxysms of asthma, which are so unusual in a child. The action of the glands on the lungs and bronchia is still more remarkable. By compressing the air-tubes, the glands give origin to the production of intense, persistent, and sonorous rhonchi, of a peculiar quality. They also prevent the free circulation of air in the lungs, and thence results obstruction of the respiratory murmur. This phenomenon may also depend on œdema caused by compression of the pulmonary organs.

But the glands may act not only on the bronchia by pressure, but, likewise, as conductors of sonorous impressions. Hence we have the following phenomena: 1. The lung being quite healthy or nearly so, various alterations in the respiratory sound may be heard in different parts of the chest, such as prolonged expiration, bronchial respiration, and all the sounds which in their normal state are formed in the bronchia and are not transmitted to the ear. 2. These symptoms are still more evident if there exists any pulmonary lesions, the stethoscopic indication of which, in common of little intensity, may seem to be exaggerated by the presence of the enlarged glands. 3. The stethoscopic sounds furnished by the lesion of one lung may be transmitted to the opposite side and produce the impression that a double lesion exists. 4. The bronchial glands resting on the vertebral column of one side, whilst they surround the

bronchia on the other, transmit directly to the ear the sounds both normal and abnormal, which are evolved in a part of the lung remote from the thoracic cavity, and thus seem to be exaggerated. 5. These stethoscopic phenomena are especially perceived at the apex of the lungs behind and more seldom in front.

All these symptoms which result from the pressure of enlarged and hardened glands on the vessels, nerves, bronchia, and lungs, are not always met with in conjunction, and when they do they may come and go, often in a curious and incomprehensible manner.

Diagnosis. — This, as may have been inferred from an enumeration of the symptoms, is not an easy matter. It must be made from a careful sifting and analysis of the symptoms and an observation of their intermittence. It will be proper, after an investigation of the direct symptoms, to examine the lymphatic glands as far as they are visible; and especially those of the neck, which seem to form beaded lines, passing behind the clavicle and continued down into the thorax, blending with the bronchial glands proper.

Tuberculosis of the thoracic glands, including the bronchial proper as well as others in the chest, may be confounded with hooping-cough, phthisis, and tumours developed in the mediastinum.

Prognosis. — If the tuberculated bronchial glands were the only disease, we might indulge in a rather favourable augury. Neither so extensive in their morbid changes nor exciting secondary inflammations as pulmonary tubercles do, still we find the tuberculous glands associated with, as precursor or cause, accidents of an alarming nature, such as hemorrhage, perforation of the lungs and œsophagus, pressure on the vessels, nerves, and bronchia.

Causes. — Inflammation of the bronchial glands is not an adequate explanation of the causes of their tuberculosis; nor is bronchitis or pneumonia more satisfactory.

Age.—This disease is peculiarly one of early life, and in persons of this period it is more frequent than pulmonary tuberculosis. Under puberty there are two periods in which glandular tuberculosis is most rife: first in very young children; and next in those, from six to fifteen years old. As respects *sex*, it has been observed, that girls under three years of age are less liable to the disease than boys of the same age; but that between eleven and fifteen years the susceptibility is equal. Among the most efficient predisposing causes should be enumerated the scrofulous diathesis; swelling and ulceration of the lymphatic glands of the neck and other parts precedes and accompany tubercle of the bronchial glands. The late Dr. Parrish, of this city, used to dwell very emphatically on the connection between scrofula and tubercle, but without specifying the variety of this latter.

Treatment. — The same difficulties that embarrass us in the diagnosis are felt in the treatment of tuberculosis of the bronchial glands. When in an advanced stage we can have but little hopes of any thoroughly curative course; but we may from analogy, after an observation of the effects of remedies on scrofulous lymphatic glands which are visible, infer the activity of suitable treatment in the disease before us. This, as in the case of pulmonary tubercle, is divided into the curative and the palliative treatment.

The primary indication is, to bring to bear as determinately as possible a wisely devised prophylaxis, which will be similar in all its leading features to that of phthisis or pulmonary tubercle. We can not recognise, however, as part of prophylaxis, sanguineous and other depletion, under a belief that there is inflammation requiring removal by these means. Dr. Ley's opinion, that diseases of the scalp in children often give rise to irritation and enlargement of the cervical glands, which are continued down to the bronchial, and his advice to remove these diseases, merit attention. But when this is attempted it must be with extreme caution, and by means of combined hygienic and therapeutical measures, which happily do not conflict with the preventive, nor subsequently curative treatment of the diseased bronchial glands, if this be still necessary.

For the removal of tuberculosis, and a change in the glandular deposit to prevent its formation, we must encourage as much as possible the absorbent function. With this view we rely most on iodine and its preparations, used externally in the form of ointment, or even tincture, and internally in the form of solution of the iodide of potassium, or of the iodureted iodide (Lugol's solution), and in cases of greater debility the iodide of iron. The best ointment for prolonged use is that of the simple iodide of potassium (hydriodate of potassa); or its combination with some narcotic extract, as of stramonium or of belladonna. This is to be carefully rubbed along the line of glands in the neck or both sides down to the clavicle, and in a line with this bone, both above and below it, thence extending over the sternum, and also in the space between the scapula.

Alternating or indeed combined with the iodide, we may prescribe advantageously some largely diluted, simple saline, such as the sulphate of magnesia, and chloride of sodium, to be taken by the patient daily and continued for a length of time. Bitters and other tonics may be used conjointly with the iodine treatment.

The palliative treatment will be carried out by the exhibition of remedies adapted to allay particular symptoms. The cough is best relieved by extract of cicuta and lactucarium; and these failing, we have recourse to the other narcotics. Among the articles possessing both tonic and anodyne properties is the wild cherry-tree bark, — a syrup of which is now prepared by our apothecaries, both pleasant and efficacious. Asthmatic attacks are to be relieved in a similar manner. The extract or tincture of belladonna I have found to be most serviceable for this purpose. Plasters of assafœtida or other fetid gums and liniments rubbed on the chest, are useful auxiliaries to a more active treatment, and correspond with the indications at this time.

But while recommending an alterative and tonic course we must not persist in remedies of this latter class when there is much fever. Under such circumstances we try soothing remedies and light vegetables and milk diluted, for food. The preparations of iodine should be suspended at this time, and some of the milder ones of iron substituted for them.

DISEASES OF THE HEART.

LECTURE CI.

DR. BELL.

DISEASES OF THE HEART.—Position and structure of the heart—its valvular mechanism—Beat or impulse of the heart; when felt—Percussion—Various tones according to the part of the sternum struck—Auscultation—Two sounds of the heart; the first caused by the systole of its ventricles; the second by the resistance and sudden tightening of the semilunar valves—Different organic affections of the heart—Functional disorders—*Simple carditis*, a rare disease—Sequences of—Softening—varieties and causes of—Diagnosis not easy—Treatment, similar to that of pericarditis—Perforative ulceration and rupture—Recorded cases of and complications with.—*Aneurism, ventricular*—Thurman's summary of—Its precise seat and complications.—*Aneurism* of the auricles.

I CANNOT offer you more than an outline of the subject of the morbid states and the disorders of the heart; and even from attempting this, within the limits of two or three lectures, I feel almost deterred, when I look over the works of Laennec, Bouillaud and Hope, the lectures by Dr. C. J. B. Williams, and the elaborate articles in the different Medical Dictionaries, both French and English, as well as the contribution of Dr. Joy in the Library of Practical Medicine, now before me. But a comparatively short period has elapsed since Corvisart, the favourite physician of Napoleon, was the only, as he was the earliest authority, entitled to any consideration on the diseases of the heart. After him came Bertin in France, and Testa in Italy, connecting him with those who in our own day have done so much to make the pathology of the heart a part of demonstrative science.

For correct diagnosis of the diseases of the heart, we must be familiar first with its *position* in the chest, in health, and then its healthy structure. The heart is placed in the anterior mediastinum, rather to the left of the mesial bone, and so oblique that the apex points forwards and downwards to the left, while the base lies back nearer the posterior centre, the spine. It, therefore, lies with its point forwards on the diaphragm, underneath which are the liver and stomach; and it is bounded on other sides by the lung, except a small space of about two inches, where, enveloped in its coverings, it is in contact with the walls of the chest. Its base is directed upwards, backwards, and to the right side, looking towards the fifth, sixth, and seventh dorsal vertebræ, the œsophagus and descending aorta intervening; and its point consequently downwards, forwards and to the left, answering in the erect posture, and in a medium state of distension, and the heart in the act of systole, to the fifth intercostal space, that is, in a middle-aged individual, to a point about two inches below, and one to the inside of the nipple; or two and a half from the base of the xiphoid cartilage. About one-third of the heart, consisting principally of the right auricle and

the upper and right side of the base of the corresponding ventricle, lies behind the sternum. The orifice of the pulmonary artery and its valves, and consequently those of the aorta likewise, which lie posteriorly, but nearly in the same line, are placed immediately behind the upper edge of the sterno-costal articulation of the left side. A moderately-sized stethoscope, applied over the origin of the pulmonary artery, will cover also the aortic orifice and its valves, as well as a very considerable portion, nearly half of each of the auriculo-ventricular openings. The position of the heart is affected in a sensible degree by gravitation, and consequently by posture.

In *structure* the heart is known to you to be a compound hollow muscular organ, consisting of four compartments or cavities lined with serous membrane and invested by a fibrous capsule, external to which is a serous membrane, that forms by reduplication the pericardium or heart-sac. The lining membrane of the heart has been named by Mr. Bouillaud *endocardium* (from ἔνδον, within, and καρδία, heart.) It is transparent and delicate, smooth and highly polished. It is more delicate and fine in the right cavities than in the left, and is least so about the orifice. The contraction of the heart and the direction in which it chiefly contracts will be understood after knowing the origin and insertion of its fibres. The greater number of these, or fleshy bundles, arise from and are inserted into the strong fibrous rings which form the auriculo-ventricular openings, or into tendinous prolongations from them. The contraction of all these muscular fibres is towards the auricular and arterial orifices, which are the most fixed parts of the organ, and the effect of the contraction must be to press the contents of the cavities towards these openings. Attached by the vessels at its base, and with its apex free, it is drawn together towards these vessels at each contraction; and the anterior surface being more convex, from the fibres being much longer than those behind, their contraction is greater, and the apex is, also, drawn forwards as well as upwards.

The valvular mechanism of the heart, so important for the discharge of the function of this organ, must be understood in order that we may appreciate the nature of its deranged and irregular contractions. The office of the semilunar valves is obvious enough, from their mere mechanical structure — attached by the whole of their convex ventricular margins, they fall loose and unresisting against the sides of the arteries at each gush from the ventricles; but no sooner does the gush cease, and the distended arterial column press backwards, than their loose arterial margins are caught by the first turn of the refluent current, and they are distended into three sacs, the free sides of which being in close contact completely intercept the passage of blood back into the ventricles. This action is merely mechanical, and can be produced in the dead body; it will be more perfect in proportion as the backward pressure from the arteries is greater. The auriculo-ventricular valves (the tricuspid and mitral) on the other hand, will not act well after death: their office depends on the vital contraction of the fleshy columns, to which their cords are attached, as well as on the mechanical spread of

their laminæ. On the right side we see the irregular triangular curtains of the tricuspid valve, which are drawn in succession, one somewhat behind its neighbour. When the right ventricle is much distended, these curtains do not entirely reach across the orifice; and regurgitation takes place. This seems to be a provision against an excess of pressure on the pulmonary vessels, and induced Mr. Adams of Dublin first to call this valve a safety-valve.

The heart in action, though not felt by the person himself, in health, communicates its *beat or impulse* perceptibly to the one making an examination, when his hand is applied to a particular part of the chest, viz., to the left front between the fourth and sixth ribs, and about two inches below and in front of the left nipple in males; but they vary remarkably, both in strength and extent, according to the stage of the respiratory act and the posture of the body, as well as from differences in their own strength. Modifications will also occur from tumours and effusions of liquid or air into the pleura, and even from abdominal tumours and a distended stomach. The greater thickness and strength of the left ventricle make its motions more forcible and extensive than those of the right; and it is perhaps, as Dr. Williams suggests, that for this reason this ventricle is placed to act chiefly on the soft cushion of the lung, which offers no unpleasant resistance to it.

"The impulse becomes stronger than natural in hypertrophy of the ventricles, and arrives at its utmost limit in hypertrophy with some dilatation: in such cases, the impulse is gradual, prolonged and heaving, and occasionally so violent as to shake the bed upon which the patient lies. The character of the impulse thus becomes the most valuable sign of hypertrophy with dilatation: the gradual progressive heaving which occurs in these cases could be produced by no other cause. In this form of disease, likewise, a double impulse is not unfrequently perceived, the diastole of the ventricles, as well as the systole, being accompanied by an impulse. This is sometimes termed the back stroke of the heart — sometimes the diastolic impulse. The impulse of the heart is stronger than natural in the early stage of pericarditis and endocarditis. In nervous palpitations, as in states of anemia, or after profuse hemorrhage, &c., the impulse becomes abrupt, sharp, and knocking, and in some cases double; the double impulse *here*, however, is not produced by the diastole of the ventricles, but 'by the apex of the heart sliding upwards, and impinging against the inferior margin of the fifth rib.' In nervous and very irritable individuals, slight exertion, or even transient mental emotion, is sufficient to increase the impulse for a time. In hypertrophy, or hypertrophy with slight dilatation, also in the early stages of endocarditis and pericarditis, the extent of surface over which the impulse is felt is greater than in the healthy state.

"The situation in which the impulse is felt is sometimes altered by disease; thus, in hypertrophy of the right ventricle, the impulse is lower down, and more to the right side; in hypertrophy of the left ventricle, it is lower down, and more to the left side than natural. In pregnancy, and ascites, or large abdominal tumours, the im-

pulse is felt higher up than natural. In empyema of the left pleura, the heart will be pushed over to the right side, and its impulse will be felt to the right of the sternum; in effusion into the pericardium, the impulse is felt sometimes at one, sometimes at another part of the precordial region." — Bellingham, *Clinical Lectures at St. Vincent's Hospital, Dublin.*

Percussion is the next means of examining the region of the heart. It is performed by striking on one or two fingers firmly applied on the chest, with three fingers of the other hand slightly bent, either on the ribs, which is better, or the intercostal spaces if necessary. This is the plan adopted for the last seven or eight years of his life by Dr. Hope. It is scarcely necessary, he adds, to say that percussion over a solid, as the heart, where it is in contact with the walls of the chest, elicits a dead sound; while that over a body containing air, as the lungs, stomach, &c., produces a hollow sound. It is less generally known, that a solid beneath a body containing air, as the liver beneath the edge of the lung, the outline of the heart beneath the lung that overlaps it, &c., may be recognised by a sound intermediate between hollow and dead. Having tried the experiment before several individuals placed at remote parts of a spacious room, Dr. Hope found that they readily distinguished the full hollow tone of the middle lobe of the lung, the duller intonation of the lung overlapping the heart or liver, and the dead sound of the precordial region, where the heart is in contact with the walls of the chest. In a well constituted chest of a person who was fat, there is commonly some dulness on percussion from the left margin of the sternum to the extent of between one and two square inches towards where the impulse is felt; but this dulness is remarkably diminished, if not quite removed, by a leaning back or supine posture, and by taking a full inspiration; and it is as notably increased by leaning forwards and to the left, and by a forced expiration. If variations in these respects are not observed, we have at once probable evidence of some morbid condition of the heart either by adhesions or pericardic effusion. When the heart is enlarged, as by hypertrophy, dilatation, fat, or even temporarily by congestion, the descent of the lungs being impeded, the dull portion increases, and may attain the diameter of three, four, or, in extreme enlargement, even five inches. The centre of dulness generally lies between the cartilages of the fifth and sixth ribs; but in great enlargement it lies lower, as between the sixth and seventh ribs. In copious hydropericardium, Dr. Hope has known the dulness ascend under the sternum, in a conical form of the sac as large as the level of the second rib; and he has repeatedly traced the gradual descent of the dulness in proportion as the fluid was absorbed.

Another evidence of the degree and kind of the heart's action is procured by the sense of hearing — or by *auscultation.* By listening either with the stethoscope, or with the ear alone applied to the region of the heart, you hear at each pulse two sounds following each other in quick but regular succession, and succeeded by an interval of silence until the next pulsation. The first is a

long, rather dull sound; the second a short, abrupt flap; they are compared by Dr. Williams to the articulate sounds *lubb dup*. After many and varied experiments, and much discussion, not always conducted with philosophic coolness, it is now decidedly ascertained, that the first sound accompanies the whole duration of the systole of the ventricles, which also causes the impulse felt on the walls of the chest; and it is also rendered equally clear that the second or flapping sound occurs at the first moment of the diastole. The motion of the auricles is accompanied by a slightly perceptible sound, according to Drs. Pennock and Moore (*Experiments on the Heart, &c.*). Various opinions have been held respecting the causes of these sounds. The first sound is attributed by Dr. Hope to muscular extension, by which he means a loud, smart sound, produced by the abstract act of sudden jerking extension of the already braced muscular walls of the ventricle, at the moment when the auricular valves close; 2, to muscular or rotatory muscular sound — *bruit musculaire ou rotatoire* — the dull rumbling sound of muscular contraction; 3, the clicking sound of valvular extension the most important of all. Dr. Williams refers the first sound or ventricular systole to a vigorous and rapid motion suddenly resisted by the mass of blood to be urged forwards by the contraction. In other instances abrupt and forcible contraction produces a sound like the first sound of the heart. If the end of a flexible tube be applied to the abdominal muscles, and these be started into sudden vigorous action, one can hear sounds quite as loud as those of the ventricles, and very like them in character. By varying the mode of muscular contraction different kinds of sounds may be obtained. The second sound is believed by Dr. Hope, and by Drs. Pennock and Moore (*Hope on the Heart*, edited by Dr. Pennock), to be produced by the closure of the sigmoid valves exclusively; by Dr. Williams, to be owing to the sudden tightening of the semilunar valves at the mouths of the arteries (aorta and pulmonary artery). The first sound, the impulse and the ventricular systole are synchronous. The second sound is synchronous with the diastole of the ventricle. The auricular systole, as we learn from Drs. Pennock and Moore (*op. cit.*), is attended by a slight intrinsic sound which is absorbed in or masked by that of the louder sound of the ventricular contraction.

"In employing auscultation in diseased states of the heart, particularly in valvular disease, or where there is a suspicion of it, mediate is to be preferred to immediate auscultation; indeed, the exact seat or limits of a valvular murmur can be satisfactorily ascertained, in the majority of cases, only by the assistance of the stethoscope.

"It is sometimes necessary to auscultate the heart when the patient is erect or seated, as well as recumbent. We had a case of pericarditis very recently in the hospital, in which, at one period, the intensity of the friction sound was so much diminished as to be hardly audible in the recumbent posture, while it was very evident in the sitting posture, and still more so when the patient leaned forward.

"It may also be occasionally requisite to make the patient walk quickly up and down stairs, or backwards and forwards in a

room, before we auscultate, in order to increase the heart's action, by which any abnormal sounds present will be rendered more distinct. There was a case in the hospital not long ago, of diseased mitral valve, in which a musical murmur was audible at the site of this orifice after exercise, while bruit de soufflet only could be heard after the patient had remained at rest for some time.

"*Alterations in the situation of the sounds of the heart.*—The extent of surface over which the sounds of the heart are audible on auscultation is altered in certain diseases of this organ, and in some pathological conditions of the lungs. In the healthy chest, the sounds are in a great measure limited to the precordial region; but when the walls of the ventricles are increased in thickness, or their cavities are dilated, the sounds become audible over a larger surface; and when, as frequently happens, these two conditions are combined (in other words, in hypertrophy with dilatation of the ventricles), the sounds are heard over the greater part of the surface of the chest, particularly if the subject is emaciated. The sounds become audible also over a larger surface than natural, when their intensity is increased, as happens in nervous palpitation, states of anemia, &c.

"Independent of any disease of the heart, the sounds of this organ may become audible on auscultation beyond their natural limits, and in some cases over a large portion of the surface of the chest; for instance, every morbid condition which increases the density of the lungs increases also their conducting power of sound. Thus, in hepatization or extensive tubercular deposition in these organs, the sounds of the heart are transmitted to a considerable distance beyond the natural limits of the precordial region; and this sign thus becomes a valuable symptom in some diseases of the lungs. In displacement of the heart, the situation at which the sounds of this organ are heard is altered, but as the seat of the impulse is likewise changed, this point has been already alluded to."—(Bellingham, *ut supra*, in Dub. Med. Press.)

With this preliminary knowledge of the situation and action of the heart, we are better prepared to investigate the morbid change of this organ, numerous and diversified as they are. Those which first engage attention, both on account of their frequency and the new products to which they give rise, causing thereby additional complications and more diversified sympathetic disturbances, are inflammations. The inflammatory affections of the heart are arranged according to the tissues and organic structures affected. Inflammation of the muscular substance and intermediate cellular tissue of the heart is *Carditis;* that of its lining membrane *Endocarditis;* of its investing membrane *Pericarditis.* Carditis may give rise to *softening*, *induration*, and *dilatation* of the heart's substance. *Hypertrophy* may be the result of a slow inflammation, as chronic perinarditis; but still more common from this last cause are serous effusions, *hydropericardium*, and sometimes secretion of coagulable lymph and even pus. Consentaneous with endocarditis, and sometimes occurring separately, are different *structural changes in the valves;* as inflammation, thickening, contraction, ossification, ulceration, and vegetations.

Other diseases of the heart, disturbing its function without any notable change in the organ itself, are designated by the rather vague

term nervous. The chief of these are neuralgia, palpitation commonly of a secondary nature, and spasms. Palpitation occurs under two different states; the one of increased, and the other of deficient action of the heart. The latter often accompanies syncope. The remote disorders of function from organic disease of the heart are both numerous and important, and interest all the other primary organs of the body, viz., the brain by apoplexy; the lungs by asthma, hydrothorax, &c.; the liver by congestion and enlargement; the aorta and its chief branches by abnormal pulsations; the veins by retarding the return of blood in them, and causing anasarca at one time, ascites at another.

The heart is not always the active cause or originator of its functional disorders; it is not seldom the recipient of irritation from other organs, to which it responds, often with extreme vivacity. In fevers, its disturbed function is one of the chief characters of this class of diseases, and for a long time was supposed to constitute the greater part of fever itself; but an amended pathology has shown us that cardiac irritation is, in general, no more than a symptom, a very important one indeed, but still a symptom. Less alarming but exceedingly harassing disorders of the heart, responsive to those of primary origin in some other organ, are continually met with in practice. These are, however, often compounded of the lesion of the remote organ and the original or constitutional susceptibility of the individual, by which at every hour, on the slightest exciting cause, more than the common routine of life, the heart throbs with violence and beats against the sides of the chest, producing by itself so much distress as to mask in part and sometimes entirely the original lesion or irritation in the remote and primarily offending organ. The observing physician sees continual examples of this combination of disorders in certain forms of dyspepsia and hypochondriasis, as well as in chlorosis and anemia, which, by the hasty and superficial inquirer, might be supposed to indicate some fixed organic disease of the heart; or if the latter be of the sentimental school, he may regard them as evidences of a mind ill at ease, whose refined sensibilities the rough world is unfitted to understand and appreciate. But, as neither time nor room is allowed for discursiveness, even on affairs of heart, as they come before the lecturer on medicine, I must pass on to the fulfilment of my purpose, which is, to make a few practical remarks, resting on an anatomical basis, respecting the chief organic and some of the functional diseases of this organ, mentioned in the kind of syllabus which I sketched for you a few minutes ago.

Carditis, once used as a term indicative of all the diseases of the heart, of an inflammatory nature, without specification of part or appendage, is now properly restricted to phlogosis of the muscular and cellular tissues of the substance of the organ. True carditis is a rare disease; its existence even has been denied by Laennec. This is too extreme an opinion. Cases, though few, are sufficiently attested, as in that one by Dr. Latham, in which the whole heart was deeply tinged with dark-coloured blood and its substance softened; and here and there, upon the section of both ventricles, innumerable small points of pus oozed from among the muscular fasciculi. Corvisart, who never met with a case of carditis in an uncomplicated form,

gave, in addition to three cases of his own, six from Meckel, Storck, and Hildanus, in all of which pericarditis existed at the same time. Partial inflammation, characterized by abscess or ulceration, is of occasional occurrence. Abscesses are more rare than ulcers. The latter occur both on the internal and external surfaces of the heart, and are consequent on inflammation of their respective membranes. The diagnosis of simple carditis cannot well be made. As generally seen, the disease is complicated with that of the heart's membranes, and its treatment will be the same as that of the latter.

M. Bouillaud arranges the cases of carditis under the three following heads: those terminating in softening (*ramollissement*), or suppuration; 2, those terminating in ulceration, perforation, and rupture of the walls of the heart, or of the columnæ carneæ, tendons, or valves; those ending in ulceration, with the consequent formation of aneurism; 4, those leading to induration in various degrees up to a fibro-cartilaginous or cartilaginous consistence, or even to perfect ossification, as in Burn's remarkable case. Softening is described by Dr. Hope (*op. cit.*) as presenting itself under the colours of *red*, *yellow*, and *whitish*; each of which may be inflammatory or not. In the case already referred to and recorded by Dr. Latham, the whole substance of the heart was softened. But both red and white softening have been met with by Dr. Hope, where there was a retardation of the venous circulation through the muscular substance, as in dilatation with attenuation, great obstruction of the mitral, and occasionally of the tricuspid valve. This condition, softening with redness, sometimes met with in typhous fever, has been by Bouillaud attributed to inflammation. Laennec refers it to the alteration or putrescence of the fluids, an opinion in which he is joined by Dr. Hope. M. Louis has met with it in typhus; and it is described by Dr. Stokes as occasionally existing in this fever, and, as constituting a condition of the organ which requires stimulation, by the administration of wine, &c. *Yellow* softening is represented by Dr. Hope to be more common than either the red or the white; it may pervade the whole or portions only of the heart, and may coexist with hypertrophy, dilatation, or other lesions of the muscular substance. This like the red may be inflammatory, or may occur independently of inflammation.

The *diagnosis* of softening of the heart is not easy. Suspicion of its existence will be entertained when the impulse is more or less reduced in strength, the beats intermittent and irregular, and of unequal force; the pulse being of the same nature at the time. It is true that the same character of pulse with that just described accompanies disease of the mitral valve. The distinction between the two is thus described by Dr. Hope:—"If after an exploration suitably conducted, no murmur be found to attend either sound of the heart, the irregularity of the pulse may be ascribed to softening, provided it be not referrible to temporary nervousness, to a paroxysm of dyspnœa, or to ebbing of the vital powers on the approach of dissolution — all of which circumstances are capable of producing transitory weakness and irregularity of the pulse, even in a healthy heart." p. 328–9.

Hypertrophy, which complicates the diagnosis, is no uncommon accompaniment of softening of the heart; and in two of the three cases introduced by Dr. Hope in his work there was at the same time pulmonary apoplexy.

The *treatment* of softening when accompanied by acute inflammation is conducted on the same principles as those which would govern us in pericarditis. When a result of chronic disease, it demands the same remedies as the primary affection; and these are often of a tonic nature, such as iron, quinia, nutritious animal diet, and good air. Complete cessation of palpitation is not to be expected till anemia is removed, for this alone is capable of maintaining the symptom; nor, adds Dr. Hope, is a diminution of coexistent inflammation to be looked for till a restoration of the tone of the general muscular system and a decrease of the physical signs of softening denote that the heart has recovered somewhat of its natural tone and elasticity. To the existence of softening of the heart in typhous fever, I have already referred; and also of its furnishing an indication for the use of various stimulants, and, I may now add, of quinia.

Coincident, at times, though not necessarily so, with inflammatory softening of the heart, is perforative ulceration and rupture of the organ, which last, happily a rare termination, is a fatal one. Signs of abscesses and ulcers vary in different subjects, and are not distinguishable from those of other affections. Ulceration is the most frequent cause of rupture of the heart, which may take place, however, in consequence of softening of the muscular tissue. These forms of disease with rupture are much more frequent on the left than on the right side of the heart; and, as M. Breschet asserts, more on the apex of the left ventricle than elsewhere; but M. Reynaud found, in opposition to this view, that in seven out of thirteen cases analysed by him the disease did not occupy the apex. The exciting causes of rupture are, generally, considerable efforts, paroxysms of passion, external violence, falls, &c.

Corvisart was the first who noticed and described cases of rupture of the fleshy columns and tendinous cords of the heart. Laennec and Bertin have each met with an instance of the same. Violent efforts, as coughing, were the cause. The symptoms were, sudden and very suffocating dyspnœa, with overwhelming faintness, paleness and coldness, followed by all the general phenomena of disease of the heart. Rupture of the heart or great vessels into the pericardium, is not always immediately fatal, as a solid coagulum or a fibrinous condition has in several instances been known to arrest the hemorrhage for a few hours. Of ten cases mentioned by Bayle eight died instantaneously, one in about two hours, and another in fourteen. Dr. Pennock, the intelligent editor of Dr. Hope's work on the heart, refers to a communication by Dr. Hallowell (*Am. Jour. Med. Scien.*, 1835) on rupture of the heart, in which he (Dr. H.) reports two cases occurring under his own observation in the Salpètriere at Paris. The number of well-attested cases of rupture of the heart amounts perhaps, by Dr. Hallowell's computation, to sixty. Of these he has given an analysis of thirty-four, in which it is stated,

that the patients had been affected for a greater or less length of time with palpitations, and had experienced frequent attacks of lipothymia, or complained of pain beneath the sternum, and tightness and weight across the chest. Usually the accident has occurred to persons advanced in life. Sixteen of the thirty-four individuals were males, and eighteen were females.

Aneurism is another sequence of inflammation of the heart, by this last causing either ulceration or softening and yieldingness of the muscular tissue. The best summary on this head is by Mr. Thurman (*Medico-Chirurgical Transactions*, vol. xxi., 1838), who is largely quoted by Dr. Hope. Mr. Thurman has collected together seventy-four cases. Lateral aneurism of the left ventricle is represented by this gentleman to be met with under two principal forms, viz., 1, unattended by any external deformity of the heart, and confined altogether to the ventricular walls: or, 2, it may present itself in the form of a tumour growing from the exterior of the organ, and in size varying from that of a nut to that of the heart itself. In sixty-seven aneurisms, occurring in the fifty-eight cases, thirty-four were attended by tumour; in nineteen there was no tumour; and in the remaining thirteen, it is doubtful whether tumour existed or not; although, from the small size of the sacs in these latter cases, it is probable that the disease scarcely extended beyond the surface of the ventricles. With respect to the tissues of the heart engaged in the formation of the aneurismal sac, a careful analysis of the cases would seem to show that, in fifteen, the sacs were formed by the muscular fibres and pericardium; in four, by the endocardium and pericardium only; in twenty-five, in all the structures entering into the composition of the walls of the heart; whilst, in twenty-three cases, the disease was either too far advanced, or the data are insufficient to enable us to assign them to their proper places. The parts of the left ventricle most affected with aneurism are the thinnest parts of its walls or the apex, and the highest part of the base. Lateral aneurism of the heart should, Mr. Thurman thinks, be regarded as the effects of inflammation, but not in any one tissue exclusively. The number of cases in which the heart is not stated to have been the seat of some lesion (hypertrophy, dilatation, &c.) in addition to the aneurism, does not exceed ten; and in three only it is positively stated to have been otherwise healthy. As respects the influence of sex, in forty cases, in which this is recorded, thirty occurred in males and ten in females. The proportion thus met with in the female is much greater than is found to be the case in arterial aneurisms, which, according to Hodgson, occur eight, and, according to Lisfranc, eleven times oftener in the male than the female. There can scarcely be a doubt, Mr. Thurman thinks, that, as in the case of other organic diseases of the heart, so it is of aneurism, acute rheumatism affecting this organ, either in the form of endocarditis or of pericarditis, is to be regarded as closely connected with the production, if not as the efficient cause of this lesion. If this view should prove to be correct, we shall have no difficulty in explaining the greater frequency of arterial aneurism during early life; as it is well known that the pro-

gress of acute rheumatism, the inflammatory affections of the heart which have been alluded to, occur much oftener at this than at any other period.

The symptomatology and diagnosis of aneurism of the heart are not by any means clear. In a great majority of cases, the disease would seem to have a very insidious origin, and to have been only very gradually announced by symptoms. There are after a while undoubted symptoms of diseased heart; but in the specification of the precise part diseased, and the kind of disease, consists the difficulty stated by Mr. Thurman, and admitted by M. Bouillaud as well as by Dr. Hope.

Aneurism of the Auricles. — In all the cases which have come to Mr. Thurman's knowledge, whether in the sinus or appendage of the auricle, and which are nine in number, the disease was connected with, and appears to have been dependent upon, an extreme contraction of the mitral orifice, producing a difficult transmission of blood from the left auricle. The number of cases of aneurismal dilatation which are recorded as having occurred in the left auricle, is much less than that which we have seen to be the case in the ventricle.

LECTURE CII.

DR. BELL.

HYPERTROPHY OF THE HEART.—Divisions of hypertrophy—Average dimensions of a healthy heart—Dr. Clendinning's and M. Bizot's measurements—Anatomical characters and volume of a hypertrophous heart—Exciting causes—Different forms and complications of hypertrophy—Connexion between hypertrophy and cerebral disease, particularly apoplexy—Ossification of the cerebral arteries—Capillary congestion of the mucous membranes and liver—Serous infiltrations and congestions; disease of the kidneys in hypertrophy of the heart—Palpitation—Impulse heard through the stethoscope—Hypertrophy with dilatation—Sounds of the heart and state of the pulse in hypertrophy—Arterial pulse; its cause and characters; modifications by hypertrophy—Causes commonly affecting the pulse—Signs of hypertrophy of the right ventricle.—*Treatment* of hypertrophy—Abstraction of blood short of producing anemia—Moderate and frequent abstractions to be preferred.—Purgatives and diuretics—Perseverance in treatment of hypertrophy all important.

HYPERTROPHY. — Bertin was the first writer who entertained clear ideas of the varieties of hypertrophy of the heart, which, with Dr. Hope, we may define to be an augmentation of the muscular substance of the heart, resulting from increased nutrition. The varieties indicated by the French writer are laid down by Dr. Hope, as follows: — 1. *Simple hypertrophy*, in which the walls are thickened, the cavity retaining its natural dimensions. — 2. *Hypertrophy with Dilatation.* This (the *eccentric* or *aneurismal hypertrophy* of Bertin) presents two sub-varieties, viz. — A. With the walls thickened, and the cavity dilated. B. With the walls of natural thickness, and the cavity dilated; *i. e.*, hypertrophy by increased extent of the walls. — 3. *Hypertrophy with Contraction.* In this (the *concentric hypertrophy* of Bertin) the walls are thickened, and the cavity is diminished.

Before speaking of the morbid growth of the heart, in which, of course, we meet with abnormal dimensions and weight, we ought to have a standard of health for the purpose of comparison. Of late years weights and measurements have been made by M. Bouillaud (*op. cit.*), by Dr. Clendinning (*Brit. Med. Almanac*, and his *Croonian Lectures* for 1838), and with still more minuteness and variety of specification by M. Bizot (*Mem. de la Société Medicales d'Observation de Paris*, 1837). Dr. Clendinning has "attempted to obtain averages accommodated to the advancing development of the organ." He estimates the average weight of the heart to be —

	Males.	Females.
15 to 30 years	8¼ oz.	8⅐ oz.
30 to 50 „	8½ „	8½ „
50 to 70 „	9⅓ „	8 „
70 and upwards	9¾ „	8 „

In his lectures, Dr. Clendinning says, the normal heart may be assumed to average for the whole life, above puberty, about 9 ounces in absolute weight for the male, and 7½ ounces, or a little more in bulk, for the female; and to bear after death to the person, for the male, the rate of about 1 to 160; and for the female, of 1 to 150. This statement is the result of an examination and weighing of nearly 400 hearts. Sex, as you have learned from the preceding calculations, has a decided influence upon the size of the heart. Under all circumstances, as remarked by M. Bizot, the size of the female heart is found to be less than that of the male. The heart, unlike the muscles of animal life, unlike, also, the greater part of the other organs, which become atrophied with age, continues to grow and increase. Old age, continues M. Bizot, is the epoch in which the heart has the largest volume. It is, positively speaking, not only more voluminous at that period, but it is absolutely greater in relation to the size of the body generally. Stature modifies the volume of the heart, which is rather less in tall persons of either sex than in short ones.

The average length of a healthy heart is from four to five and a half inches. The breadth across the base of the ventricles is found to range from three inches and a quarter to four inches. Each cavity of the heart on an average will contain a hen's egg, and when moderately distended is capable of holding about 2½ oz. or a little more of fluid.

The proportions of the relative capacity of the ventricles in all ages are relatively the same. The capacity of the ventricles increases with age, and the thickness of the walls of the left ventricle increases in the same ratio, or that of age, while those of the right ventricle remain very nearly stationary. In the fœtus, the thickness of the two ventricles is nearly the same; at birth the left is a little thicker; and with the advance of age the disparity between the two ventricles increases. Hence, as M. Bizot very truly remarks, we cannot but see, that, to take the thickness of the wall of

the right ventricle as a term of comparison, as has been generally done, in order to estimate the proportional thickness of the wall of the left ventricle, is the most defective means possible. The two following tables give the thickness of the walls of the two ventricles: —

	MALES. Lines.			FEMALES. Lines.		
Ages.	Base.	Middle.	Apex.	Base.	Middle.	Apex.
1 to 4	3	$2\frac{9}{10}$	$1\frac{9}{19}$	$2\frac{9}{16}$	$2\frac{7}{8}$	$2\frac{1}{16}$
5 to 9	$3\frac{1}{3}$	$3\frac{5}{6}$	$2\frac{2}{3}$	$3\frac{1}{20}$	$3\frac{1}{10}$	$2\frac{3}{10}$
10 to 15	$3\frac{2}{3}$	$3\frac{5}{6}$	$2\frac{1}{3}$	$3\frac{3}{10}$	$3\frac{2}{5}$	$2\frac{2}{5}$
16 to 29	$4\frac{2}{9}$	$3\frac{7}{9}$	$3\frac{4}{9}$	$4\frac{2}{7}$	$4\frac{7}{13}$	$3\frac{5}{26}$
30 to 49	$4\frac{17}{36}$	$5\frac{1}{11}$	$3\frac{13}{23}$	$4\frac{1}{9}$	$3\frac{27}{34}$	$3\frac{6}{27}$
50 to 79	$4\frac{37}{38}$	$5\frac{29}{38}$	$4\frac{1}{29}$	50 to 89 $4\frac{1}{2}$	5	$3\frac{3}{4}$
Medium from 16 to 79	$4\frac{65}{122}$	$5\frac{19}{122}$	$3\frac{95}{122}$	16 to 89 $4\frac{3}{8}$	$4\frac{4}{5}$	$3\frac{13}{30}$

	MALES.			FEMALES.		
Ages.	Base.	Middle.	Apex.	Base.	Middle.	Apex
1 to 4	$\frac{9}{10}$	$\frac{6}{10}$	$\frac{5}{10}$	$1\frac{3}{36}$	$\frac{7}{8}$	$\frac{13}{24}$
5 to 9	$1\frac{1}{3}$	$\frac{5}{6}$	$\frac{5}{6}$	$1\frac{3}{10}$	1	$\frac{7}{10}$
10 to 15	$1\frac{1}{3}$	$1\frac{1}{6}$	$\frac{5}{6}$	$1\frac{7}{20}$	$1\frac{3}{10}$	$\frac{9}{10}$
16 to 29	$1\frac{27}{38}$	$1\frac{8}{19}$	$1\frac{1}{19}$	$1\frac{4}{7}$	$1\frac{2}{7}$	$\frac{25}{28}$
30 to 49	$1\frac{39}{46}$	$1\frac{7}{23}$	$\frac{45}{46}$	$1\frac{19}{22}$	$1\frac{13}{54}$	$\frac{25}{27}$
50 to 79	$2\frac{1}{19}$	$1\frac{53}{168}$	$\frac{81}{85}$	$1\frac{1}{4}$	$1\frac{1}{4}$	1
Medium from 16 to 79	$1\frac{113}{122}$	$1\frac{99}{244}$	$1\frac{2}{61}$	15 to 59 $1\frac{2}{3}$	$1\frac{7}{24}$	$\frac{673}{720}$*

The anatomical character of hypertrophy consists in the muscular substance of the heart being usually firmer and redder than natural. But in anemic subjects we may expect to meet with flabbiness and paleness of texture — the states which then prevail in the muscular system generally. Firmness existing in a great degree constitutes *induration*, a distinct affection, dependent not so much on increased as on altered nutrition of the part, the elementary particles being denser than natural. It is generally attended with hypertrophy. This morbid condition, or hypertrophy, may be confined to a single cavity, or may simultaneously affect several, or even the whole. Sometimes one cavity is thickened, while another is attenuated. When all the cavities are hypertrophous, and at the same time dilated, the heart attains a volume, two, three, and occasionally even four times greater than natural; and its weight properly eight or nine times, may be thrice as much. A case, continues Dr. Hope, was met with lately at St. George's, in which it was two pounds and a half. The left ventricle, being more prone to thickening and not less to dilatation than the right, sometimes attains a volume seldom or never acquired by the right; and when its enlargement is very great it occupies not only the left pericardial region, but extends far under the sternum, where its impulse and sound may be mistaken for those of the right ventricle. The situation of the greatest thickening is usually a little above the middle

* See Dr. Pennock's valuable note, in his edition of Hope.

of the ventricle, where the *columnæ carneæ* are inserted. The cavity of the hypertrophous left ventricle is sometimes dilated to such a degree as to admit the largest orange, or the fist of an adult. I have twice, says Dr. Hope, during the last six months, seen it exceed even these dimensions. On the contrary, in hypertrophy with contraction, the cavity may be reduced to the size of a small walnut or a pigeon's egg; in Bouillaud's case it could scarcely contain the finger. The cavity of the right ventricle, naturally a little larger than a hen's egg, may be dilated to the size of a goose's egg or more; or it may be contracted to less than a pigeon's egg. In Bouillaud's case, 65, it could scarcely contain the thumb; and in case 123 the *columnæ carneæ* were so thickened and adherent that there was scarcely any cavity left, and the blood could only filter through the narrow spaces between them. Hypertrophy may be not only confined to a single ventricle, whether the right or the left, but it may be confined to particular parts only, as the base of the septum, the apex, the *columnæ carneæ*, or the external walls, the remainder of the cavity being either natural or attenuated. The *hypertrophy of the auricles* is almost invariably of the second species, or that with dilatation.

The *exciting causes* of hypertrophy are either of a nervous or of a mechanical nature. Under the first head are included all moral affections, and all derangements of the nervous functions that excite long continued palpitation. The second embraces all those causes which can either accelerate or obstruct the circulation, and thus occasion a preternatural pressure of the blood upon the heart; such are violent and sustained corporeal efforts of every description. These violent exercises may even occasion rupture and inflammation of the valves and aorta, issuing in incurable organic disease. It is *protracted* efforts that are, in Dr. Hope's opinion, always the most pernicious. Malformation of the chest, either congenital or occasioned by curvature of the spine, encroachment of the diaphragm on the cavity of the chest from the pressure of the gravid uterus, of ovarian dropsy, of other abdominal tumours, but perhaps above all, continues Dr. Hope, of long, stiff, stay bones, or wooden *busks*, which, by fixing the abdomen, prevent the descent of the diaphragm, are so many causes of hypertrophy of the heart. Mechanical obstacles to the passage of the blood from the aorta, as valvular disease or extreme smallness of this canal, are also, occasional causes. Inflammation of a contiguous serous membrane, as of the pericardium or pleura, is also a not unfrequent cause; although not to the extent asserted by Bouillaud, who asserts that it is almost always complicated with chronic pericarditis or endocarditis, or their consequences. Dr. Clendinning tells us, that in upwards of five hundred autopsies made by him of patients dead of various diseases, above one hundred and seventy, or above a third of the whole number, proved to have had heart disease in some form or other. Five-sixths of these were, he says, cases of hypertrophy uncomplicated with other diseases of the heart, such as pericarditis, endocarditis, or valvular disease. In about thirty cases only, or in about one-sixth of the whole, was well-marked valvular disease detected; in all these last cases, with but one exception, hypertrophy existed.

The frequency of the various forms and complications of hypertrophy and dilatation is expressed in the following scale by Dr. Hope: —

1. Hypertrophy with dilatation of the left ventricle, and a less degree of the same in the right.
2. Hypertrophy with dilatation of the left ventricle, with simple dilatation of the right.
3. Simple dilatation of both ventricles.
4. Simple hypertrophy of the left.
5. Dilatation with attenuation of the left.
6. Hypertrophy with contraction of the left.
7. Hypertrophy with contraction of the right.

The *effects* of hypertrophy merit serious consideration. Among the first of these are capillary congestion, by the increased force and activity of the circulation, and serous infiltration. The sensibility of the organs will be exalted, and they will be rendered more liable to inflammation, serous effusion, and hemorrhage. Hence apoplexy and phrenitis, epistaxis, ophthalmia, and other inflammatory affections of the parts of the body, have been traced to this form of disease of the heart. The connexion between hypertrophy of the left ventricle and apoplexy is clearly made out by Bouillaud, Hope, Bricheteau, and others. Of fifty-four cases of hypertrophy detailed by M. Bouillaud, eleven, that is about one-fifth, present the coincidence of cerebral hemorrhage or softening of the brain; and this in individuals of various ages, from twenty-five up to seventy-nine. Dr. Hope's cases of apoplexy, thirty-nine in number, at the St. Mary-le-bone Infirmary, between December 12th, 1832, and the same date 1834, exhibit a coincidence in twenty-seven of hypertrophy of the heart; or 9-13, nearly three-fourths of the whole. The ages at which these conjoined diseases proved fatal are not such as might *à priori* have been anticipated. Dr. Hope presents the following estimate on this score: —"Between birth and forty years, disease of the heart was not found in any of the four fatal cases that occurred within these dates. Between forty and fifty, it occurred in eight out of nine! — a remarkable increase. Between fifty and sixty, it occurred in four out of five — a decrease. Between sixty and seventy it occurred in three out of seven—a further decrease; and between seventy and eighty it occurred in ten out of eleven! — another remarkable increase. It would thus appear that the periods of life during which fatal apoplexy is most prevalent are precisely those in which concomitant disease of the heart is of most frequent occurrence; namely, between forty and fifty, and between seventy and eighty."

M. Bricheteau (*Journ. Complem. du Dict. des Scien. Med.*, 1818) relates twenty cases of the coincidence between apoplexy and hypertrophy of the left ventricle, and draws the same conclusion with Dr. Hope respecting the ages at which death from this conjunction of cardiac and cerebral disease are most liable to occur. Lallemand (*Recherches Anatomico-Pathologiques sur l'Encephale et ses Dependences*) gives several cases in which the two diseases were conjoined with fatal effect. In his Lettre 1re, Observation XII., in a note, he points out a very important circumstance in the pathology of ven-

tricular hypertrophy, viz., the contraction of the semilunar valves, which, he thinks, is the most common cause of cardiac hypertrophy, or aneurism, as he terms it. If this obstruction exist, distressing effects indicated by appropriate symptoms follow; but apoplexy or cerebral oppression is not among the number. The fact in a more modified shape is admitted by Dr. Hope (p. 261). We have a bluish colour of the lips and cheeks, infiltration in the cellular tissue of the limbs, symptoms indicating a venous congestion, which are wanting for the most part in hypertrophy without any valvular obstruction.

It has been suggested (*Med. Gaz.*, 1835), that "the true explanation of the hemorrhage in the brain is to be found in the diseased state of the cerebral arteries;" but this is assuming an occasional complication, it may be cause, for a fixed and determining one. We shall be obliged either to deny its force, or else to be able to detect a morbid state of the arteries in other organs, as in the lungs, for example, in which hemorrhage is an occasional effect of cardiac hypertrophy. But the coincidence between apoplexy and a diseased state of the arteries of the brain, particularly those at the base of this organ, has not been overlooked. Dr. Hope pointed it out in the first edition of his work. Still, we must admit, that ossification of the cerebral arteries, which is sometimes met with in extreme old age, is not incompatible with life and the possession of the mental faculties.

It has been already stated that the brain is diseased in various ways by persistent hypertrophy of the heart. The history of individuals affected with it, not unfrequently presents a striking narrative of violent headaches, brain fevers, various inflammatory complaints, and states of great nervous irritability and excitement. This remark, adds Dr. Hope, has been corroborated by the recent researches of Dr. Clendinning, his successor at the St. Mary-le-bone Infirmary. As the ophthalmic artery is derived from the carotid within the cranium, the eye participates with the brain in the effects of hypertrophy, and becomes vascular, brilliant, and prone to ophthalmia. The wasting away of the eye which Professor Testa (*Malattie del Cuore, &c.*) has remarked as one of the effects of disease of the heart, is with good reason supposed by MM. Bertin and Bouillaud to be connected with ossification of the ophthalmic arteries.

Capillary congestion of the air-passages is a common effect of cardiac disease, whether it be hypertrophy, or dilatation without hypertrophy. The mucous membrane is injected and reddened; and consequent upon this organic change are functional embarrassment, as hurried breathing, catarrhal and bronchitic disorders, with cough and dyspnœa. Sometimes blood is mixed with the sputa, and even a pulmonary apoplexy may supervene — a result already described to you as not uncommon, when I was speaking of hemoptysis or bronchial hemorrhage (Lecture LXXXIX). I may take this occasion to point out, for correction, a contradiction to this view, in my attributing pulmonary apoplexy to hypertrophy of the right side of the heart. The evidence, except in that adduced by M. Louis soon to be mentioned, is all in favour of the left being the offending and suffering side of the heart. The lungs in general are

implicated with cardiac disease, manifested either by serous infiltration or œdema. Emphysema of the lungs is also one of the most noticeable lesions which accompany diseases of the heart. Generally antecedent to the latter, it is, however, sometimes consecutive, as when it is the result of prolonged efforts made for the inhalation of air.

Congestion of the digestive mucous membrane, also, is distinctly indicated by M. Andral as a common sequence to diseases of the heart. Commonly it is mere obstruction, but at times it is converted into real inflammation. The liver is very frequently much congested, especially when the disease occupies the right cavities of the heart. With greatly augmented size we find the liver of a deep red and gorged with blood, which flows out freely on the slightest pressure. During life the enlargement of the organ is quite manifest, descending as it often does below the false ribs. A copious blood-letting, or other sanguineous evacuation, will sometimes suffice completely to remove this swelling. The spleen, sometimes more voluminous and engorged with blood than natural in heart disease, is, however, more generally small, denser, and even harder than in its normal state.

Serous congestions and infiltrations from cardiac disease are met with in the cellular tissue and the serous cavities. The first appearance is a slight puffiness about the ankles, which gradually extends upwards, until a dropsical effusion occupies the whole sub-cutaneous cellular tissue. The face is early swelled; sometimes the hands and arms are swelled at the same time with the ankles; but the infiltration of the upper extremities is less seldom met with than that of the lower ones. Of the serous membranes, the peritoneum is that which is most frequently filled with effused serum in organic affection of the heart. Ascites only shows itself, however, after infiltration of the cellular tissue of the lower limbs. Serosity in the pleura and pericardium is much less frequent; and in the arachnoid it has not been seen at all. It is worthy of remark, that both serous congestions and anasarca sometimes disappear in a short period; but they return somewhat later in the disease.

The strong and sustained contraction of the ventricle, by sending more blood, and with additional impetus, to the different tissues, may so far modify their nutrition as to cause an augmented growth. Proof of this change is met with in the kidneys, which in cardiac hypertrophy of long standing are generally found enlarged and otherwise diseased, and often presenting the granular change of structure and albuminous deposit in the urine described by Dr. Bright, and on which I have, on a former occasion, adequately enlarged (Lect. LXII and LXIII).

In thus describing effects, I have indicated some of the chief secondary or functional and general symptoms of hypertrophy of the heart. The direct organic or local and physical ones are now to be designated; and under this head I shall include those which are the immediate evidences of the morbidly excited action of the heart, such as palpitation, pulse, &c. The chief of these are, according to M. Bouillaud, the disordered actions of the heart itself, viz., an augmentation of the force and extent of its pulsations, and of the intensity

of its double sound. If to these we add increase in the extent to which dulness is perceptible on percussion in the precordial region, and occasionally a notable prominence in the same part, he thinks we have enumerated its proper signs. The whole mass of the heart, instead of the mere point, seems to come into contact with the side of the chest at each beat. This summary of symptomatology requires examination.

The energy of action of a hypertrophous heart, even when not subjected to the excitement either of exercise or of emotion, is such as to make it border on *palpitation*, and the patient has the annoying consciousness of his heart beating at almost all times. He is annoyed at its thus beating, and it palpitates the more because he is annoyed. The distress is increased by stimulants of any description, and sometimes by a full meal, however simple the kind of food. In noting now the impulse of the heart in hypertrophy we must be understood to refer to this morbid condition without valvular or vascular disease. It is better ascertained by the ear applied to the stethoscope than by the hand applied to the chest. A strong, slow, heavy impulse is the principal sign of simple hypertrophy; and the affection may be known to be greater when the impulse is followed by a *diastolic* impulse, as Dr. Hope calls it; by the first, the head of the observer applied to the stethoscope over the heart is distinctly raised, and he sometimes feels a shock disagreeable to the ear; by the latter there is a sinking back in a sudden manner of the heart, terminating in a jog or shock. In simple hypertrophy, and in that with contraction, the impulse is seldom perceptible much beyond the precordial region, except during attacks of palpitation. The impulse in this, as indeed in every other form of disease, is the more perceptible the thinner are the walls of the chest. Thus, it is the most distinct in the emaciated, and in children; whereas, in very stout and muscular subjects, it may be barely susceptible.

In *hypertrophy with dilatation* the signs are a compound of those of hypertrophy and those of dilatation. The contraction of the ventricles can easily be felt by the hand applied to the precordial region, and we find during palpitation smart violent shocks which sometimes repel the hand. In extreme cases, Dr. Hope has known the extent almost equal to that of the expanded hand. If we attentively examine the patient when most calm, we see that not only his whole chest and the pit of his stomach, but his head, his bowels, and even the bed-clothes, are strongly shaken at each contraction of the heart. The pulsations of the carotids, the radials, and the other superficial arteries, are often visible. The impulse of the heart can sometimes be distinctly felt as high as the clavicle in the left side of the thorax, and sometimes even on the left side of the back, especially in meagre subjects and children. The beats of the heart in hypertrophy, and hypertrophy with dilatation, free from valvular disease, are, even during palpitation, seldom irregular in the early stage of the disease, while the patient's general strength continues little impaired. But in the latter stage, preceding dissolution, the pulse intermits and the dyspnœa is sometimes excessive. As the impulse of the heart is diminished by loss of blood, diarrhœa, or any exhausting disease, rigid and long-continued abstinence, and in general all the

causes capable of producing debility, we must be aware of the temporary diminution or cessation even of impulse in an actually hypertrophied heart, during the operation of these causes. The impulse of the heart is moreover masked by the existence of pulmonary emphysema over the precordial region, and it occasionally ceases entirely, or becomes a mere oppressed struggle, when some affection of the lungs supervenes.

The *sounds* of the heart in hypertrophy are less than in health, or deadened. In *simple* hypertrophy the first sound, or that produced by the ventricular contraction, is duller and more prolonged than natural, in proportion as the hypertrophy is more considerable. The second sound, viz., that produced by the sigmoid valves during the ventricular diastole, is very feeble. The interval is shorter, owing to the first sound being longer. Both sounds are proportionately weaker in *hypertrophy* with *contraction*. Each sound of the heart though essentially one, consists of the sounds of the two sides united; and hence it is in hypertrophy of both ventricles that we must expect to find the sounds confined within very narrow limits. In hypertrophy with dilatation the sounds are increased to their maximum, being louder than in any other disease of the heart, especially during palpitation. It is therefore to this variety that the remark of Bouillaud respecting augmented intensity of sound applies. In *hypertrophy* with a predominance of dilatation, the first sound is not so loud as in the preceding variety, nor has it a prolonged termination, but is short and smart like the second.

Resonance of the precordial region on percussion is deficient in simple hypertrophy, if the heart be considerably enlarged; but as hypertrophy with dilatation is the disease in which the organ attains the greatest volume, it is that in which resonance is most frequently and most extensively deficient. The line of dulness where the heart comes in contact with the walls, may be traced with great precision; and it often forms a circle of two, three, and occasionally four inches in diameter. Prominence of the precordial region has been already noticed as one of the signs of hypertrophy.

Closely connected with the state of contraction of the left ventricle, whether in health or in disease, is the beat of the *pulse* at the wrist. The pulse in hypertrophy of the left ventricle undergoes, from valvular and other lesions, a variety of modifications which disguise its real nature. It must, therefore, be studied in cases totally exempt from complication. In such, it is almost invariably regular, and bears strict relations in strength and size to the thickness and capacity of the left ventricle. Thus, in simple hypertrophy, it is stronger, fuller, and more tense than natural; it swells gradually and powerfully, expands largely, dwells longer under the finger, and in anemic subjects (but no others), continues Dr. Hope, it is sometimes accompanied with a thrill or vibration. These characters are still more marked in hypertrophy with dilatation, so long as the hypertrophy is predominant; but when the dilatation has proceeded so far as to diminish the contractile power of the muscular fibres, the pulse, though still full and sustained, is soft and compressible. In hypertrophy with contraction of the cavity, it is tense, but small, expanding little under the finger; and if the contraction be great, it loses its

tension and becomes weak as well as small, from the insufficient quantity of blood propelled into the arteries. I use here Dr. Hope's own language, as abbreviation would only obscure. He adds: The strength, largeness, and tense prolongation of the pulse of hypertrophy with dilatation, are often so remarkable, that from this sign alone the practitioner may often make a successful conjecture of the nature of the disease; the inflammation only can impart similar strength, and comatose affections similar prolongation. Depression or exhaustion of the nervous system will of course modify the pulse of hypertrophy, and of hypertrophy with dilatation.

Arterial Pulse. — In order to render the arterial pulse a guide in the diagnosis of cardiac disease, we ought to have been well apprised of its signification in health. The beat of the artery at the wrist, that which for convenience sake we generally select, is the expression of the functional activity of the left ventricle, to whose contractions it regularly responds. When the ventricle contracts forcibly, the pulse is strong and resisting; when the ventricle contracts feebly, the pulse is weak and smaller. An oversight of the real physiological relations of the pulse has induced many, shall we say most practitioners, until of late years when organology is in the ascendant, to attribute to it various significations, and a mysterious import of the condition of the general system, quite unwarranted by the real state of things. The pulse, then, whether in health or in disease, with the modifications to be immediately mentioned, is an index of the dynamic state of the ventricles, except when the valves interposed between the ventricle and the aorta or great artery are structurally affected. The changes in the pulse, in the different states of the system during the diurnal cycle, in health as well as in disease, indicate similar changes in the ventricle. The circumstances which modify this latter are of course various; the quantity and quality of the blood, the state of the respiratory organs, and modifications in innervation being the principal ones. There is yet another modifying cause of difference in the pulse, and of course in the contraction of the ventricle as regards frequency, which depends on posture of the body. The number of pulsations when the body is in an erect position, will be from ten to fifteen more than when it is recumbent. So, also, between lying and sitting, and between this and standing, there are notable differences in the frequency of the pulse. The immediate cause is the muscular exertion and strain, by which the ventricle is tasked to greater effort to distribute the blood through the body. The hydrostatic pressure is inconsiderable, for if the muscular effort required for standing be removed by giving the body a fitting support, as by means of a revolving board to which it is strapped, so that the weight is transferred from the ground to the new support against which the body rests, the pulse is very little more accelerated than when the person is in a recumbent posture. The difference in the pulse in the different postures is called the *differential pulse.* It was noticed by Dr. Bryan Robinson, but more fully considered and explained by Drs. Graves, Knox, and Guy. It is most noticeable in the early part of the day, reaches its maximum about noon, and its minimum

towards midnight. Contrary to what is generally believed on this subject, the excitability and frequency of the pulse in health are greater in the morning than in the evening. In the common forms of indisposition, attended with febrile nervous disturbances, the differential pulse is greater than in health; but in advanced stages of hypertrophy and dilatation of the heart, Dr. Graves has found very little change in this particular, or, in other words, that the pulse is very generally unaffected by posture. He suggests that this fixed character of pulse may be a useful sign in our diagnosis of hypertrophy of the heart or of organic disease, by which we can distinguish it from functional disease of this organ.

The quality of the pulse as regards volition and resistance will be not a little modified by the artery itself. Thus, when it has a thin yielding coat and large diameter, its beat will be relatively full and soft; when small, the pulse will be small and weak. At other times, again, as in old age, the coats of the artery become morbidly resisting and indurated, sometimes osseous, and then of course the pulse will feel hard if not strong. External causes, and particularly heat and cold, produce an effect on the pulse by modifying the state of the arteries. Moderate heat or warmth tends to expand the artery, and in this way to diminish the resistance which it makes to the blood impelled into it by ventricular contraction. Cold, on the other hand, as we learn from daily observation, even without reference to the direct experiments of Schwann, Müller, Hastings, and Williams, causes a contraction of the arteries, and consequently renders the pulse smaller. Dr. Williams, in experiments carried on in 1835 to ascertain the causes of the sounds of the heart, repeatedly observed that when the aorta of an ass, recently killed, was plunged into cold water, it contracted, so as not to permit the introduction even of the little finger, and its coats acquired an increased thickness and rigidity; the pulmonary artery did not contract so much.

In stating, as I did a few minutes ago, that the pulse at the most represents the physiological condition of the left ventricle, and represents also its dynamic condition, we are not to infer that in all the morbid states of the cavity it is equally and distinctly responsive. In the main there is, however, greater accordance between the two than might at first appear; as when the pulse is feeble owing to the transmitted ventricular impulses hardly reaching the radial artery, and yet when we listen to the heart we hear pulsations of some loudness, seemingly indicative even of violent efforts. But we soon learn that with all this seeming violence there is really a deficiency of power in the heart to propel the blood through the system. Commoly in these cases there is feebleness in the muscular parietes of the ventricle; but sometimes, and herein much tact in discriminating then differenceis required, the ventricle is oppressed by the excessive quantity of blood sent to it, and relief is in the latter case procured by diminishing the quantity of the blood, and the pulse rises in consequence. But whatever may be the cause of these apparent contrasts between the force of the ventricle and the arterial pulse, you must take the proper steps to determine the actual condition of each; and to do this with effect you will follow the advice of Dr. Williams; and with your ear at the

heart, and your finger at the same time on the radial pulse, make a careful survey of the circulation.

The proportion of the number of beats of the artery to a respiration in health, four and a half of the former to one of the latter, is a standard, mutable indeed, but still of value to aid us in our diagnosis of both pulmonary and cardiac as well as febrile diseases. Increase of respirations disproportionately to acceleration of pulse will indicate some disorder of the air-passages or lungs. In some forms of fever, again, as in typhus, the disproportion is on the side of the pulse, the beats of which are so frequent, while respiration is both relatively and even actually slower.

I proceed now after this, I hope not unreasonable, digression on the pulse, to finish an enumeration of the symptoms of hypertrophy. The complexion is generally of a higher colour; in many it is florid when hypertrophy is present in its first period. But after a while this sanguine hue of apparently full health is exchanged for "a purplish patch" on the cheeks, and a purple or violet colour of the nose and lips, the intermediate skin becoming pale and sallow. In those again who are naturally devoid of colour, when the hypertrophy is a little advanced, and the capillaries become obstructed, an universal cadaverous paleness and sallowness, extending sometimes even to the lips, overspread their face.

The *signs of hypertrophy of the right ventricle*, in addition to the physical or increased impulse and dulness on percussion under the lower portion of the sternum, are, 1, absence of the strong, large, and prolonged pulse of hypertrophy of the left ventricle; and 2, turgescence of the external jugular veins, accompanied by pulsation synchronous with that of the arteries. This last is regarded by Dr. Hope as one of the best general signs, though after all an equivocal one, of hypertrophy of the right ventricle.

It is common to speak of the left ventricle as by far more liable to hypertrophy than the right; but the observations of M. Louis lead to a different opinion. Of 49 cases of valvular hypertrophy 29 were of the right ventricle.

Of *hypertrophy of the auricles* there are no general signs distinguishable from those of disease or obstruction in the corresponding ventricle or orifice to which the hypertrophy of the auricles owes its origin.

The *treatment* of hypertrophy on rational principles should be hygienic and medical. The first consists in an avoidance of all excitement, physical or mental, restriction to a simple diet, chiefly of vegetables and milk, the last in moderate quantities, and a very limited allowance of animal food in anemic habits; abstinence from all alcoholic drinks, and from tea and coffee; an active state of the cutaneous function, maintained by frictions, the warm bath, and warm clothing; and, when it can be accomplished, the habitual inhalation of cool air. The quantity of food used, and even of the simplest drinks, must be studied as well as quality; for whatever distends the stomach in the first instance irritates the heart, and distends the bloodvessels subsequently. A full meal causes a mechanical pressure on the diaphragm, which is felt by the heart, and by irritation of the stomach affects sympathetically the heart in the same manner.

The medical treatment of hypertrophy ought, according to Laennec,

to be begun by the abstraction of blood to as great an extent as can be borne by the patient without sinking; and the operation is to be repeated every two, four, or eight days, until the palpitation has ceased, and the heart no longer gives under the stethoscope more than a moderate impulse. Even when anasarca, ascites, œdema of the lungs, and a very marked state of cachexy have supervened, we ought not, in the opinion of this writer, shrink from bleeding and abstinence. Dr. Hope, with apparently a larger scope of observation of all the phenomena of the disease, and the secondary as well as the primary effects of large bloodlettings, thinks that it will be a safe practice to abstract small quantities of blood, at longer intervals than those recommended by the French physician. He points to the anemia which is apt to be induced by large and repeated sanguineous evacuations, and its accompanying palpitation and breathlessness on exertion or excitement, and that disposition to serous infiltration which in popular language is called "dropsy from debility." Hence, Dr. Hope argues, that it appears that the indications in the treatment of hypertrophy are, to diminish the quantity without materially deteriorating the quality of the blood; and to do this in such a manner as, without producing either reaction or anemia, permanently to enfeeble the action of the heart and the energy of the circulation. Four, six, or eight ounces of blood should be taken every two, three, four, or six weeks, according to the age and strength of the patient, so as merely to keep down palpitation, dyspnœa, and strong impulse of the heart. If the head be much affected, and symptoms indicate threatening apoplexy or inflammation of the brain, the practitioner must not limit himself to a few ounces of blood, but must bleed according to the principles which regulate the treatment of these affections.

This last advice seems to me to convey a correct idea of the course that ought to be pursued in the treatment of hypertrophy. There are, it is true, cases of young and robust persons, in whom nutritive life is very active, and who have strained, as it were, their heart by some immoderate exertion, who will bear and require the heroic treatment recommended by Laennec, and still more by Bouillaud, after the plan first laid down by Valsalva and Albertini. More especially is it to be carried out when pericardiac adhesion and inflammation complicate, it may be were preceded by, hypertrophy. In others, again, and probably the majority, including the poor and badly-fed labourer and artisan, or the dissipated inhabitant of a crowded city, the restrictions in the use of the lancet recommended by Dr. Hope should govern us.

Auxiliary to bloodletting is active purging, which may either follow this latter, or replace it, in the treatment. Common salines, such as Epsom salts, in doses of one or two drachms twice or thrice a day, will answer the intentions proposed. Diuretics are also in severe cases very useful, and indeed decidedly advantageous; sometimes warding off a fatal result for many years.

Of the supervention of dropsy in heart disease, I shall take occasion to speak more fully when treating of endocarditis.

When palpitation is caused by morbid sensibility of the nervous system, which, again, is often kept up by or associated with anemia, as indicated by a pallid complexion, quick jerking pulse, debility, &c.,

remedies of a different nature must be had recourse to. Among these, preparations of iron rank foremost, alternating or combined with aloes or rhubarb, to regulate the bowels. A due proportion of animal food will be allowed to the patient under these circumstances.

Perseverance in the treatment is all important to success: it must be pursued for one, two or three years, according to circumstances. Dr. Hope, founding his opinion on a large number of cases in private practice, which he has carefully watched, believes that nearly the whole who are under the age of forty may be radically cured of hypertrophy, provided it be exempt from complication with valvular or aortic disease, adhesion of the pericardium, softening of the heart, or other organic obstacles to the circulation; and provided also that the constitution is sound and the general health tolerably good. In persons under twenty-five years of age, even when dropsy has supervened, our prognosis need not be of a desponding nature; for they may be often cured.

LECTURE CIII.

DR. BELL.

DILATATION OF THE HEART.—Its signs and diagnosis—Treatment, by moderate tonics.—*Diseases of the valves and orifices of the heart*—Their connection with hypertrophy—Large proportion of the left side—Proportionate size of healthy valves—Induration, excrescence, and vegetations of the valves—Endocarditis the most frequent cause of valvular disease—General symptoms and effects of an alarming nature—Peculiar and distinctive symptoms—Well-defined peculiarities of pulse—Prognosis—Physical signs—Murmurs—Their varieties—Venous or continuous murmur—Venous pulse—its cause—Purring tremor or thrill—Table of the different murmurs.—*Pericarditis*—Its association with valvular disease and endocarditis—Symptoms—Physical signs—Rheumatic character of pericarditis—Sounds in pericarditis—Anatomical traits of pericarditis—Prognosis.

DILATATION OF THE HEART, consisting in an amplification of one or more of its cavities, is associated often with hypertrophy, in which the cavity is enlarged and the walls thickened. It may be simple dilatation with the natural thickness of the walls preserved; or it may be accompanied by unnatural thinness of the parietes of the heart. This last, or *dilatation and attenuation*, although it is the one most insisted on by some writers, is impliedly denied to exist by M. Louis, since he says he has not seen a case of the kind. Dr. Hope, however, at once, on opening the subject, refers to a case (p. 289) in which the prevailing thickness was only two lines, and the apex was a mere membrane, or rather consisted of the internal and external membrane strengthened by a deposition of lymph on the outside. Dilatation takes place more in the transverse than in the longitudinal direction of the ventricles, and hence it communicates to the heart an unusually spherical form; so that, from this configuration alone, we may often at once determine whether a heart is dilated or not. When both the auricle and ventricle are much dilated, it is not unusual to find the intermediate aperture widened, and its valve sometimes not large enough to close it. As this causes regurgitation, it is as serious a malady as disease of the valve itself, by producing the same effects.

In reference to the causes of dilatation the disease itself may be re-

garded as purely a mechanical effect of over-distension. Contraction of an orifice, nervous palpitations, occupations requiring constantly renewed and long sustained muscular efforts, are so many causes, which we may express in a general way by referring to them deficient action of the heart and all obstructions to the circulation whether situated in the orifices of the heart or in the aortic or pulmonary circulation. Dilatation affects only a single ventricle, and it is generally the right, but seldom in a great degree. More commonly it attacks both, and then the extent may be greater in either. It is seldom that dilatation of the auricles occurs under any other circumstances than those of disease of their valves. By some it is alleged that the right auricle and left ventricle are the most common seats of simple dilatation. Its anatomical characters are not only a thinning and extension of the walls of the affected compartment, but also generally a paler and more flaccid condition of their muscular fibres.

The *signs and diagnosis of dilatation* are, palpitations of a feeble oppressed kind, pulse soft and feeble, chilliness of the extremities, melancholy and indifference to exertion, accumulation of blood in the lungs causing difficult respiration, cough, expectoration of a thin serous mucus, œdema of the lungs greatly aggravating the dyspnœa, terrific dreams with starting from sleep, passive pulmonary hemorrhage, which last is often the precursor of death in individuals who have suffered much from laborious respiration. Pulmonary venous engorgement gives rise to serous infiltration, which generally appears first in the lower extremities, discoloration of the face, congestion of the brain, and of the mucous membranes, passive hemorrhages, congestion and enlargement of the liver. This last is a very common consequence of retardation of the blood on the right side of the heart; and it gives rise in its turn to ascites and jaundice, favours eminently hematemesis, intestinal hemorrhage, piles, and, though indirectly, uterine hemorrhage. Angina of the heart may occur as an adventitious complication of dilatation no less than of hypertrophy. Of all the general signs of dilatation of the *right ventricle*, Dr. Hope agrees with Laennec in regarding a permanent turgescence of the external jugular veins without sensible pulsation as the most constant and characteristic.

The *physical signs of dilatation with attenuation* are, diminished impulse, which in some cases is entirely absent even during palpitation, an approximation of the first to the second sound of the heart, analogous to the flapping of a pair of bellows, or a gentle tap on the hand with a finger. When, says Dr. Hope, whose opinion I so generally give in his own language, there is dilatation with attenuation, even in a moderate degree, the first sound becomes almost the same and nearly as strong as the second; and, finally, when the dilatation is considerable, the two sounds cannot be distinguished either by their nature or intensity, but solely by their respective situations (the first over the lower half of the ventricles, and the second over the semilunar valves, opposite to the lower edge of the third rib, and thence up the great arteries), and by their respective relations of synchronism or anachronism with the arterial pulse. In proportion as the sounds of the heart are louder, they are audible, *cæteris paribus*, at a greater

distance over the chest. The *resonance on percussion* of the precordial region is diminished by dilatation. When it extends over the inferior part of the sternum it denotes dilatation of the right ventricle.

In the *progress* of dilatation we often see it in a moderate degree merely give rise to a simply shorter respiration than common, and the patient experiences palpitations from very slight causes. When dropsy comes on, and, after having been removed by remedies, constantly shows a disposition to return, we may know that the dilatation tends to its fatal termination.

The *treatment* of dilatation with hypertrophy or increased power of the heart has been already detailed. That of dilatation with thinness and diminished power will be begun by a removal of the more obvious causes, such as hydrothorax, chronic bronchitis, asthma, or the use of wind-instruments, too violent exertion, drunkenness, and a constrained posture. Our hopes of cure will rest mainly on the absence of contraction of any orifice of the heart, or the comparative recency of the disease. The medicinal course will be of the moderately tonic kind, and particularly of iron in full doses. But if there be inflammation of the lungs or bronchi, this should be removed by appropriate means. It is very important that the patient should be protected against atmospheric vicissitudes, and particularly cold and moisture. Attacks of dyspnœa are best relieved by the warm pediluvium, at the same time that, while a blanket is thrown round the patient to promote perspiration, fresh and cold air be admitted for him to breathe: he should take, also, some antispasmodics, as of assafœtida combined with camphor, or laudanum and ammonia. Venesection is generally admissible, for the most part injurious, and sometimes fatal.

Diseases of the valves and orifices of the heart are intimately connected with each other, sometimes as cause and sometimes effect, and often associated, without our having a precise knowledge of the order of causation, with hypertrophy, dilatation, aneurism, and softening of the heart itself. Frequently they follow endocarditis. Valvular disease is much less frequent on the right than on the left side of the heart. Out of 400 cases of valvular disease, Dr. Hope did not meet with at the utmost twenty cases of disease of the right valves, which would only be 5 *per cent.*, or 1 in 20. Dr. Clendinning met with 1 in 16. The induration on the right side was almost always fibrous or cartilaginous, and not osseous. Before speaking of morbid states of the valves and orifices, one of the most common, which in the latter is contraction of its size, we ought to know the average healthy standard. Mr. Bizot, quoted by Dr. Pennock in his additions to Dr. Hope's book, lays down, as the result of examination of 171 hearts, the following proportions: — The circumference of the left aurico-ventricular valve is from 25 lines in early life, that is, one to four years, to 48 lines and a fraction; in advanced life, between 50 and 79, the measurements of the right valve are $29\frac{3}{5}$ lines to $57\frac{1}{2}$ for males, and 27 lines to 49 and a fraction for females, in the same two extremes of life. The circumference of the aortic orifice is from 17 to 36 lines in the male heart, and $16\frac{1}{10}$ to $32\frac{1}{3}$ lines for the female, at the same limits of early and advanced age; that of the pulmonary orifice is $18\frac{3}{5}$ to 35 lines for the male, and 17 to $32\frac{17}{30}$ for the female, of the ages already specified.

Indurations of the valves with contractions of their aperture are caused by ossification and thickening, sometimes excrescences or vegetations. Calcareous matter is sometimes deposited on the valves and causes their induration. The change in structure is usually the result of inflammation either of the serous membranes of the valves or of their proper substance. Ossification of the valves is common in old people after sixty. Another affection of the valves, whether auricular or semilunar, occasioning regurgitation, is atrophy. Even without any disease of the valve itself, regurgitation may take place when, in consequence of dilatation of the auricular orifice, the valve is not large enough to close.

The exciting cause of valvular disease of the greatest moment and of the most frequent occurrence, is inflammation of the intestinal membrane of the heart, or *endocarditis* generally connected with acute rheumatism. Other causes are overstraining the valves by increasing the force of the circulation. Dr. Williams divides diseases of the orifices and their valves into the *obstructive*, or those that more or less *obstruct* the current of blood in its proper channel, and the *regurgitant*, or those which occasion it to take a *reversed* direction.

When we inquire into the *general symptoms and effects* of valvular disease, we soon find that they are seldom dependent on obstruction of the valves alone; but are partly attributable to coexistent disease of the muscular tissue of the heart. So long, in the opinion of Dr. Hope, as the organ remains free from dilatation, hypertrophy or softening, the valvular disease is not in general productive of great inconvenience. He has seen individuals who were affected in an eminent degree with disease of the valves or of the aorta maintain for years a very tolerable degree of health, so long as there was no hypertrophy or dilatation of the heart: but in proportion as these supervened, the symptoms of valvular obstruction became more and more developed, and eventually assumed their most aggravated form. I shall adduce presently another explanation of this occasional exemption from secondary diseases.

The general symptoms are the same whether the disease be fibrous, cartilaginous, osseous, or consist of vegetations. The symptoms are cough; copious watery expectoration in many cases; dyspnœa; orthopnœa; frightful dreams, and starting from sleep; œdema of the lungs; pulmonary congestion and apoplexy; passive hemoptysis, that is, sputa stained with dark and grumous blood, which occurs especially in great contraction of or regurgitation through the mitral valves; turgescence of the jugular veins; lividity of the face; anasarca and dropsies in general, which in this form of disease attain their utmost degree; injection of any or all the mucous membranes; passive hemorrhages from those membranes; engorgement of the liver, spleen, &c., and congestion of the brain with symptoms of oppression sometimes amounting to apoplexy, occasional cerebral hemorrhage. Colliquative diuresis is mentioned by M. Gendrin among the symptoms of disease, of either of the auriculo-ventricular valves.

Diagnosis. — The peculiar and distinctive signs of valvular disease are — 1, great severity of those of hypertrophy or of dilatation alone, the paroxysms of palpitation and dyspnœa in particular being more violent, more obstinate, and more easily excited; 2, well defined

peculiarities of pulse, first clearly ascertained by Dr. Hope after having made written notes of 10,000 cases. When the *mitral valve* is contracted, and also when it admits of free regurgitation, the pulse is, in various degrees, small, weak, irregular, intermittent, and unequal. When either the contraction or the regurgitation is great, the whole of these characters are invariably present. But when the degree of either is slight, the effect on the pulse may only be a slight degree of weakness and intermittence, increasing when the circulation is hurried. But then it must be admitted, that softening of the heart, pericarditis with copious effusions, endocarditis causing polypi in the cavities, and polypus in any other disease of the heart, will give the same kind of pulse. The pulse in contraction of the aortic valves, contrary to the assertion of Corvisart, Louis, Bouillaud, is not, as we learn from Dr. Hope, small or permanently irregular, unless the case be one of extreme contraction. The pulse *of regurgitation* through the aortic valves is permanently *jerking;* a high degree of the pulse of unfilled arteries, as seen in anemia from any cause. Valvular diseases of the right side of the heart produce little effect on the pulse; for these reasons, as assigned by Dr. Hope, 1, because there is not a direct connection between that side and the arterial system; and 2, because the action of the organ is less under the influence of the right ventricle than of the left, in consequence of the superior muscular strength of the latter. *Pain* in the region of the heart is another symptom that affords presumption of disease of the valves. Where the valves, the coronary arteries, or the beginning of the aorta are infiltrated and inelastic, not stretching equally with other portions of the heart, that pain occurs most frequently and with the greatest severity. Pain of this description has acquired the name of *angina pectoris.*

The *prognosis* in valvular disease must be guarded, since the termination may be either sudden, or preceded by the customary signs of approaching dissolution, or by symptoms of pressure on the brain, or by cerebral hemorrhage.

The *physical signs* of diseases of the valves, are merely a tremor communicated to the hand applied over the heart, and certain sounds or murmurs caused by the heart's action. A few words on valvular murmurs will precede my remarks on diagnosis of valvular disease; or, more correctly speaking, they will form a necessary introduction to this latter. In disease of the valves the sounds become various morbid murmurs, as those of bellows, sawing, filing, rasping, whistling, or a perfectly musical tone. The several murmurs indicative of valvular diseases, are, according to Dr. Hope, 1, the *systolic murmurs* which attend the ventricular systole in every degree of fibrous, fibro-cartilaginous, steatomous and osseous disease of the aortic valves sufficient to contract the apertures. The same remark applies to vegetation of the valves or of the orifice. This sound, according to Dr. Williams, seems broken into by something like a flap in the middle. It is well to be aware, also, as stated by Dr. Pennock, that a very rough bellows murmur, a whizzing or rasping sound, is heard over, and above the aortic orifice; when a ridge of cartilaginous or ossific deposit is found around the internal circumference of the ascending aorta, near its valves, though these valves may be in a

normal condition. If the lesion be near the cardiac origin of the artery, the second sound is frequently obliterated. *Diastolic murmur* of the aortic valves, or from regurgitation, is occasioned by all the varieties of fibrous, fibro-cartilaginous, steatomous, and osseous transformations, and also by inflammatory tumefaction in acute and chronic endocarditis. The murmur is soft like bellows murmur and generally prolonged, "a long sigh tailing as it were the second sound." Systolic murmurs of the pulmonic valves are rarely if ever met with; and the same may be said of the diastolic murmurs of these valves. The probabilities are at least thirty to one against a murmur connected with the semilunar valves being seated in the pulmonic set. Systolic murmur, that is, from regurgitation, is loud considering the depth of its seat, because it is occasioned by the great force of the ventricular contraction. This is of all murmurs the most frequent, in Dr. Hope's experience.

When speaking of venous murmurs as the consequence and a sign of interrupted circulation in the veins, it may not be amiss to make some reference to the *venous pulse*. This phenomenon has been noticed at different times by practitioners, who are not, however, at all agreed as to its cause. It has been most frequently observed in the upper extremities, and most commonly in females; but whether dependent on a peculiar state of the veins themselves or of the heart, we do not know. In nearly all the cases recorded, there was some obstruction either to a free and regular circulation, by hypertrophy or valvular disease of the heart, or some congestion or inflammation of the lungs. A modification of venous pulse, the throbbings of the jugular, we are able often to trace to disease of the right side of the heart, such as regurgitation from the right ventricle.

The following conclusion may, Dr. Hope thinks, be deduced respecting valvular murmurs:—

1. The ventricular *systolic* currents through contracted orifices, from being stronger than the *diastolic*, produce louder murmurs.

2. Considerable contractions, of a rough, salient configuration, whether osseous or not, produce the rough murmurs of sawing, filing, or rasping, provided the current be that of the ventricular systole, its diastolic currents being too feeble.

3. The pitch or key of murmurs is higher in proportion as they are generated nearer the surface, and the currents producing them are stronger; and *vice versâ*. Also, the key is lowered by distance, independent of depth, from reverberation through the chest.

4. Musical murmurs indicate nothing more than ordinary murmurs.

5. Rough murmurs, and even loud and *permanent* bellows murmurs, indicate organic disease.

6. Permanent murmurs from regurgitation necessarily indicate organic lesions.

7. Continuous murmurs in the heart will probably be found to indicate, sometimes organic disease attended with regurgitation out of the aorta into the right ventricle or pulmonary artery; sometimes churning of a little serum between layers of rough lymph on the pericardium; and sometimes, probably, dilatation of the pulmonary artery and compression of the vena innominata.

The *venous or continuous murmur* was first explained by Dr. Ward of Birmingham, and since then has been more fully illustrated by Dr. Hope. It is in a much lower key than the arterial bellows murmur; for while the latter is often as high as the note produced by whispering the letter *r*, and seldom lower than *air*, the venous murmur is usually as low as *who*. This sound offers to Dr. Hope's mind the most complete and ready imitation of the phenomenon. Its loudness and intensity will depend on the greater or less depth of the vein, and the degree of pressure to which it is subjected. *Musical venous murmurs.* — By the adroit management of pressure with the stethoscope over or near large veins, the venous murmur may often be raised, by a gradual swell, into a more or less musical hum, such as is yielded by a child's humming-top. This Dr. Hope proposes to call *venous hum;* a more appropriate title than that of *bruit de diable*, given to it by M. Bouillaud. The constitutional causes of the venous murmur, hum, and whistle, are exactly the same as those of the arterial bellows murmur, viz., impediment to the regular and even flow of blood in the canal, or deficient power to propel the fluid in the vessels. This last is very common in anemia and in chlorosis.

The *purring tremor* or *thrill* of the heart (*bruit cataire*), is produced by contraction of the semilunar valves or of their respective orifices; but it is rarely felt because the sternum is interposed: if, however, adds Dr. Hope, the heart is displaced from beneath the sternum by hydrothorax, emphysema (even circumscribed emphysema), encephaloid or other tumours, &c., the tremor may then become perceptible in the region of the semilunar valves. Regurgitation of the mitral valve, is, in the opinion of the author just cited, beyond comparison the most frequent cause of tremor in the heart, since the current is strong, and the tremor admits of being felt through the intercostal spaces.

Physical signs of the diseases of the arterial and auriculo-ventricular valves occurring together. — The murmurs which we have described separately for each one of these diseases, are found united, and the whole nicety of the diagnosis consists in determining the maximum degree of these murmurs. This will be easy, as all the murmurs do not present the same character of roughness or softness.

Diagnosis. — In order to form a sure diagnosis in the diseases of the valves, we must ascertain, 1st, that a disease of the valves exists, which is easily recognised by the intimate nature of the murmur; 2d, which is the orifice or cavity affected, to be determined by the maximum degree of the murmur; 3d, whether there be regurgitation or contraction, which is ascertained by the synchronism of the murmur with one of the two sounds of the heart; 4th, what is the nature of the alteration (cartilaginous or osseous induration), to be ascertained by the tone of the murmur; 5th, whether there exists any complication (hypertrophy, dilatation, diseases of the aorta), to be characterized by its proper signs. (Aran — *Practical Manual on Diseases of the Heart*, p. 140—Amer. Translation.)

I take from the same work, which is the best summary of our existing knowledge of heart diseases, the following Recapitulations of the murmurs accompanying diseases of the different valves.

- The murmurs corresponding with the first or systolic sound, indicate
  - contraction of the arterial orifices.
    - aortic. — Maximum of the murmur on a level with the inferior edge of the third rib, and thence ascending to the right along the course of the aorta.
    - pulmonary. — Maximum of the murmur along the course of the pulmonary artery; murmur of a more elevated pitch and nearer the ear than the systolic murmur of the aortic orifice.
  - regurgitation through the valves.
    - mitral. — Maximum of the murmur on a level with or a little above the apex of the heart, extending outwards and to the left. This murmur is deep and of a more elevated pitch; it is often accompanied by the vibratory or purring tremor.
    - tricuspid. — Maximum of the murmur along the course of, or near the left border of the sternum; on a level with or a little above the apex of the heart.
- The murmurs corresponding to the second or diastolic sound, indicate
  - deficiency of the valves.
    - aortic. — Maximum of the murmur on a level with the inferior border of the third rib, and a little above this point, along the course of the aorta. This murmur is better perceived along the left ventricle, than the systolic murmur of the same orifice.
    - pulmonary. — Maximum of the murmur on a level with the inferior border of the third rib, along the course of the pulmonary artery, slightly along that of the right ventricle.
  - contraction of the orifices.
    - left auriculo-ventricular. — Maximum of the murmur on a level with or a little above the apex of the heart, extending outwards and to the left; always feeble and low, it is wanting when the contraction is not very considerable.
    - right auriculo-ventricular. — Maximum of the murmur on a level with or a little above the apex of the heart, but nearer the sternum. Like the preceding it is often wanting.

The *treatment* of valvular diseases will be conducted on the same principles as endocarditis, from which they so often originate.

Pericarditis. — I have already mentioned the frequent association between diseases of the valves and endocarditis, or inflammation of the lining membrane of the heart; an extension of which to the valves is believed, by M. Bouillaud, to be the chief cause of their organic change, —thickening, vegetations, and ossifications. Pericarditis, or inflammation of the investing membrane of the heart and its duplicated extension, is perhaps of still more frequent occurrence; and merits notice first. Great interest is attached to both these membranous diseases, from their frequent connection with articular rheumatism, to which they readily succeed, without proper care, and even at times when all due skill has been manifested in the treatment of the prior affection. Pericarditis is not easily recognised by fixed general symptoms, although these are laid down as diagnostic in some systematic works.

Symptoms. — The existence of *pericarditis* is believed, by M Bouillaud, to be certain in the individual affected with rheumatism when the following symptoms are present: a dull sound, on percussion over the precordial region, on a surface double and triple the extent of that in health; arching or elevation of the same region; remote beatings of the heart, but which are little or not at all sensible to the touch; sounds of the heart distant and obscure, and accompanied by different abnormal sounds, some arising from the rubbing of the opposite coats of the pericardium against each other, others from the complication of pericardium with valvular endocarditis; and a pain more or less acute at the region of the heart. Palpitations, irregularities, inequalities, and intermissions of pulse, are sometimes conjoined with the above symptoms.

Dr. Williams believes that pericarditis cannot exist for any lengtn of time, and certainly not to a dangerous extent, without producing *physical signs* that are quite characteristic. The cases in which we should especially be on the look out for the signs of pericarditis are those of rheumatism in all its forms, but particularly the acute kind, which is generally called rheumatic fever, the subjects of mechanical injuries, or of pleurisy or pneumonia affecting the left side; and all doubtful instances of difficult breathing, especially when accompanied by œdema, general or partial.

Pericarditis and endocarditis of a rheumatic character may occur primarily in one person from the same causes which in another would give rise to articular rheumatism, or they may be the consequence of metastasis; or, finally the sequelæ of the articular variety, as well as of rheumatism in other parts.

M. Bouillaud, who has paid most attention to pericarditis and endocarditis, as connected with articular rheumatism, asserts that in eight cases out of nine the latter affection is accompanied by one or both of the former. In another estimate made by this writer the proportion is not so great; out of ninety-two cases recorded by him, there were thirty-one in which pericarditis and endocarditis coincided with articular rheumatism; viz., seventeen of pericarditis, and fourteen of endocarditis.

Dr. Williams corroborates the views of M. Bouillaud, in regard to rheumatism being by far the most common cause of pericarditis, adding, "but it still more frequently produces endocarditis;" and although he does not think these inflammations are essentially a part of rheumatism, he can confidently state that he has found signs of endocarditis or pericarditis, or both, to a greater or less extent, in fully three-fourths of the cases of the disease in question. He adds, that in a little more than half of the proportion just stated, there was no complaint of pain in the chest, palpitation or dyspnœa. Dr. Macleod (*Med. Gaz.*, 1837-8) makes the proportion one-fifth. Dr. Hope states that acute rheumatism had preceded about three-fourths of the worst cases of valvular disease and adhesion of the pericardium, four hundred in number, which have occurred among upwards of ten thousand hospital patients.

The first physical sign of inflammation of the membranes of the heart, is an increased loudness of the natural sounds, with an impulse stronger and more abrupt than usual. The more distinctive signs of pericarditis are, various sounds of superficial friction, which are quite characteristic. At first this sound is soft and rustling like the rubbing together of two pieces of paper or silk stuff; and it may accompany only part of the natural sounds, from which, however, it is obviously distinct, in being much more superficial. It is generally heard first about the middle of the sternum, or to the left of it, corresponding with the base of the heart, or the attachment of the auricles. It afterwards increases in loudness and duration, being heard beyond the immediate region of the heart, and accompanying not only the periods of the natural sounds, which it disguises, but also the interval between them. It thus gets a sort of continuous jogging rhythm, corresponding with the movements of the heart, which is like that of the saddle when one rides on horseback; and when, as it generally nappens, the friction sound becomes harder, and more like the creaking of leather, its resemblance to the noise of a new saddle is quite ridiculous. In some cases the noise is crackling, like that of crumpling dried membrane or parchment. Inflammatory injection alone of the pericardium will not produce it; but the smallest effusion of lymph, and even slight ecchymosis, or effusions of blood under the pericardium proper, from acupuncture, may cause distinct rustling or rubbing sounds. The natural sounds of the heart are completely disguised by the friction sound; but they may sometimes be heard at the top of the sternum, and in the carotid arteries, and they will be often attended with a murmur; this depends on the simultaneous existence of endocarditis, and will be noticed presently. The pericarditic friction does not continue for many days in succession.

The anatomical traits of pericarditis are, preternatural redness of the membrane, coagulable lymph adhering to its surface, and fluid effused within its cavity. Rarely does the pericardium undergo thickening. Lymph after effusion sometimes becomes organised with astonishing rapidity, as within the space of twenty-four hours. Effused serum within the cavity of the pericardium is seen conjointly with lymph. Purulent effusion is more common in the chronic

stages. In thirty-seven cases of pericarditis, Louis found that effusion was sero-sanguinolent in five, serous in nine, sero-purulent in fifteen, and true pus in seven.

Resolution is the most common termination of pericarditis, which, in a large majority of cases, is a curable disease. Adhesion of the pericardium is a less favourable termination. Valvular disease is a frequent termination of the endocarditis accompanying pericarditis. Chronic pericarditis is a sequela of the acute form, though sometimes it comes on with scarcely any precursory symptoms of acuteness.

The *prognosis* in pericarditis is generally favourable. Bouillaud declares that he saves the greater number of his patients. Dr. Hope, while criticising the treatment by large and repeated bloodlettings of the French author, goes farther, and tells us that one fatal case in twelve is about "the outside" of his loss. The average duration of the disease under treatment, ending favourably, is a week or ten days. It has terminated fatally in twenty-seven hours. If pericarditis be not arrested early in its progress, the prognosis is unfavourable, as we may then fear adhesion of the pericardium, and complications of hypertrophy, carditis, softening, and even valvular disease. The treatment of pericarditis will be described at the same time with that of endocarditis, after I shall have detailed the chief phenomena, vital and physical, of this latter.

LECTURE CIV.

DR. BELL.

ENDOCARDITIS. — Its origin in rheumatism; a frequent concomitant with pericarditis — Its anatomical characters — Termination in valvular disease — *Treatment of pericarditis and endocarditis* — Free depletion by venesection, purging, and diuretics; counter-stimulants; mercury; iodide of potassium — Chronic endocarditis; treatment of. — *Dropsy* — Its pathology — Connection with diseases of the heart and valves especially — Progress of anasarca — Ascites with hepatic congestion — Danger of gangrene in lower extremities — Manner in which the kidneys suffer — *Treatment.*

ENDOCARDITIS has received the present designation from M. Bouillaud, who had been most zealous and successful in enlarging our knowledge of the disease and its complications, and especially frequent rheumatic character. His predecessors in this department of medical investigation, Baillie, Burns, Kreysig and Laennec, had pointed out the occasional existence of inflammation of the lining membrane of the heart; and Dr. Watson had even recognised and publicly noticed the frequency of this affection, previously to M. Bouillaud's publication on the subject. Dr. Hope says that the fact of the frequency of endocarditis, as well "as almost every other of importance which M. Bouillaud has published, either on endocarditis or pericarditis, is to be found in the works of Dr. Latham, Dr. Elliotson, Dr. Stokes, and myself." Be this as it may, it is not the less certain that the attention of the profession generally was only fully awakened to the importance of the subject by the writings of M. Bouillaud, as

contained in his works on the Heart, and on Acute Articular Rheumatism. Dr. Hope candidly admits this, when he says: "To M. Bouillaud the merit is due of having been the first to draw attention in a decided manner to inflammation of the internal membrane of the heart and great vessels."

Endocarditis is most commonly a sequence, or rather we ought to say, a continuation of acute rheumatism. In such circumstances it is known, according to M. Bouillaud, by the following signs: — Bellows, file or saw sound in the precordial region, with a dulness of this part on percussion, to an extent much more considerable than that in the normal state, and also sometimes, but in a less degree than in pericarditis with effusion, an elevation or abnormal arching of the chest: the movements of the heart raise with some force the precordial region; and these are often irregular, unequal, intermittent, and accompanied, at times, with a vibration and trembling. The pulse is hard, strong, vibrating, unequal and intermittent, like the beatings of the heart.

On the subject of diagnosis of endocarditis, Dr. Hope says, I may now sum up by stating that this affection may be supposed to be present if a person be *suddenly* attacked with three signs: 1, fever; 2, violent action of the heart; 3, a valvular murmur which did not previously exist, provided the murmur be well distinguished from an attrition murmur, as the latter indicates pericarditis. The evidence is still stronger, if the signs occur in connection with acute rheumatism.

Endocarditis is a frequent concomitant of pericarditis, especially when it is of a rheumatic character; the anatomical reason for which is found in the fibrous structure intermediate between the two membranes, at the auriculo-ventricular and arterial orifices, and which itself is so obnoxious to rheumatic inflammation.

The anatomical characters of acute inflammation of the endocardium are, redness, an effusion of lymph or pus on its surface, and thickening, softening, and ulceration of its substance and of the subjacent cellular and fibrous tissues; also, according to M. Bouillaud, the presence of adherent, colourless, coagula of blood. Remembering the peculiar exposure of the endocardium, that is, its being continually bathed by blood, which on its passage through the heart must carry away any exudation or lymph formed by the membrane, we must not expect to find there traces of inflammation after death, as we find them on other serous surfaces. Still we do meet with, in subjects dead of rheumatic and other inflammations of the heart, on the membrane near its valves, and especially at their attachments and *corpora aurantii* at their margins, striated or punctuated patches of vascular redness, sometimes accompanied by an inequality, roughness or softness of the membrane, occasionally with soft, thickening, or distinct films of soft lymph upon it. In some cases, continues Dr. Williams, we find apparent abrasions, or distinct ulcerations of the membrane; and to the edges of these, or to any roughness or irregularity which the valves or lining membrane may present, are attached little soft, fibrinous bodies, generally of a rugged conical shape, and more or less tinged with blood, which have obtained the name of *vegetation*.

The chief cause of endocarditis is acute rheumatism; or rather it is during this latter disease and as a part of it that we meet with the heart affection. We may say, in general, that endocarditis is induced by the same kind of causes as pericarditis. It may occur either as a primitive or as a consecutive disease. The affections on which it is most apt to supervene are, pericarditis, pleurisy, phlebitis, and acute rheumatism. In the acute stage it may terminate fatally in a very few days; and one of the principal causes of death here is supposed to be the extensive formation of sanguineous concretions within the heart. If actively and properly treated it will generally end favourably within about a week; but if it pass into the chronic state, its duration is indefinite. Yet even here the lesions thus produced become sometimes apparently stationary, and under judicious management life may be prolonged to a very advanced period. We ought not, however, to be unmindful of the following remarks of M. Bouillaud in his work on acute articular rheumatism already noticed. "If it be true that acute inflammatory affections of the heart are much less fatal than has been supposed, it is but too true, at the same time, that, persisting, they ordinarily leave in their train lesions called organic, under which the invalid finally sinks, when they affect those parts whose functions are necessary to life. That is what actually takes place when endocarditis has been followed by thickening, induration, adhesions, vegetation of the valves with deformity, obliterations of these valves; contractions of the orifices, dilatations of the cavities, hypertrophy of the muscular substance," &c. I may remark, by the way, that those of you who are unable to consult the *Traité Clinique du Cœur, &c.*, par J. Bouillaud, Professeur de Clinique, &c., will find a very good digest of the work in an article taken from the British and Foreign Medical Review, and inserted in my *Eclectic Journal of Medicine*, for April and June, 1837.

Dr. Hope judiciously observes: — "The termination of endocarditis in valvular disease has, I fear, been by far the most common, up to the present time, especially amongst the working classes. This is in consequence of endocarditis having been little known as an effect of acute rheumatism; whence the treatment of the latter was not specifically directed to the obviation or removal of the former. In proof of this, I may repeat a statement already made, that I have found the worst forms of valvular disease to date more frequently from "rheumatic fever (by which is to be understood rheumatic endocarditis), than from all other causes put together. The eyes of the profession are now attentively directed to this subject; and it is to be hoped that it will soon become one of the best known, because most important, in medical science — one, in short, of which it will be disgraceful to be ignorant."

The treatment of both pericarditis and endocarditis, in their acute forms, will consist at first in free and frequent bloodletting, both general and local. M. Bouillaud, in the case of an adult in the vigour of life seized with pericarditis, orders, on an average, from three to four venesections, each to the amount of twelve or sixteen ounces, within the three or four first days; together with the simul-

taneous application of twenty or thirty (French, of course) leeches, or cupping to the extent of eight or twelve ounces during the same period. In feebler subjects, or where the intensity of the disease is not so distinctly marked, local bloodletting, by means of cups over the left side of the chest, or of leeches under the mamma of that side, must suffice; to be followed by purging and counter-irritation by means of blisters, tartar-emetic, or croton oil to the chest. Tartar emetic internally, and colchicum, which I have found to be serviceable in acute articular rheumatism, should now be used if the disease has not been arrested by bleeding.

The treatment of acute endocarditis is essentially the same as that of pericarditis; or if there be a difference, it is only in the still earlier recourse to copious and repeated depletions, in order to prevent the coagulation of the blood, the deposition of false membranes within the heart, and permanent derangement of its mechanism. Even when it supervenes on rheumatism in other parts, for which active remedies had been freely used, we ought not to be deterred from recourse to the means already indicated for its cure. In a case of endo-pericarditis, which succeeded to acute and violent rheumatism of the bowels, and for which I had bled both generally and locally, I had recourse notwithstanding to the lancet and to cups over the chest. The result was a complete convalescence and restoration to perfect health — rendered the speedier by the exhibition of the sulphate of quinia after the depletions.

In thus bearing testimony in favour of free bloodletting in endocarditis and pericarditis, I ought to add that the practice to the extent recommended and pursued by M. Bouillaud is only called for in those cases in which temperament, prior robustness of frame, and sanguineous plethora, with violent rheumatic seizure, conspire to give these diseases great intensity at an early date. Subjects of a more mixed habit of body and constitution, and in whom the acute stage has passed into the sub-acute, or thence into the chronic, are better treated by moderate bloodlettings, to the avoidance of sudden or full impressions on the circulation; and in these cases free and repeated local bleeding should be regarded and employed as a measure of at least equal importance. Dr. Williams recommends that calomel and opium should be given until the gums show their effects; and he adds that this combination seems to be most valuable twice or thrice in the day, as prescribed by Dr. Chambers. One ought to be very sure of the diagnosis before causing ptyalism, which aggravates common palpitation and other disorders of the heart. As the disease becomes more chronic, two or three grains daily of the iodide of potassium are recommended with a view to promote the absorption of the effused lymph. Of this remedy, I should, from my own experience, augur favourably; and I may add, also, that it is valuable in rheumatism of the joints, particularly in *synovitis*, or where the synovial rather than the fibrous membrane has been the seat of inflammation. The iodide, but in doses of ten grains increased to thirty, three times a day, is used regularly by Dr. Graves towards the latter period of acute articular rheumatism.

Dr. Hope's advice, as the result of very large and long experience,

merits our confidence. The *treatment*, he says, suitable for acute endocarditis, is the same as that for pericarditis, and *it must not be less prompt and vigorous.* The practitioner must not be misled by the apparent mildness of the symptoms in cases where there is little impediment to the circulation through the heart. He must never, for an instant, forget, that there is a *possibility* of subsequent valvular disease, and that the mere possibility is a contingency of such magnitude, as to merit all the resources of his abilities and experience for its obviation.

In chronic endocarditis, Dr. H. has experienced the most satisfactory results from prolonging the mild use of mercury, so as to maintain a barely sensible effect on the gums, for three, four, five, or six weeks; simultaneously employing a succession of small blisters on different parts of the precordial region, restricting the patient to a farinaceous and light broth diet, and confining him to bed, for the purpose of *insuring* the utmost possible corporeal tranquillity.

Should the murmur still persist, the mercury may be discontinued, and its future resumption must be left to the judgment of the practitioner; but the counter-irritant, antiphlogistic treatment, in a moderate degree, that is, short of reducing the patient to a state of anemic debility, together with quiet and the use of digitalis and mild sedatives, as extr. hyosciami and tr. or infus. lupuli, may be advantageously continued for several months, with the view of completely subduing the chronic inflammatory process, and allowing any thickening that has already taken place to undergo the utmost possible absorption. Beyond this the treatment resolves itself into that of established valvular disease.

I have reserved for this place remarks on *Dropsy*, which might have been made when hypertrophy of the heart and diseases of its valves were the subjects before us.

Dropsy, so common an effect of heart disease, cannot be successfully treated without a knowledge of its organic origin. In fact, the pathology of dropsy resolves itself into that of the organ, — heart, kidney, liver, or the membrane, — pleura, pericardium, peritoneum, or arachnoid, on the lesion of which the serous infiltration depends. This is the whole key to the pathology of dropsy.

There is not always uniformity of result, as regards the supervention of dropsical effusion, in valvular disease of the heart. Some patients suffering in this way extensively have no dropsy. The apparent anomaly is explained here by the presence or absence of pulmonary congestion. When the mitral valves are diseased, so as to prevent a free passage of blood from the auricle into the ventricle, the pulmonary veins are unable to unload themselves, and congestion of the pulmonary tissue takes place; the right side of the heart suffers in consequence; the whole venous system becomes congested, and anasarca follows. M. Gendrin thinks that anasarca is always accompanied by œdema of the pulmonary tissue, which he regards as the chief secondary cause of most of the remote phenomena of heart disease.

The swelling, at first partial and slight, commences in the lower extremities, appears only about the ankles and towards evening, and

disappears on the patient's rising from bed. Gradually, however, the serous infiltration into the sub-cutaneous cellular tissue increases and is extended to the abdomen, chest, upper extremities, and face; the infiltration predominating in the most dependent parts, as the posterior part of the back, or on one side of the face, or one arm, when the patient sleeps upon his side. When the anasarca is general, serum is not unfrequently effused into the peritoneum or pleura, upon one or both sides, which adds considerably to the dyspnœa, and aggravates materially the patient's sufferings. Ascites in such cases is almost always preceded by congestion of the liver and of the portal system; and as I have had occasion to remark before, hydrothorax is in like manner preceded by congestion and œdema of the lungs.

Very variable are the periods that may elapse between the first occurrence of dropsy in cardiac disease and the fatal termination. Commonly the anasarca is controllable at first by remedies, and leaves the patient free for a longer or shorter time, to return again; and although it may be once more measurably removed, it recurs after a while and goes on to its fatal termination, or rather persists with the cardiac lesion by which it was primarily produced, and on which it actually depends. The anasarca accompanying the advanced stages of disease of the valves, particularly that of the mitral valves, is usually more extensive and greater, and accompanied with more pain than when the anasarca supervenes upon other diseases, or upon those of other parts of the heart.

There is a tendency in the skin and subjacent tissues of the lower extremities to become gangrenous, which may be brought into destructive action by punctures or incisions made with a view to relieve the excessive distension by evacuating the contained fluid. Some practitioners prohibit without reserve any operation of this nature in the dropsy from cardiac disease; and they are in the main correct, as regards punctures on the feet or lower part of the legs. I have done this last myself, and although my patient escaped gangrene, yet there was such a near approach to it, with erysipelatous inflammation, as to disincline me in the like cases to repeat the operation. Dr. Watson judiciously remarks, that a few punctures in the upper third of the thigh will permit of the escape of a large amount of serum; with it may be added considerable relief to the patient. Dropsy comes on later after obstruction in the aortic or semilunar valves than it does in the mitral ones.

Before concluding these remarks on the pathology of dropsy dependent on diseases of the heart, and particularly of its valves, I am tempted to give you Dr. O'Beirne's ingenious anatomical explanation of the manner in which the kidneys suffer at this time. The entire paper may be found in the eighth volume of the *Dublin Medical Press*.

"Having premised this view of the peculiar condition in which the vena cava inferior is placed, in cases of obstruction to the ascent of its blood, it remains to consider the effects which that condition of the trunk produces upon its main branches, and ultimately upon the organs from which those branches proceed. The organs in question are the kidneys, the uterus, and the urinary bladder. As

has been already observed, both renal veins enter the inferior vena cava at a very obtuse angle, and as much as possible in the direction of the natural current of blood in the latter. But as it is there not only impeded, but repelled, it is manifest that the renal veins, so far from being enabled themselves as usual, must even be subjected, more or less, to the pressure of the column of blood in the cava. When these veins are so circumstanced, the circulation through the kidneys must be greatly disturbed; and, as a natural consequence, the functions of these organs are imperfectly performed. The over-distended state of these veins is then only relieved by the effusion of small quantities of their serous contents into the pelves of these organs, while the blood of their minute arteries having ceased to be admitted by their corresponding venous radicles, must, at least in small quantity, be poured into the same cavities. Hence, the urine becomes scanty, high-coloured, and *albuminous*."

As regards the *treatment* of dropsy occurring in endocarditis, as well as in hypertrophy and valvular disease, I have to offer but a few suggestions in addition to the advice already laid down, for your guidance in these affections. After venesection and purging as far as may be deemed advisable, we have recourse to the most efficient diuretics, viz., the saline, the sedative, and mercury. Under the first we include the bitartrate and nitrate of potassa, and iodide of potassium; under the second digitalis, the opium of the heart, as M. Bouillaud calls it, colchicum, and squill, for the primary acrid operation of this last is soon followed by a sedative one. In some cases tincture of cantharides is given with benefit. I have frequently derived very satisfactory results from the tincture of digitalis in simple hypertrophy, anterior to any serous infiltration; and I cannot but believe that, if used after venesection and in conjunction with spirit of nitric ether, or some of the salines, it will contribute not a little to a cure of the disease, and at any rate the prevention of dropsical symptoms. The conditions for the advantageous use of mercury are nearly the same as those for free bloodletting. This article, useful in hypertrophy, with evidences of general nutritive excitement, and occurring in the sanguine and robust, is contraindicated in the cases of anemia and cachexy with a predominance of nervous symptoms. Morbid irritability of the heart is aggravated by mercury, as it would be by any other sedative and reducing agent. Other more commonly recognised sedatives from the vegetable kingdom are well thought of by Dr. Hope, who, in all cases where there is considerable disposition to palpitation, resorts to them habitually: such as extract of hyosciamus or conium, in doses of three, four, or more grains twice a day. Camphor and assafœtida are, on occasions, good remedies. Tartar emetic as a counterstimulant, either alone, or what is generally preferable, in combination with opium, will be worthy of trial at this time. Like mercury it is opposed to nutrition, and will on this account be adapted to a state of the organ in which this process is preternaturally active.

LECTURE CV.

DR. BELL.

DISEASES OF THE HEART (*Concluded*).—*Hydropericardium*—Its varieties; their causes and treatment—*Adhesions of the pericardium*—FUNCTIONAL DISEASES OF THE HEART—Vagueness of this title—Explanation—*Palpitations*; their different origins and different treatment, according to organic and constitutional complications.—*Syncope*—Causes—occasional danger from—Treatment—Precautions in particular cases to avoid syncope.—*Neuralgia of the heart and angina pectoris*—Symptoms—Causes; not well known—Treatment, to vary with complications of disease in other organs.—Asthma.

HYDROPERICARDIUM is one of the consequences of unchecked pericarditis; but more frequently, according to M. Bouillaud, it is the result of an obstacle to absorption and to free venous circulation, in consequence of the primary disease of the heart. There being no sound of respiration, and sometimes a prominence of the ribs in these parts, the case might be taken for pleuritic effusion; but that the sounds of respiration and percussion are still good in the back and in the axilla, and are not materially varied by the change of posture. The sounds of the heart become distant and obscure, and its beat, if felt at all, is (as Corvisart has remarked) very variable as to the place where it is perceptible; being sometimes on the left, and occasionally disappearing altogether, when the patient is lying in a supine posture. The *treatment* of hydropericardium will be the same as that of other dropsies; if it be of the active kind, or the result of pericarditis, bloodletting, general or local, according to the activity of the circulation, will be called for; but if the dropsy be passive, bloodletting will be dispensed with, and counter-irritants had recourse to; such as blisters, either in succession, or kept open with savine cerate, tartrate of antimony and pitch plaster, likewise setons and issues. Purgatives and diuretics will come into service in both varieties of the disease; but in the passive, they will be followed by or alternated with tonics — quinia or the muriated tincture of iron.

Adhesions of the pericardium are generally associated with hypertrophy with dilatation. Cases of adhesion terminating in enlargement, in Dr. Hope's experience, often hurry to their fatal conclusion with more rapidity than almost any other organic affection of the heart. He differs from Bouillaud, who does not think that adhesion interferes in any respect with the functions of circulation and respiration; for, although true adhesion may not for a time create much inconvenience, its effects are ultimately fatal, especially to the working classes. Dr. Hope mentions two characteristic signs of chronic pericarditis, viz.: 1, the heart, though enlarged, beats as high up as natural, and sometimes occasions a prominence of the cartilages of the left precordic ribs; 2, an abrupt jogging or trembling motion of the heart, very perceptible in the precordial region with the cylinder. This last sign is more distinct when the heart is hypertrophous and dilated.

Functional Diseases of the Heart.—It is customary for writers on the diseases of the heart to divide them into organic and functional. The division is not a happy one, since it is neither based on physio-

logy nor pathology. What, indeed, are the first evidences of organic disease but disorder of function? when are there functional disturbances without organic irritation? As explained, however, functional diseases of the heart are various abnormal actions of this organ, dependent — 1, on a peculiar susceptibility of this organ, innate or acquired, by which common stimulants irritate it; and, 2, on an excess of the direct customary stimulus, as of blood, or in the indirect or transmitted excitement from other organs; the organic texture of the heart all the while undergoing little if any appreciable change. The chief manifestations of these functional diseases of the heart are irregular contractions of its cavities, or *palpitations;* deficient contractions, causing *syncope;* and exalted sensibility, giving rise to *neuralgia* and *angina pectoris.*

Palpitation we have seen to be a common symptom in several of the diseases of the heart, of avowedly organic origin and seat. It offers little that is distinctive; since it may accompany excessive nutrition or hypertrophy and inflammation of the organ, or simple irritability from a state of great feebleness, defective nutrition, and anemia. It is only when we can put aside, in our diagnosis, any organic change by which palpitation could be kept up, that we assume this irregular action to be a functional disease. But this last postulatum being granted, it is still a matter for earnest and careful investigation before we can decide with tolerable accuracy the kind of derangement; for this may be from excess in the quantity of blood, from a too rich and fibrinous quality of this fluid, or from a poverty of blood and anemia of the muscular tissue of the heart itself, or undue sensibility of the system of cardiac nerves. Hence the young, robust, and plethoric man may have palpitations, which will require venesection, reduced regimen, and repose for their removal; while, on the other hand, palpitation in a young chlorotic female would be aggravated excessively by this treatment, and could only be relieved by tonics, nourishing food, and tolerably active exercise in the open air. A third class of patients, again, will often present themselves, who would be injured alike by depletion or by stimulation, but whose cases will be treated successively by sedatives — digitalis and colchicum internally, and counter-irritants externally.

But there are other and quite common causes of cardiac disorder besides those consisting of particular states of the blood or of the heart, and which will cause palpitation of this organ. These are gastric and intestinal irritation, or repletion, pulmonary and hepatic congestion, uterine disorder, inflammation of almost any viscus, or whatever interrupts the regularity of the circulation, and calls in any way on the heart for additional contraction. Our diagnosis, therefore, of palpitations, even after we are assured that they have no organic source as far as respects textural alteration, must be quite imperfect until we have instituted careful inquiries, and made, as far as possible, our own observations on the rhythmic or abnormal discharge of the other functions of the animal economy with which the heart may be supposed to sympathise; and with which of them does it not hold sympathetic relations? Whoever has had a thorn or a needle retained in his hand or foot, or has suffered from paronychia, has felt

his heart throb with undue force, and with no becoming regularity in consequence. He will remember, also, how prompt was the relief from this palpitation after the offending body was removed, and its immediate effect, local inflammation, had been subdued by a few leeches to the part, or by poultices. Acting on so clear a hint, the physician must always, when he finds a heart palpitating with undue force and irregularity in a person who is neither plethoric nor anemic, direct his inquiries to the discoveries of the thorn, in the shape of some hitherto hidden irritation of another and often remote organ. Often he will find 'the thorn' in the brain, some one or more of its faculties, either of propensity or sentiment, having been pierced and wounded, and thereby keeping up cardiac irritation manifested by palpitation. I need not enlarge on these suggestive hints nor make an application to each set of circumstances for your government in the details of treatment, medical and hygienic. Your own intelligence may be safely trusted to guide you to the requisite conclusions. Need I say that on some points of cardiac palpitation our prognosis must be guarded, if it be not positively discouraging; as where the disorder is kept up by permanent obstacles, such as tubercular irritation, or malformation of the chest and deformed spine. To most of the palpitations, in which the heart and its appendages are not sructurally affected, the term *nervous* is applied. If used in this sense no harm can ensue; but if we persuade ourselves that the disease is only an unequal action of the nervous system, or depends on irregular innervation as a primary cause, in place of this being only a secondary one, itself developed by irritation or inflammation of another organ, we may be greatly misled in our indications of treatment. Even in that which would seem to be a case of decidedly nervous character, as when palpitation follows spinal irritation, it is not easy to say how far this latter is primary, or is itself the effect of the protracted but less potent irritation of some internal organ.

The physical signs of palpitation with anemia are thus described by Dr. Hope: — The impulse of the heart is less remarkable for force, than for an abrupt, bounding character, with throbbing of the arteries — often universal and jerking pulse. Hence, this species of palpitation is more audible to the patient than perhaps any other, the sound appearing to rush through his ears, especially when he lies on his side in bed, and each arterial throb causes a movement of his pillow. Some are so sensible of the universal arterial throb, that they can count the pulse by the mere sensation, particularly as experienced in the back when resting against a chair.

When the anemia is considerable, palpitation occasions a weak, soft bellows murmur in the aortic orifice, with the first sound; and a corresponding whiff is heard in the carotids, subclavians, brachials, and other considerable arteries, especially when slightly compressed with the edge of the stethoscope, though this is not always essential to the production of the phenomena. It might, says Dr. Hope, be expected in the pulmonic orifice also; yet he has not been able to satisfy himself of its existence in this situation.

In the anemic condition, a bellows murmur is often heard near the left nipple, even when no abnormal sound can be detected at

the aortic valves; thus proving, says Dr. Pennock, that the regurgitation takes place through the mitral orifice.

Syncope. — In palpitation of the heart, whatever may have been the remote or exciting cause, the immediate agency is irregular excitement of the nerves, or unequal and extreme innervation. In syncope, on the other hand, this excitement is wanting, and the muscles of the heart are for the moment paralysed. The causes of this state are numerous; some purely mental, as fear and disgust; others physical, as pain, concussion of the nervous system from falls, blows, &c.; sudden and extreme abstraction of blood, suddenly taking the erect posture after long recumbency, especially if the patient be anemic, or have been exhausted by hemorrhage or by long disease. The ordinary duration of syncope is from a few seconds to a few minutes; but, in some cases, it lasts for hours and even days, imitating death so perfectly as to lead those around to inter a yet living body. But in other cases the heart's action is not wholly suspended, though it is exceedingly feeble. In cases of suspended animation from apoplexy or drowning, it is highly important for us to ascertain whether the heart yet pulsates; for if it does, however feebly, we may anticipate a successful issue of our efforts at resuscitation. Syncope, when purely nervous, need seldom excite alarm; but when proceeding from organic disease of the heart it is at times the precursor to death itself. In another state of disease, as towards the decline of fever or violent phlegmasia, and after uterine hemorrhages, or even protracted labour, syncope of a fatal kind may be brought on by the patient imprudently sitting up to discharge the bowels, or to urinate, or for some other less warrantable purpose. The injunction in all these cases, not to rise, cannot be too urgent, nor too often repeated to all the parties concerned; patients, nurse, and friends near.

The *treatment* of syncope will be, first, a horizontal posture, or the head even lower than the rest of the body, the admission of fresh air, sudden dash of cold water on the face, startling the patient by a sudden noise or even blow, as by slapping the back of the hand or arm with some force; the application of ammonia and other pungent odorous substances to the nose. In the syncope of newly-born children, whose face is pallid, different from asphyxia by oppression of the brain, owing to fulness of the bloodvessels, and which requires the flow of blood from the cut extremity of the umbilical cord, a cold dash on the chest, tickling the nostrils with a feather, a gentle compression and elevation of the chest with the hand, rubbing and slight titillation of the feet, ammonia, not too strong, to the nostrils, and, if need be, a moderately stimulating enema, even of warm water, will often suffice to restore animation. In extreme cases of syncope in adults, a dash of cold water from some height on the spine, and stimulating enemata, would be of service.

Neuralgia of the heart and *angina pectoris* are sometimes described as separate diseases, when, in fact, they are but different degrees of the same disease. If it should be said that in angina there are other states of the organ superadded to the mere irritation of the nervous tissue, the same remark may be made of common

neuralgia, facial for example, in which there is distinct vascular excitement of contiguous parts associated with the disorder of the nerve.

Sudden and violent, distressing and alarming as are the paroxysms of angina pectoris, they often go off with the same rapidity in which they came on. Generally they are induced by some unusual exertion, as in walking up a hill with the wind blowing in the face, and especially exertion after eating, and mental emotions. At a more advanced period of recurring paroxysms, these are more easily excited, as by intense thought, the acts of eating, coughing, or exoneration of the bowels. At this stage of the disease it will even recur as the individual lies in bed, and especially on his awaking from his first sleep.

The *symptoms* of angina are so clearly described by Dr. Joy (*Library of Practical Medicine*), that I shall give them to you in his own words: —

The pain, which at first was confined to the chest and upper part of the left arm, reaching commonly only as far as the insertion of the deltoid and pectoral muscles, afterwards often extends along the ulnar nerve down the inside of the arm to the elbow, wrist, or even to the fingers. It occasionally, though rarely, affects the right arm also, the neck, and lower jaw towards the ear, causing a feeling of choking and difficulty of articulation ; and may even reach, though this is much more uncommon, to the lower extremities. The pain often follows the course of the anterior thoracic nerves, more especially of the left side ; and in females there is at times, from this cause, extreme tenderness of the breasts. In some anomalous cases the painful sensation has been known to originate in the arm, not being at all felt in the chest till a more advanced period of the disease.

The duration of the seizure at the commencement rarely exceeds a few minutes, though it may last for half an hour or an hour, and in the more confirmed stage of the affection the paroxysm may be still further prolonged.

The pulse is subject to great varieties, being in the slighter forms often but little affected ; whilst in the protracted and more aggravated cases it is feeble, irregular, or intermittent in some, quick and strong in others; its derangements, which often continue to a certain degree in the intervals, being frequently accompanied by a marked tendency to syncope. The respiration is sometimes affected to such a degree, that the patient cannot continue in the recumbent posture: yet the difficulty of breathing, in the earlier stages more especially, is very unlike spasmodic asthma ; for the patient, by an effort of the will, is still able to take a full inspiration, and sometimes finds a momentary relief from the effort. A patient of great strength of mind has been known to persist in walking, in spite of the vehemence of his sufferings ; and his resolution has been rewarded by their speedy cessation. Others, again, have made a similar attempt without the like result; and we apprehend that where the attacks, as is so often the case, are connected with that excited and over-loaded state of the heart induced by muscular exertion, the experiment cannot be exempt from hazard, and especially so if any organic disease exist.

A critical inquiry into the value of the various opinions held by writers respecting the seat and precise organic cause of angina pectoris, does not comport with my plan or intentions at this time. It is sufficient to remark, on this subject, that all the alleged causes, such as ossification of the coronary arteries, deposition of fat in the heart, enlarged liver, a plethoric condition of the heart and great vessels, have been severally found in subjects who, during life, had not suffered from angina pectoris; and conversely this disease has killed; and yet none of the organic changes just mentioned have been found. For an investigation of the pathology of angina pectoris and cases illustrative of the phenomena and sudden turns and termination of the disease as well as its treatment, I can confidently recommend to your perusal a lecture in the volume, by Dr. Chapman, recently published (*Lectures on the More Important Diseases of the Thoracic and Abdominal Viscera*). This gentleman believes angina to be originally neuralgia of the pneumogastric nerve, which spreads subsequently to other nerves, and to those of the heart among the number; and he supposes that the immediate cause of the irritation consists in irregular or misplaced gout, inasmuch as recovery has been frequently known to come on, the gouty action being excited in the extremities.

Respecting the ætiology of angina pectoris, Dr. Hope makes some very judicious observations: — They who have ascribed angina pectoris to any particular cause to the exclusion of others, have, Dr. H. thinks, unquestionably taken too limited a view of the subject; as experience has fully proved that it may originate in various causes. According to his own observation, it may originate in any cause, whether organic or functional, capable of *irritating* the heart, or of rendering it morbidly susceptible of irritation, and as structural disease of the organ has this effect more than any other cause, it is that on which the malady, in its severer forms, is most frequently dependent.

The *treatment* of angina pectoris will be conducted according to the notions entertained of its pathology. The proper course will be to take cognisance of all the probable and actual organic lesions which may precede and so often accompany the disorders of the heart. Preventive measures will be of most importance, and those directed to an avoidance of undue repletion, and especially at undue hours, and bodily exertion or mental excitement. Small bleedings and laxatives and sedatives may be required in some cases; active purging and low diet in others; tonics, and nourishing but not stimulating food in another class; and in all the occasional recourse to if not habitual use of counter-irritants. Laennec, who is not certainly prone to overrate the power of remedies, assures us that he has most frequently succeeded in alleviating the distress in angina by the magnet, so applied as to carry a magnetic current through the thorax. The alkaloids of the *ranunculaceæ*, such as the veratria and aconitine, have proved on occasions quite serviceable in the hands of their original recommender, Dr. Turnbull. A belladonna plaster over the precordial region, renewed every week or ten days at farthest, procures considerable alleviation of the attacks.

When neuralgia of the heart occurs without the other concomitants of angina pectoris, as it sometimes does when alternating with neu-

ralgia in other parts of the body, the treatment will be conducted on the same principle and by the same remedies as those in which we rely under this last mentioned circumstance.

Asthma has been at different times referred to by me in the preceding lectures as symptomatic of a diseased state of the bronchial membrane and pulmonary engorgement; and it has been formerly so described in connection with dry catarrh. A frequent cause of asthma commonly unnoticed by the practitioner, is disease of the heart. Sometimes from this latter cause blood exists in the lungs in excess, giving rise to asthmatic oppression; as is the case when the right ventricle is hypertrophous, or the left side of the heart obstructed; or still more, when these two affections coexist: also, when the circulation is merely accelerated, as by palpitation, running, or by slighter efforts in corpulent persons. Sometimes, as Dr. Hope also remarks, blood does not enter the lungs in sufficient quantity; and this may arise from the weakness of the right ventricle, from an obstruction in its mouth, or from increased resistance on the part of the lungs; as, for instance, during sleep, when the respiratory function is less active.

The variety of asthma from diseases of the heart comprises, in Dr. Hope's opinion, by far the greatest proportion of the most severe and fatal cases. Asthma from disease of the heart often imitates the characters of the other varieties; and this perhaps for a very simple reason, that the lungs are in much the same state as in those varieties. Thus, it is *humid* or *humoral*, when there is permanent engorgement of the lungs, causing copious sero-mucous effusion into the air-passages, as in cases of contraction of the mitral valve. It is *dry*, when the engorgement is only temporary, as in cases of pure hypertrophy. It is *continued*, when there is a permanent obstruction to the circulation; and any of the varieties may be *convulsive*, when the heart has sufficient power to palpitate violently. The worst cases of convulsive asthma from disease of the heart are those of hypertrophy with dilatation and a valvular or aortic obstruction.

Asthma is, in fact, then, it will have been seen, but a symptom, or a series of symptoms, for a removal of which we must direct our remedies at the organic cause, but on these points I refer you to my lectures antecedently on this subject.

DISEASES OF THE NERVOUS SYSTEM.

LECTURE CVI.

Diseases of the Nervous System—Pathology of, unknown—Molecular change in the nervous centres—Difficulties of distinguishing arachnitis from encephalitis—General and partial cerebritis—Symptomatology of—Diagnosis of—Preservation of intellect in—Production of general symptoms by local lesion.

To-day we commence the consideration of the diseases of the nervous system, and here let me remark, that, even on the very threshold, we have to encounter several difficulties; some depending upon the great obscurity of the symptoms—some upon the want of correspond-

ence between the symptoms and known organic changes, and some upon the necessarily imperfect nature of our classification of nervous affections. Many persons are in the habit of taking a limited view of the nervous system. They suppose that, when we speak of its diseases, we merely allude to affections of the brain and spinal cord; but the truth is, that the nervous system, so far as regards organization, is universal; and there is evidence to show that, even in parts and tissues which present no appearance of nerves or nervous communication, there resides a nervous power, either inherent in their organization or derived from external sources, and by the latter mode, of *nervous irradiation from surrounding tissues*, has the sensibility of serous membranes been supposed capable of explanation. But there can be little doubt that even these tissues present nervous expansions, though of an infinite delicacy. They are, we know, supplied with white vessels, and doubtless have nerves corresponding to their vessels in size and function — nerves, insensible to us in health, but when inflammation elevates the organ in the scale, capable of transmitting the most exquisite pain to the centre of perception. It seems, also, to be highly probable that nervous disease may commence not only in an affection of the brain or spinal marrow, but also in a similar condition of any part of the system. Again, if we admit the nervous system to be the governing and directing portion of the whole body, it is likely that some modification of that government *precedes* the alterations which takes place in the circulatory and nutritive functions of other parts. Thus, in all diseases it may be laid down as a general rule, that there is an affection of the nervous system, either local or general; or, in other words, that there is no disease which we could name, which does not present signs of an affection of the nervous system, either *quoad* the suffering organ itself, or of an affection more general and diffuse. If we take, for instance, a case of gastritis or hepatitis, we find a lesion of function in the nerves of the respective organs, which, in certain cases, seems local; but, if the inflammation be intense and the fever high, we have superadded to this a sympathetic affection of the brain or spinal cord. The same thing applies to all forms of local disease; for in all there is an affection of the nerves, either confined to the suffering organ, or extending to the whole system.

In reviewing the phenomena of nervous diseases, we find them presenting several varieties depending upon certain circumstances. In the first place, they vary according to the seat of the disease. We find that the signs and symptoms of affections of the cerebro-spinal system differ very considerably from those which characterise diseases of the sympathetic nerves. Again, if we take any part of the nervous system, and examine its diseases, we find that here also there is a source of variation connected with the peculiar part affected. Thus, if we take the cerebro-spinal system, we find that disease of one part of it differs most essentially in symptoms from disease of another: we may have enormous and fatal disease of the spine without the slight injury of the intellectual powers, but we seldom have disease of the brain, particularly of the surface, without a more or less appreciable lesion of the phenomena of the mind. To follow up

this point, suppose we take the diseases of the brain itself, as compared with each other; we find that their symptoms vary according to the locality, so that, whether we look to physiology or pathology, we must consider the brain as consisting of several distinct parts, and not as an inseparable whole. It is admitted, by many writers of high authority, that there is a difference between the symptoms of disease affecting the periphery, and disease affecting the central parts of the brain; and there is reason to believe that we may be able, in many cases, to diagnosticate affections not only of the centre and periphery of the cerebrum, but even of other parts of the organ.

The same variety occurs with respect to the effects of diseases of the nervous centres. In some instances we have, as the result of disease of the brain, a loss of muscular power, or of sensation, in different parts of the body — sometimes affecting the face, sometimes one side, or even both; and these paralysis may be single or variously combined. It appears, then, that the component parts of the nervous system, by being to a certain extent separate and distinct, furnish a very extensive source of variety in the phenomena of nervous affections.

Lastly, we have the varieties which depend upon the nature of the lesion. We generally observe an obvious difference between cases of nervous disease, accompanied by some *known change* in the injured part, and cases in which no such change can be demonstrated. Thus, for instance, we know the symptoms of apoplexy, and that, in the majority of cases, it is a disease connected with some perceptible change in the circulation of the brain — as excessive distension of its vessels, or an effusion of blood on its surface or into its substance. We also have some idea of the nature of inflammation of the brain; we know that its substance becomes at first red, then begins to soften, and finally is converted into a pulpy mass. Now, there are a number of symptoms which are so often and so constantly connected with peculiar organic changes, that, the symptoms being known, we can make a tolerably correct guess of the nature of the alteration, or *vice versâ*.

On the other hand, however, we have a large and important catalogue of nervous affections, in which the symptoms give but very unsatisfactory information as to the real nature of the disease, and to the elucidation of which the painful and long-continued investigations of the pathological anatomist have hitherto been directed in vain. Of the actual nature of a numerous, complex, and interesting class of diseases — the *neuroses* — we know nothing. All we can say of them is, that they are examples of lesions of function in various parts of the nervous system, presenting no trace of structural alteration *appreciable by our senses*. It is a startling fact, and one which must be a source of gloomy reflection to the pathologist, that many of the diseases of the nervous system, which present the most violent symptoms, are those in which there is the least perceptible organic alteration. Every man who has seen a case of hydrophobia, or tetanus, or mania, or epilepsy, has witnessed a train of extraordinary and horrible symptoms, infinitely worse than those

which are seen to accompany even great organic alterations of the brain.

Here, then, is a singular fact: that there is a part of the system presenting a series of diseases under this extraordinary law, that the most violent and frequently fatal symptoms are accompanied by the least perceptible organic alteration. Now, what is the nature of these neuroses? To give you a familiar illustration, let us take a case of tetanus or hydrophobia as an example. Here we have a train of symptoms exhibiting the most frightful irritation of the nervous system; and yet, when we come after death to examine, with eager curiosity, the cause of all these appalling phenomena, what do we find? — nothing. There is no unequivocal, no constant, no prominent alteration of any part of the nervous system, to throw light upon the obscurity of our opinions, and unable us to fix the nature or locality of the disease. We lay aside the knife in despair, and bitter indeed is the consciousness of our ignorance.

Two opinions have been entertained by pathologists with respect to those singular affections: one, that they are examples of some peculiar modification of the nervous influence, *independent of any organic change.* In other words, the pathologists who entertain this opinion hold, that the principle of life may be altered in its phenomena, and admit of modifications, independent of any molecular change. The supporters of this doctrine reason thus: — In the phenomena of neuroses we have a train of extraordinary and violent symptoms unconnected with organic change. Now, it is quite unphilosophical to say that there is organic change when we cannot see or demonstrate it; and, on the other hand, it is not absurd to suppose that we may have lesions or peculiar modifications of the nervous principle, without any organic alteration. The other opinion is, that in the neuroses there is some organic change, the nature of which cannot be ascertained, in consequence of our limited powers of detecting elementary changes. In whatever light we view this question it appears to be surrounded with difficulties. No one can deny that neuroses are very different from organic diseases of parts. If we compare them with that class which is most familiar to us — the inflammatory affections — we find a remarkable difference. In the first place, the neuroses may be brought on by causes not reckoned among those commonly capable of exciting inflammation. In the next place their invasion is sudden, and their progress rapid; they arrive at their *acmé* in a very short period of time, and subside rapidly. These are characters which do not belong to the ordinary forms of organic disease. Again, we often observe the utmost intensity of nervous pain without the co-existence of swelling, redness, or heat of the part affected. We find, too, that they are not to be subdued by the antiphlogistic plan; on the contrary, several of them are either relieved or cured by an exactly opposite line of practice; and many cases, which would appear to demand the lancet, are known by long experience to be most benefited by stimulants. Lastly, the most accurate and well conducted investigations of pathological anatomy have failed in demonstrating the slightest organic change in these cases — at least, where changes are found, these

are *neither constant, competent, nor commensurate with symptoms;* so that, whether we compare the information we derive from symptoms, or the result of pathological anatomy, we find a great difference between neuroses and organic diseases. It may be said that, though they are not inflammatory affections, they have some resemblance to them. This, however, is only a gratuitous supposition; for, even in the very worst cases, they present nothing analogous to the results of inflammation, and the brain and spinal cord are as free from perceptible organic change, in the majority of cases of fatal tetanus and hydrophobia, as they would be in nervous affections of a slight and transient character.

You may have been already convinced that it is difficult to form any clear or definite notion of the nature of neuroses; indeed, the only thing we can say of them is, what they are not. When we reflect on nervous phenomena, and consider how occult, how mysterious the properties of those organs which give rise to them are, we are struck with astonishment at the discrepancy between cause and effect. No medical man has ever witnessed a case of confirmed tetanus or hydrophobia without being oppressed with a conviction of the imperfect and limited state of our knowledge of nervous disease.

It may be very possible, that in these neuroses the change, though so slight as to escape our means of detection, does absolutely occur; and yet such is the nature of nervous phenomena, that we must admit that great and extraordinary effects are produced by very slight causes. Do we see any thing like this in nature? — any remarkable alterations in properties depending upon apparently slight causes? We do — we see extraordinary changes taking place in the characters of various inorganic substances, (to which I need not particularly allude), and there is no reason why the same thing should not occur in organic structures. On considering the doctrine of Isomerism, I should be inclined to think that it throws some light on this obscure subject. In chemistry, it is a well-known though singular law, that the properties of two bodies may be essentially different at the same time that their respective component elements are, as far as our knowledge goes, identically the same: and the change, whatever it may be, appears to result, not from the abstraction or removal of any of the component atoms, but from their peculiar juxta-position. Now, it being admitted in chemistry that many bodies having the same constitution possess totally different properties, and this difference being explained by the different position of their elements, it does not seem strange if the same thing should take place in the phenomena of organized beings; and, if this be the case, we have a key towards elucidating the nature of these neuroses, and can conceive how an analogous change — a difference in the arrangement of the molecules of the component parts of the nerves, or their centres — may produce new modifications of their properties without making any distinct change in their nature, or adding or abstracting a single organic molecule. I am much inclined to adopt the opinion of those who think that, in the neurosis, a peculiar organic change actually takes place, though we cannot demonstrate its

existence, because, to reason on the phenomena of animal life, independently of organization, is to plunge blindly into hypothesis, and retrace the errors of an antiquated and exploded school.

In treating of the diseases of the nervous system, I regret that time will not permit me to enter into the subject as fully as I could wish; all that I hope to be able to accomplish is, to give a sketch of some of the more prominent affections. The arrangement I purpose to adopt is the following: — 1st, I shall treat of local inflammations of the brain; 2d, of general inflammations of that organ; 3d, of mere sanguineous congestion of hyperæmia of the brain; 4th, of apoplexy; and 5th, of the various forms of paralysis.

In taking up the subject of cerebral inflammation, I beg leave to observe, *in limine*, that the brain may be attacked by general or local inflammation; and further, that it may, as stated in books, be inflamed in its membranes, or in its substance, or in both together. A great deal has been written to show that we can distinguish, during life, between inflammation of the substance and of the membranes of the brain. On this point, I believe, we may come to this conclusion — that inflammation of the membranes of the brain, or arachnitis, may be distinguished from some cases of local inflammation of the cerebral substance, but that it cannot, in the present state of our knowledge, be distinguished from *general* inflammation of the brain. We can, in most instances, make a distinction between local disease of the brain and arachnitis; but, when the whole substance of that organ is affected, our means of diagnosis fail. This, however, is not so much to be regretted, as the distinction is of very little consequence, so far as treatment is concerned. Here we arrive at the knowledge of a principle highly consolatory in the practice of medicine; namely, that in many acute cases where the diagnosis between two diseases of neighbouring parts is difficult or impossible, it is also, so far as regards immediate treatment, unnecessary.

If we inquire what are the symptoms of membranous inflammation of the brain, as laid down in books, we shall find them to be the following; pain, delirium, convulsions, alteration of sensibility, and coma. These are the symptoms which are generally given as characteristic of arachnitis; and it is quite true that they are observed in many cases of the kind. But the person must be dull indeed who thinks that such symptoms imply nothing more than an inflammatory affection of the membranes of the brain. Take, for instance, one of the most prominent symptoms — delirium; what does this imply? — that the portion of the brain which discharges the functions of intelligence or mind has been injured, and is rendered incapable of performing its office. No one will venture to assert that the membranes of the brain are the organs of thought, and that the delirium proceeds from *their* morbid condition: such a notion as this could not be entertained for a moment. What, then, are we to suppose? One of these two things — either that there must be inflammation of the substance as well as of the membranes, or that the substance of the brain must be affected in a neurotic manner without any actual inflammation. As far as delirium is concerned, it appears to me to be quite impossible to distinguish between inflamma-

tion of the brain generally, and of its membranes. The same rule applies to the other symptoms — convulsions, alteration of sensibility, and coma. I repeat, that all we can say on this subject is, that, in such cases, there is either inflammation of the substance as well as the membranes of the brain, or that with the membranous inflammation there is a neurotic condition of the substance of the brain. Yet who, in such cases, can affirm with certainty that the symptoms of derangement of the substance of the brain are merely neurotic, when inflammation is admitted to exist within the cranium, and when we know that the two inflammations commonly coexist?

The fact of delirium occurring so frequently in inflammation of the membranes of the brain, is of considerable importance, as showing, not that membranes of the brain have anything to do with intelligence, but as supporting the opinions of those who believe the periphery of the brain to be the seat of the intellectual faculties; and here is a fact which, as far as it goes, is in favour of the doctrines of phrenology. If we compare those cases of cerebral disease, in which there is delirium, with those in which it does not occur, we shall find that it is most common in cases where disease attacks the periphery of the brain, as in arachnitis. The cases in which we observe great lesions of the brain without delirium are generally cases of deep-seated inflammation of a local nature, or inflammation of those portions of the brain which the phrenologists consider not to be subservient to the production of mental phenomena. This fact, also, would seem to confirm the truth of the opinion of the difference in function between the medullary and cortical parts of the brain. It is supposed that the cortical part of the brain is the organ of intelligence, while the medullary portion performs a different function. It is, however, a curious fact, that in delirium the inflammation is generally confined to the surface of the brain, and that, in cases of deep-seated inflammation, the most important symptoms are those which are derived from the sympathetic affections of the muscular system.

Partial encephalitis may be either primary or secondary. An example of the latter is that inflammation of the substance of the brain which supervenes on apoplectic effusion, tumours, or cancer. What we generally observe, in a case of this kind, is more an alteration in the functions of the muscular system, and less of the intellect. This alteration consists at first in an apparent increase of innervation in certain muscles of the body, and we generally find that one of the earliest symptoms of local encephalitis is the occurrence of pain in some of the muscles of the extremities. This is a curious fact, but one which is well established. In partial encephalitis there is often but little, or even no pain in the head; and the only warning we have of the approach of cerebral disease is the occurrence of pain in the extremities, followed by rigidity. Here are the two most prominent symptoms of the disease — pain in the muscles of the extremities, and then rigidity. Further, we have alternate spasms and relaxations of the muscles, in which, however, the power of the flexor muscles ultimately prevails; so that, if the disease be in the forearm, it may become permanently flexed on the arm, and the contraction of the fin-

gers is sometimes so great as to drive the nails into the flesh. If it affects the leg, the heel may be pressed against the buttock sometimes so forcibly as to form a sore. As the case proceeds, the limb becomes more fixed in its new position, and every attempt to extend it causes pain. During the prevalence of these symptoms, it frequently happens that the patient does not feel pain in the head, or any diminution of intellectual power. The absence of pain in the part affected may be accounted for by recollecting that it is a general law, that all inflammatory affections of deep-seated parts are, to a certain extent, of a comparatively painless character; and we may account for the non-existence of any lesion of the mind, by remembering that the disease is partial, and confined to a portion of the brain which appears to have little or no connection with the intellectual functions. In cases of this kind, when the muscles of the face are affected, the phenomena are interesting, from their being (*in the first stage*) the reverse of those of apoplexy. The face is drawn *from* the affected side, and the tongue pushed, by the opposite half of the genio-hyoglossus muscle, *to* the affected side. This is the spastic stage, when complete disorganization has not yet occurred. But when this happens, then the phenomena of the face are like those of apoplexy, because the opposite muscles, which were in a spasmodic, are now in a paralysed state; so that the face is drawn *to* the affected side, and the tongue pushed *from* it, by the healthy action of muscles which are deprived of their antagonists.

I mentioned before that delirium may not occur during the course of a partial encephalitis; and I gave, as a reason for this, the circumstance of the disease being of small extent, and confined to parts of the brain which do not discharge any of the functions of mind. Another explanation has been given, drawn from the consideration of the double nature of the brain. It is thought that, where disease exists in one part of the brain, sanity may be still preserved in consequence of the healthy condition of the corresponding part; but where disease attacks both hemispheres together, as in a case of arachnitis, then there is a distinct lesion of the mental faculties.

The next stage of partial encephalitis is that in which the diseased portion of the brain breaks down, softens, and is converted into purulent matter. This stage is marked by a new train of symptoms. The first stage is characterised by pain occurring in the muscles of the face, or of the extremities of either side, and followed by great rigidity. The second stage is of a different character; the rigidity and spasm of the muscles diminish, and are succeeded by a paralytic and flaccid state of these organs. Voluntary motion on the affected side now becomes impossible, the organ on which it depends being destroyed. Now let us, for sake of arrangement, call the first, or spastic condition, the convulsive paralysis, and the second, the paralysis with resolution. In the first, or convulsive stage, the brain is affected in the first degree; it is labouring under irritation or actual inflammation, and the disease still holds out a tolerably fair prospect of relief or cure. But in the second stage a cure is impossible, and hence it is a matter of the greatest importance to commence our operations at an

early period; and, by having recourse to prompt and active treatment give the patient every chance for a cure.

In the partial inflammation of the substance of the brain, sensation is variously altered. In some cases motion is lost, while sensation remains intact; in others, sensation is partially or wholly abolished. In many instances the intellectual powers remain in all their integrity, or but little impaired, even after the occurrence of symptoms which mark the softening down of the substance of the brain, and its conversion into purulent matter. In a few there is, during the first stage of the disease, a slight alteration in the state of the intellect, marked by a certain degree of excitement or exaltation of the mental faculties, and this, on the supervention of the second stage, is exchanged for a state of depression. In fact, the morbid phenomena of the mind and of the muscular system, where they coexist, appear to be regulated by the same laws. Where the disease is extensive, you can easily observe the injury of the mental faculties which accompanies the second stage; the patient answers slowly when questioned; his memory is weak, and his countenance has a stupid expression. But cases, even of extensive local suppuration, have been described by various authors, in which there was no lesion of the intellectual functions observed. These, however, generally admit of an explanation. Thus, in the cases recorded by Lallemand, the abscesses were situated in the cerebellum, pons Varolii, and other parts which are not supposed to have any connection with the phenomena of mind. There are several well-authenticated cases of extensive disease, not only of these parts, but even of the substance of the hemispheres, occurring without any appreciable lesion of the intellect. Thus, Mr. O'Halloran gives the case of a man, who, after an injury which destroyed a large portion of the frontal bone, had extensive suppuration of the brain, and lost an enormous quantity of the substance of one of the hemispheres, and yet preserved his intellect entire up to the moment of his dissolution. There is some difficulty in explaining this. It is an opinion entertained by some physiologist, that when one hemisphere is diseased, its functions are discharged by the other; and that, the brain being a double organ, disease of one side does not impair the functions of the other. But, in answer to this, it may be urged that there are many cases on record in which disease of *a single hemisphere* has produced great alterations of intellect. The supporters of the former opinion attempt to explain such cases in this way. They state, that in the majority of such cases there was, besides the local encephalitis, inflammation of the arachnoid membrane, and that the lesion of intellect was not so much the effect of local disease of the brain as the result of its complication with an arachnitis engaging the whole periphery of the organ. In the next place, they explain the fact of a *general* affection of the brain arising from *local* disease, as depending in most cases on the pressure which the tumefied state of the diseased portion necessarily makes on the second hemisphere; and they state that this pressure must be very considerable, as the brain, being confined within a bony cavity, has no power of expanding itself. Now, it is a most interesting fact, in support of this view, that, in a great number of the cases of loss of brain with preservation of intel-

lect *all through the case*, an extensive opening existed in the bones of the skull, so as to permit of expansion in the diseased hemisphere, and prevent the pressure being exercised on the opposite one. This point appears to be borne out by the result of Mr. O'Halloran's cases, and by many other examples. Lastly, in every acute case of local inflammation of the brain, two causes having a tendency to produce symptoms exist. One of these is the local disease which gives rise to those phenomena of motion and sensation which we observe on the opposite side of the body; the other is the determination of blood to *the whole brain*, the result of the irritation of that disease. — "*Ubi stimulus ibi humorum affluxus.*"

LECTURE CVII.

ENCEPHALITIS—diagnosis of—Preservation of function with organic disease—Vicarious actions of parts—Importance of pathology to phrenology—Use of pathology to phrenologists—Arachnitis at the base of the brain—Symptoms of—Influence of age over the intellectual faculties—[Discussion in the French Academy on the organ of language]—Influence of the optic thalami and corpora striata on the motions of the extremities—Diagnosis of disease of the cerebellum—Connection with the generative system—Remarkable cases of.—[Experiments of Dr. Budge.]

WE were occupied at our last lecture in considering some of the phenomena of partial encephalitis, by which is generally meant a localised inflammation of the deep-seated parts of the brain; because superficial inflammation of the cerebral substance is very rarely partial. I endeavoured to show that the diagnosis of this local encephalitis was to be drawn, in a great measure, from the occurrence of pain and muscular affections of *one side of the body;* in other words, that the phenomena of this disease were partial, so as to give us at once a distinction between general and partial inflammation of the brain. In cases of general inflammation, we have convulsions of both sides — delirium and coma; in the partial form these symptoms are absent until complication takes place. Thus the supervention of delirium, or of convulsions on both sides, in a case where previously the signs of only *partial* encephalitis existed, would point out, in all probability, an extension of disease to the opposite hemisphere. I also endeavoured to point out the different modes in which partial encephalitis might be accompanied with symptoms of a general character, or affecting both sides; that there might be a coexisting inflammation of the membranes; or that the pressure of the diseased on the healthy hemisphere of the brain might be the cause of the complication. I stated, that some of the most remarkable cases of extensive destruction of the brain, without perceptible injury of the mental powers, were those in which a traumatic opening in the skull gave full scope to the swollen parts, and obviated the effects of pressure on the sound hemisphere. I also observed that, in cases of local affections of the head, there are two causes which have a tendency to produce general symptoms. One of these is the cause which determines the pain and muscular affection of the opposite side; the other is the general determination of blood to the head; so that we may

have cases in which the *actual inflammation* is limited to a part of one hemisphere, and yet from the general determination of blood to the head, we may have coma and general symptoms.

To return again to the interesting consideration of great loss of cerebral substance with preservation of intellect, I have to remark, that this circumstance is one which some persons might quote against the opinion that the brain was the organ of intelligence; and I believe this fact has been laid hold of by the opponents of phrenology, and put forward as a powerful argument against the truth of its doctrines. Thus, for instance, in the case of Mr. O'Halloran's patient, who lost a large portion of one hemisphere, and yet, with all this mischief, the powers of the intellect remained unimpaired; it would not seem strange if a person should say, here is vast destruction of substance without any lesion of intelligence; how, then, can the brain be considered as the organ of thought? But let us look at this matter in its true point of view. In the first place, it is to be remembered that cases like this are rare — that they are to be considered as the exception and not as the rule. I have already shown you, that it is a law of pathology that lesion of structure and lesion of function are not always commensurate. This law applies to the brain as well as to all the other organs. To say that the brain was not the organ of intelligence, because in cases of extensive cerebral disease that intelligence was preserved, is false reasoning. A man will digest with a cancerous stomach; is it to be argued from this that the stomach is not the organ of digestion? I have seen the liver completely burrowed by abscesses, yet the gall-bladder was full of healthy bile. I have seen one lung completely obliterated, and yet the respirations only sixteen in the minute, and the face without lividity. What do these facts prove? Not that the health of organs is of no consequence, but that with great disease there may be little injury of function.

By reference to the original laws of organization, we may (in some cases at least) arrive at an explanation of this fact. You know that organs are primitively double; and we find, that though the fusion at the median line is produced by development, yet that the symmetrical halves still, to a certain degree, preserve their individuality. Thus we see how the laws of organization affect the phenomena of disease, and recognise a provision, acting from the first moment of existence, against the accidents of far distant disease.

Now, admitting that the brain is the organ of thought, we may suppose that, as in case of partial obstruction of the lung from inflammation, the remainder of the organ takes on an increased action, so as to supply the place of that which has been injured or destroyed. We know that if one lung be hepatised, the other takes on its functions, and carries on the process of respiration for a time. That this is the case, is shown, first, by life being continued, and, secondly, by the stethoscope, which informs us that the respiration of the lung, which has a double duty thrown upon it, is remarkably intense, proving the force of its action; and it has been further established that the lungs which thus takes on a

supplemental action may become enlarged and hypertrophied. May not this also occur in the brain. There is no reason why such a pathological phenomenon, occurring in one viscus, may not also take place in another. But the opponents of phrenology say, supposing the organ of causation to be destroyed, how can the person continue to reason? It strikes me that the only way in which we can account for this is, by supposing that other parts of the brain take on the functions of those which have been injured or destroyed. Nor is there anything extraordinary or anomalous in such a supposition. We see, almost every day, examples of this kind. We see that in certain diseased states of the liver, accompanied by suppression of its secretion, its functions are assumed by other parts, and bile continues to be separated from the blood by the kidneys, salivary glands, and by the cutaneous exhalents. Here is a remarkable case, in which the glands and other parts take on the performance of a function totally different from that in which they are ordinarily employed. We find, also, that when the urinary organs are obstructed, urine, or its principles, are discovered in parts of the system where we should not at all expect them. Thus we have a very remarkable case detailed in the *American Journal of the Medical Sciences*, in which we find that a youug female, who laboured under paralysis of the urinary organs, discharged urea from almost every part of the body, even from the ears. Neither is there anything very extraordinary in this. In several instances of suppression of the menstrual discharge, do we not see a vicarious secretion taking place from the surfaces of parts the most distant, and unconnected with the uterine system? It is a well-established law, that when the functions of organs are suspended or destroyed, other parts will often take on the action of the injured viscus. Now, supposing that a portion of the brain is to be looked upon as the organ of causation, and such portion is injured or destroyed, there is no reason why the remaining sound portion of brain should not take on, at least to a certain extent, in addition to its own, the functions of that part which has been injured. If, independently of any phrenological views, we admit the brain to be the organ of thought, there is no reason why we should not admit that the loss of intellectual power, produced by lesion of one part, may not be supplied by an increase of activity in the remaining portions. It is only by a supposition of this kind that we can account for the preservation of the integrity of mind in many cases of disease of the brain. If we admit the phrenological doctrines, we can suppose that when one organ is injured, another may take on an additional function, and in this way preserve the integrity of the intellect; so that, whether we reason from phrenology or not, the continuance of soundness of mind, in cases of injury of the brain, can be understood when you come to contrast it with other analogous pathological facts. I again repeat, that it is not more extraordinary that, in case of local injury of the brain, the sound parts should take on a supplemental action, than that bile should be eliminated by the salivary glands, skin, and kidneys, or that the principles of urine should be discharged from almost every part of the system, or that a vicarious

discharge from the roots of the hair should supply the place of the uterine system.

On this subject, one point should always be borne in mind, viz., that we may be wrong in saying that a patient is *quite sane*, while he is still an invalid and in bed. Unless we can show that after his recovery, and in his various intercourse with the world, he preserves his original intelligence, it would be wrong to assert that there has been absolutely no lesion of intellect consequent on the affection of the brain. While lying at ease in bed, and unaffected by any moral stimuli, he may seem to possess a sound condition of mind; he may put out his tongue, or stretch forth his hand, when requested; he may give an accurate account of his symptoms, and answer all the ordinary medical interrogatories with precision. But you are not, from this, to conclude that he is perfectly sane. Many persons, under these circumstances, have died in bed, and appeared to preserve their intellect to the last; but in such cases the test of sanity, *intercourse with the world*, could not be fairly applied, and hence I think that there are not sufficient grounds to pronounce a decided opinion as to the real condition of the intellect in such cases.

Before I quit this part of the subject, I wish to make a few remarks on the doctrines of phrenology. There can be no doubt that the principles of phrenology are founded on truth, and, of course, highly deserving of your attention, as likely, at some future period, when properly cultivated, to exercise a great influence over medical practice. The great error of the phrenologists of the present day, consists in throwing overboard the results of pathological anatomy. If a pathological fact is brought forward, as appearing to bear against the validity of their opinions, they immediately exclaim, "we dont recognise any fact or principle drawn from disease; our science has to do with the healthy, and not the morbid, condition of the brain." Now, this is altogether absurd. Phrenology, if true, is nothing but the physiology of the brain, and pathology is nothing but the physiology of disease. Phrenology must be tested by disease as well as by health, and if it does not stand the test of pathology, it is wrong. If phrenology be a science founded on truth, if it is a true physiology of the brain, or of that portion of it connected with mental phenomena, one of two results should obtain — either that it should be confirmed by pathology, or that the difficulties, which pathology presents, should be explicable in manner consistent with the science. The phrenologists, in my mind, are doing a direct injury to the cause of their science, by their unnecessary and ill-timed hostility to pathology. It is idle to say, as they do, that theirs is the science of health, and that it is unfair to apply to it the test of disease. From pathology is drawn a host of facts, from which the doctrines they profess derive their principal support. The mere phrenologist, who understands not and despises pathology, is nothing better than a charlatan, and professes a science which he does not comprehend. If he would recollect that the brain in a state of health is most, and in a state of disease least adapted to the purposes of thought, he would see that this is one of the strongest arguments in favour of his doctrine, that the brain is the organ of mind. The more healthy

it is, the fitter it is to discharge the functions of intellect, and *vice versâ;* yet phrenologists are so absurd as to think that pathology has nothing to do with their science.

But besides confirming the doctrine that the brain is the organ of thought, there are innumerable facts drawn from pathology, which have a tendency to prove that particular parts of the brain are the organs of peculiar phenomena. We see an injury on one part of the brain accompanied by a train of symptoms indicating some peculiar lesion of mind; we see an affection of another part, attended by a different class of phenomena. Here pathology, the science which phrenologists reject and despise, goes to establish the groundwork of their doctrines, that the brain consists of a congeries of parts, having each a separate and distinct function. We find, for instance, that disease of one portion of the brain affects the intellect; of another the generative organs; of a third, the muscular system. What does this prove but that the brain is not a simple organ, but composed of a congeries of parts, each of which governs a different part of the system, or ministers to a peculiar purpose? Now, what is this but what the phrenologists themselves wish to prove?

Further, the professors of phrenology have placed all their organs on the surface of the brain, and for this they have been loudly censured. Phrenology, it is urged, knows, or professes to know, nothing about the central parts of the brain, which must be equally important with the superficial, and have confined their investigations to the surface alone. Now, it is a curious fact, that the pathology which they deny, in this instance, furnishes the best reply to this objection. I mentioned, at my last lecture, that if we examine the symptoms of delirium, we find that it characterizes the inflammation of the periphery, and is commonly wanting in that of the deep-seated portions. In other words, mental alienation is the characteristic of the disease of that portion of the brain where the phrenologists have placed the intellectual organs. Here is a strong fact in favour of the doctrines of phrenology, derived from that science which the mere phrenologist throws overboard and despises. Again, according to the researches of some celebrated French pathologists, there are a number of facts to show that there is a remarkable difference between the symptoms of arachnitis of the convexity and of the base of the brain. This conclusion, which, after a most careful series of investigations, was adopted by them, is borne out by the results of my experience, and appears to me to be established on the basis of truth. They have discovered that arachnitis of the convexity of the brain is a disease characterized by prominent and violent symptoms, early and marked delirium, intense pain, watchfulness, and irritability. We have first delirium, pain, and sleeplessness, and then coma. But in arachnitis of the base of the brain, the symptoms are of a more latent and insidious character; there is some pain, and the coma is profound, but there is often no delirium. What an important fact for the supporters of phrenology is this, and how strikingly does it prove their absurdity in rejecting the lights derived from pathology? Here we find the remarkable fact, that inflammation of the arach-

noid, investing the base of the brain to which the phrenologists attach, comparatively, no importance, is commonly unattended with any lesion of the intellectual powers, while the same inflammation of the convexity is almost constantly accompanied by symptoms of distinct mental alienation.

It is objected to the phrenologists that they know little or nothing of the central parts of the brain; that though these parts may be fairly considered to be of as much importance as any others, still they do not admit them to be organs of intellect. Now, what does pathology teach on this subject? It shows that we may have most extensive local disease of the central part of the brain — that we may have inflammation, suppuration, abscess, and apoplexy, without the slightest trace of delirium. Indeed, there can be no doubt that the central portions of the brain have functions very different from those on the surface. They appear more connected with another function of animal life, muscular motion and sensation. Then let us examine the phenomena of old age. Every one is familiar with the fact, that when a man arrives at an extreme age, he generally experiences a marked decay of intellectual power, and falls into a state of second childhood. Does pathology throw any light upon this circumstance? It does. From a series of ingenious and accurate investigations, conducted by two continental pathologists, Cauzevielh and Desmoulins, it has been found that a kind of atrophy of the brain takes place in very old persons. According to the researches of Desmoulins, it appears that, in persons who have passed the age of seventy, the specific gravity of the brain becomes from a twentieth to a fifteenth less than that of an adult. It has also been proved that this atrophy of the brain is connected with old age, and not, as it might be thought, with general emaciation of the body; for, in cases of chronic emaciation from disease in adults, the brain is the last part which is found to atrophy; and it has been suggested that this may explain the continuance of mental powers, during the ravages of chronic disease; and also the nervous irritability of patients after acute diseases, in which emaciation has taken place.

I might bring forward many other facts to show that phrenology is indebted to pathology for some of the strongest arguments in its favour: and I think that those phrenologists who neglect its study, or deny its applicability, are doing a serious injury to the doctrines they seek to establish. The misfortune is, that very few medical men have turned their attention to the subject; and that, with few exceptions, its supporters and teachers have been persons possessing scarcely any physiological, and no pathological knowledge. Phrenology will never be established as a science, until it gets into hands of scientific medical men, who, to a profound knowledge of physiology, have added all the light derived from pathological research. To give you an instance of the mode of reasoning of the non-medical phrenologists. In their drawing-room exhibitions, they appeal with triumph to the different forms of the skull in the carnivorous and graminivorous animals, with respect to the development of destructiveness; and all are horrified at the bump on the tiger's skull. But, as Sir H. Davy well observes, this very protuberance is a part of the

general apparatus of the jaw, which requires a more powerful insertion for its muscles in all beasts of prey. Phrenology, as generally taught, may answer well for the class of dilettantis and blue stockings, or for the purposes of humbug and flattery; but its parent was anatomy, its nurse physiology, and its perfection must be sought for in medicine. The mass of inconsequential reasoning, of special pleading, and of "*false facts*," with which its professors have encumbered it, must be swept away, and we shall then, I have no doubt, recognise it as the greatest discovery in the science of the moral and physical nature of man that has ever been made. I feel happy, however, in thinking that, of late, the science has been taken up on its true grounds, in Paris, London, and Dublin. Vimont's splendid work on *Comparative Phrenology* will form an era in the science. In London, Dr. Eliotson has directed the energies of his powerful mind to the subject; and in Dublin we have a Phrenological Society, of which Dr. Marsh is the president, and my colleague, Dr. Evanson, the secretary; and under such auspices, much is to be expected.*

Having drawn your attention to the ordinary symptoms of local encephalitis, our next inquiry is, how far we can diagnosticate the actual seat of disease from phenomena observed during the life of the patient. Do not suppose, for a moment, that this part of the subject is undeserving of your attention, in the strongest sense of the word. Recollect that the more accurate and extensive is diagnosis, the more certain and available is the practice of medicine. On this subject, matters are not altered to the same extent as in the cases of chest or abdominal diseases. In our knowledge of the two latter, we have made vast strides within the last few years; but in cerebral affections, though much has been effected, much still remains to be done; and it is not improbable that some of the opinions on this subject, still promulgated in schools, require correction. If we examine the various cases of cerebral disease on record, we find that in some the paralysis was complete, and that sensation and muscular motion became, as it were, annihilated. In other cases, the muscular system alone appeared,

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* [As a valuable contribution to the science of anthrophology the great work, *Crania Americana*, by Dr. Samuel George Morton, deserves special notice and consideration. Though not prepared in the spirit, it furnishes important illustrations of phrenology. The author, in his dedicatory epistle to Mr. John S. Phillips, says: "You and I have long admitted the fundamental principles of phrenology, viz., that the brain is the organ of the mind, and that its different parts perform different functions; but we may have been slow to acknowledge the details of cranioscopy, as taught by Dr. Gall, and supported and extended by subsequent observers. We have not, however, neglected this branch of inquiry, but have endeavoured to examine it in connexion with numerous facts, which can only be fully appreciated when they come to be compared with similar measurements derived from the other races of men. Yet I am free to acknowledge that there is a singular harmony between the mental character of the Indian and his cranial developments as explained by phrenology."—B.]

to suffer; while in a third class we find that sensibility is destroyed, while the power of motion remains intact. Again, in some we have complete hemiplegia, in others the paralysis is but partial; in some the affection is slight and transient, in others it is incurable and permanent. The result of all this would appear to imply that there are different states and seats of cerebral disease, producing different modifications of nervous phenomena. It has been taught that a paralysis of the organs of speech points out a lesion of the anterior lobes of the brain, and there are many cases on record in support of this opinion. Here is a pathological statement strongly in favour of the doctrines of phrenology. But, on the other hand, it must be confessed that there are numerous cases on record of lesion of the powers of speech, independent of any affection of the anterior lobe; and hence, so far as the diagnosis of lesion of the anterior lobe, derived from loss of speech, is concerned, we cannot make up our minds. You are aware that the phrenologists place the organ of language in the anterior inferior part of the brain. Now, when an affection of this portion of the brain is found to coincide with the loss of speech, it is all very well; but the difficulty is to account for those cases of loss of speech in which there is no appreciable lesion of the substance of the anterior lobe. In investigation on this point, however, you must bear the following distinction carefully in mind. The organ of language of the phrenologists is not properly the organ of the *power of speech*, but that by which, as it were, thought is converted into language. A man, from paralysis of his tongue, might be incapable of speaking; and such a case, existing without lesion of the anterior lobes, might be most unfairly quoted against the phrenologists.*

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* [A very interesting discussion on this subject was held a few years ago, at a meeting of the *French Royal Academy of Medicine*. M. Bouillaud, in a memoir communicated fifteen years ago, had collected the details of sixty-four cases, to show that the phrenological organ of language is seated in that portion of the anterior lobes of the cerebrum which rests on the roof of the orbits, as first announced by Gall, and subsequently confirmed by the observations of Spurzheim and others. On the present occasion M. Bouillaud added the reports of thirteen other cases, which have come under his notice, and all of which, he thinks, tends to prove the correctness of the phrenological doctrine. He admits that several instances apparently opposed to this doctrine have been published by MM. Cruveilhier, Andral, Lallemand, and others; but he insists that the details of these cases have always been unsatisfactory, and never sufficiently complete for the purposes of an absolute decision.

MM. Richoux and Cruveilhier followed in opposition to M. Bouillaud, introducing, among other objections, that one, the fallacy of which has been pointed out by Dr. Stokes in the text — when he states: "The organ of language of the phrenologists is not properly the organ of the *power of speech*, but that by which, as it were, thought is converted into language." The phrenological faculty of language is certainly not the same as the faculty of speech or articulation. One

Again, paralysis of the upper extremities has been connected with disease of the optic thalami, and posterior lobes of the brain. It is

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is the memory of words; the other is the mere power of expressing or enouncing them.

M. Blandin advocated the opinion of M. Bouillaud and the phrenologists, and, in confirmation of them, related the following case: —

"A child received a musket-ball in the orbit; after destroying the eye it traversed the exterior orbitar plate, and made its escape just in front of the ear. This child, whom I saw at the Hôtel-Dieu several weeks after the accident, had lost all power of articulation. During its recovery, it was necessary to teach and accustom it to pronounce words. When it left the hospital, it was able to articulate its own name, and a few other words. Now in this case is it not highly probable that the superior orbitar plate was fractured, and that an inflammatory process had extended to the point of the anterior lobe which rests upon it?

"As to the objected cases, in which the lesion of other parts of the brain seemed to occasion a loss or some disturbance of speech, they prove nothing in my opinion against the opinion of M. Bouillaud; for the corpus striatum and the thalami optici, for example, contribute by their irradiations to the formation of the anterior lobes; and the same may perhaps be said of the fibres of the upper part of the medulla spinalis, which are in truth the primary roots of these parts.

"On the other hand, even if it can be shown that in some cases, where there has been disease of the anterior lobe, the speech has not suffered, it may possibly be that the immediate seat *du principe coordinateur* was not involved in the lesion. M. Bouillaud has not affirmed that the whole of the anterior lobe presides over the faculty of language; a small portion of it only being, according to the phrenological views, the seat of this power.

"M. Martin Solon adduced the following cases from his own practice in confirmation of the same doctrine: —

1. "A girl had been for a length of time affected with slight impediment in her speech; gradually she lost the power of uttering even a syllable, and every movement of the tongue was lost. Symptoms of contraction and spasm came on, and she died. On dissection, besides the usual traces of chronic meningitis, several hydatids were found in the medullary substance of the anterior cerebral lobes.

2. "In another case, whose progress and general character had been very similar to those in the preceding one, there was found on dissection a well-marked softening or *ramollissement* of the anterior lobe.

3. "A young girl lost her speech after a severe attack of fever. When all the active symptoms had disappeared, frictions over the forehead with an ammoniated pommade were employed, and the speech gradually returned. Similar successes attended the use of the same means, in a case where the loss of speech followed a suppression of the catamenia.

"M. Gerdy expressed himself unsatisfied with such cases as those adduced by the preceding speaker.

"One single well-authenticated case of decided lesion of the ante-

the opinion of Bouillaud, Serres, and others, that the optic thalami regulate the motions of the upper extremities; and it is a fact, that in many instances of paralysis of the upper extremities, disease has

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rior lobes, in which the speech was unaffected, is quite sufficient he thought to overthrow the phrenological doctrine. Now, many more than one such case may be adduced. Thus, in the remarkable instance reported by M. Andral, of a youth who suddenly lost his speech, sight, and intellect, all the symptoms disappeared after a certain time; the speech returned, and also the intellect and vision. Subsequently this youth died — the amendment having, however, continued to the last, — and on dissection the right anterior lobe of the brain was found to be excessively softened. M. Bouillaud himself is candid enough to acknowledge that it is a very curious instance, and not easily explicable. Many other such cases are to be found in various pathological records.

"M. Ferrus, one of the physicians of the Bicêtre Hospital, replied to the observations of M. Gerdy. He was quite willing to admit that, while avowing his belief in the truth of the general principles of phrenology, he did not give his assent to every doctrine inculcated by its professors. He though that it required many restrictions, and stood in need of not a few modifications; but in his opinion it had already thrown too valuable a light upon the functions of the brain to merit such reproaches as had been used by MM. Cruveilhier, Gerdy, Rochoux, &c., &c. He had satisfied himself by numerous researches that the faculty of language is really seated, or, in other words, has its material organ in the convolutions of the anterior lobes. I have, says he, over and over again observed, that in those persons who are gifted with a striking memory of words, and an aptitude for the acquisition of languages, the eyes are usually prominent and full, in consequence of the great development of the inferior portion of the anterior cerebral lobes. The lower part of the forehead, too, is usually projecting in such persons.

"My pathological observations have led to a similar result; and they are certainly not at all in accordance with those of M. Rochoux. I have, for example, repeatedly observed that, in the majority of cases where the speech had become affected after the delirium of insanity, the anterior and inferior convolutions of the brain exhibited striking alterations, either as to the consistence of their cineritious matter, or in the relations between it and its investing membranes, or in the more deeply-seated medullary substance. Three days ago I examined the body of an insane, almost idiotic, patient, who had become paralytic; for a length of time his speech had been confused, and his condition presented no chance of amendment. More lately his symptoms had become more acute and violent. The excessively congested state of the bloodvessels of the meninges and of the substance of the brain accounted for this aggravation; while the unusually strong adherence of the pia mater to the special convolutions — designated by Gall as the organ of language — afforded a rational explanation of the loss of speech in this case.

"M. Ferrus adduced two or three other similar examples in confir-

been found in these parts. We might term the following a synthetic case, illustrative of the doctrine: — "A soldier was wounded in the right shoulder with a lance, in consequence of which he got an aneurism of the axillary artery, for which an operation was performed. At the moment the ligature was tightened he experienced exquisite pain in the situation of the ligature, which extended to the brachial plexus; this continued until the next day, and then ceased. On the fourth or fifth day the pain returned with increased violence, and continued until the seventh day, when it became intolerable. He was blooded, but without any good effect; he then became comatose; his head was drawn backwards; he had alternations of stupor and excitement, and soon after expired. On dissection, the ligature was found to embrace some of the principal branches of the brachial plexus, and there was an abscess in the posterior lobe of the brain, extending to the optic thalamus." Here we have a case of injury of the upper extremity, and that portion of the brain which is supposed to govern it was found in a state of manifest disease. Serres gives, also, the details of some experiments in support of this opinion. On removing the posterior part of the right hemisphere of the brain in a dog, he found that the left anterior extremity became paralytic; he prolonged his incisions into the corresponding portion of the oppo-

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mation of the phrenological doctrine on this subject. He then alluded to the cases reported by Andral and others, which appear to be conflicting with these; and suggested that most of them are far from being conclusive, seeing that in by far the larger majority one organ only of the faculty has been injured, its fellow in the other hemisphere remaining the while almost or altogether intact. But even admitting that both organs have been found seriously altered, without the faculty of being deeply disturbed, such cases by no means afford so decisive an argument against M. Bouillaud's views, as some of my learned colleagues appear to imagine. Every pathologist knows how frequently different parts and viscera are found after death almost totally disorganized, which had given out during life no very decided symptoms of disturbance or disease. If this be true of the brain *en masse*, and of other organs, why may it not be equally so of parts of the brain?

"M. Bouillaud closed the discussion — which had continued during three *seances* of the Academy — by replying to the various arguments and facts which had been adduced by his opponents.

"Certainly we must acknowledge that the phrenological doctrine has on the whole very successfully resisted the attacks of its adversaries during this rather protracted ordeal, and that not a little merit is due to M. Bouillaud for his manly and able defence of his positions. Even M. Cruveilhier admitted that he did not combat *à priori* the localization of the faculties of the mind; moreover, that he willingly acknowledged the utility of phrenology, and the services which it had already conferred; but, continued he, 'I have not yet heard sufficient reasons to place the organ of language in one part of the brain to the exclusion of other parts.'" — *Gazette Médicale.* — B.]

site hemisphere, and found that the right extremity became paralysed. In another dog he plunged a bistoury into the posterior part of the right lobe, and found that the left anterior extremity became affected with convulsive motions. He then introduced into the wound a few drops of nitric acid, so as to produce inflammation of that portion of the brain, and observed that the convulsions of the left fore-foot became more violent; in fact, that the animal had all the symptoms of a local inflammation of the brain, namely, convulsions, rigidity, and then paralysis. Rolando has performed a series of experiments with the same view, and his conclusions are exactly those of Serres. So that, if we connect the results of these experiments with some facts drawn from pathology, we might conclude that the optic thalami, and posterior lobes of the brain, have a very important share in regulating the muscular motions of the upper extremity. I may here state, that, in this city, a case of a female occurred, who got an attack of severe pain in the left hand and fingers, which became afterwards contracted; and she had, in addition to this, alternate flexions and extensions of the fore-arm, *followed by resolution and paralysis.* On dissection, there was an abscess found in the right optic thalamus; the rest of the brain was healthy.

With respect to those cases in which there is paralysis of one of the lower extremities, it has been taught that it arises from disease of the corpus striatum. On the anterior lobe the following case is given by Serres: — "A woman, forty years of age, had an attack of apoplexy, from which she recovered with the left leg in a state of complete paralysis, and the left arm admitting of a slight degree of motion." Here was a case of lesion of both the upper and lower extremity on the same side, but in the former the paralysis was partial, in the latter complete. On dissection, it was found that two circumscribed abscesses existed in the substance in the right hemisphere, the larger situated in the *corpus striatum*, the smaller in the optic thalamus. Another case is given of a patient who got paralysis on the side; the muscular power of the arm being completely destroyed, while the leg retained a considerable degree of motion. In this case the *corpus striatum* was but slightly affected, while nearly the whole substance of the optic thalamus was destroyed. I have also to remark, that Serres performed similar experiments on the corpus striatum in dogs, and came to the conclusion, that it governs the motions of the lower extremities. The structure, extent, and special action of the corpus striatum and optic thalamus, are said to afford some explanation why, in ordinary cases of paralysis, the arm is more often affected than the leg, and does not recover so soon. The fact of the prolongations of the optic thalami being much more complicated and extensive than those of the corpora striata, is thought to explain their greater liability to disease.

There are, however, not unfrequent exceptions to this law; and it is not uncommon to meet with cases which militate against the doctrines laid down by Serres, and other pathologists, particularly so far as regards the connection between the *corpora striata* and the government of the lower extremities, so that I would have you

look upon it as a point *by no means* fully established. The latest observations on this subject are by Andral, who brings forward many facts opposed to the opinions of Serres, Foville, &c., &c. Out of seventy-five cases of accurately circumscribed disease of the brain, the disease being hemorrhagic, or otherwise, he found that in forty, where the paralysis existed in both extremities of one side, there were twenty in which nothing was injured but the anterior lobe, or the *corpus striatum ;* while in nineteen the lesions existed in the posterior lobe, or the optic thalamus. In these seventy-five cases, also, were twenty-three in which one arm was paralysed. In these, eleven presented the disease in the anterior lobe, or in the *corpus striatum ;* ten in the optic thalamus, or posterior lobe ; and two in the middle lobe. Finally, out of these cases were twelve of paralysis of one arm ; ten of these presented disease in the *corpus striatum,* or anterior lobe ; and two only with disease in the optic thalamus, or in the posterior lobe.

These facts prove how uncertain the matter is yet. It would appear that when a simultaneous and equal injury of both corpora striata and optic thalami exists, it would be natural to expect complete paralysis of one side, and I believe there are some cases on record in support of this opinion. But when you have paralysis affecting both sides of the body, you are not to suppose that there is necessarily an affection of the *corpora striata* and optic thalami, for such symptoms, in the majority of cases, are found to depend upon either an intense congestion of the brain, or a large serous or sanguineous effusion. The same phenomena are produced by the pressure exercised by the diseased on the sound hemisphere, in a case of local encephalitis, or by disease affecting the upper part of the spinal cord.

With respect to disease of the cerebellum, the only means of determining its affections, consists in first considering the seat of the pain, if any, and, in the next place, the effect on the genital system. There are a great number of cases detailed in various treatises in proof of the close connection between the cerebellum and the genital function. I shall relate a few of these. A man, aged thirty-two, got an attack of apoplexy, followed by violent erection of the penis, which continued until death ; here we have a case of apoplexy accompanied by priapism. On dissection, the whole of the cerebrum was found healthy; but there was an apoplectic effusion in the middle lobe of the cerebellum.

Another case is given of a man, aged fifty-five, who died of apoplexy in a brothel, and who, after the attack, had violent priapism. On dissection, the substance of the cerebellum was found to be extensively destroyed, and there was an apoplectic effusion in the fourth ventricle. There is a remarkable case on record of a prostitute, in whom the clitoris was extirpated, as it was considered that it was the irritation of that organ which brought on a pernicious habit, by which her health was greatly impaired ; and it was conceived that, as soon as the supposed source of excitability was got rid of, she would give up her vicious propensity, and be restored to health. But in this instance it is probable that the effect was taken for the

cause; for on her death, which took place some time after, the cerebellum was found to contain a number of chronic abscesses. Serres gives the case of a woman, who died of an apoplectic effusion into the cerebellum. During the fit, she had hemorrhage from the uterus; and, on examining that organ after death, a large clot of blood was found within its cavity, and the broad ligament, ovaries, and, in fact, every part of the generative apparatus, was in a state of high vascularity. Yet this female was seventy years of age, and her menses had ceased at the usual period. There is a most important case bearing on this point on record. A gentleman, who was subject to constant and distressing nocturnal emissions, consulted his physicians, who, considering them to be the result of debility, prescribed various tonic and stimulant remedies. He used various preparations of iron, bark, camphor, opium, hyosciamus, nitric acid, and many other things of a similar kind, but without advantage. From the fact of the failure of all these remedies, and the circumstance of his having complained of an occasional sense of uneasiness in the back of the head, his physician was led to think that his symptoms might have some connection with an excited condition of the cerebellum; and, under this impression, had the back of the head shaved, leeched, and covered with a quantity of pounded ice. *From this time, his symptoms began to decline rapidly, and in a fortnight he was quite free from complaint.* Now, this case, taken singly, would prove very little; but when we view it in connection with the number of cases in which disease of the cerebellum has been known to be followed by excitement of the genital organs, it becomes of considerable importance. I have now seen two cases in which this connection was observed. In the case of a young man who was brought into the Meath Hospital some time ago with paraplegia, it was observed that the penis was in a state of constant erection, and there were continual seminal emissions. On dissection, an effusion of blood was found in the cerebellum, and another in the hemisphere opposite the paralysed side. There was another case of a patient who was attacked with apoplexy and paralysis of one side, but with the unparalysed hand he continued to attempt the act of masturbation, so that it was necessary to tie down his hand. On dissection, there were several effusions in the substance of the cerebellum. All these facts strongly go to prove the connection which subsists between the cerebellum and the generative function; and I think it would not be unsafe to make the diagnosis of disease of that organ in cases of cerebral disease, where the genital system was much excited.

[A case of this kind was published by Dr. Dunglison some years ago, which had been cited as a case of meningitis of the cerebellum by Dr. Abercrombie. A boy, aged five, pale and delicate, after having been slightly indisposed for four or five days, was seized, on the 9th of August, with violent convulsions. On the 10th, there was fever with delirium; a vacant look of the eye, and an evident imperfection of vision, which appeared by his attempting to lay hold of objects that were presented to him, and missing them; the pupil was

dilated, and there was slight strabismus. On the 11th, 12th, 13th, and 14th, the symptoms gradually increased. On the 15th, coma; constant motion of the right arm and leg; the left appearing to be paralysed. In the night he was seized with violent convulsions, which continued till his death, which took place on the morning of the 16th. On dissection, the brain was found healthy. There was remarkable vascularity on the tuber annulare, forming a thick web of vessels. This was connected with the arachnoid coat of the right side of the cerebellum, which was thickened, with some deposition of coagulable lymph. About four ounces of fluid was found at the base of the skull, but not above a teaspoonful in the ventricles.

An important point in this case, which Dr. Abercrombie appears to have overlooked, was the connection between the state of the cerebellum and the genital functions; the latter being much excited, and the penis in an almost constant state of erection. See "Case of Arachnitis Cerebelli, by Robley Dunglison, M.D., &c., &c.," in the "*London Medical Repository*," for October, 1822; and Abercrombie "*On Diseases of the Brain*," 3d edit., Lond. 1836, p. 60.

Farther and direct physiological proof of the connection is found in the recent experiments of Dr. Budge of Altenkirchen. The following are the views of this gentleman on the subject: —

"It is well known that Gall places the organ of the sexual appetite in the cerebellum; and the remarks of subsequent physicians have often been directed to the subject, though without having yet arrived at any definite result. For even if one collects all the known cases of diseases of the cerebellum, as Burdach has done, one finds, indeed, that an actual affection of the sexual organs has occurred in no small number of such cases, but that in a great number, nay, even in the majority, none such has existed. In like manner cases have occurred to every observant physician which are favourable to such a connection of the two organs; and, again, others which, though in other respects similar, afford no such evidence. A more certain and incontrovertible proof is wanted; and I have at length succeeded, by experiments on numerous animals, in demonstrating this influence of the one organ upon the other, in the most simple, distinct, and certain manner.

"For these experiments old cats are the best animals that can be employed; and they may be made upon them either during life, or, still better, immediately after death. The experiments were repeated so often, that there could not be the least doubt in regard to their result; and though, in some animals, the phenomena were far more marked and distinct than in others, yet in all they were so similar, that the relation of one will sufficiently illustrate the whole.

"In a twelve-year old male-cat, who had been killed by a wound of his heart, the whole of the skull was removed as quickly as possible, and then the abdominal cavity opened, and both testes, with their spermatic cords and vasa deferentia, exposed; all of which occupied but a few minutes. Not the slightest motion was observed in the testicles. I now stimulated the cerebellum with the point of the knife; and I had done so for scarcely so much as three seconds, when one testicle raised itself up, and moved from the spermatic cord on which

it had lain, so as to form nearly a right angle with it. At the same time it became more and more tense. The more I irritated the cerebellum, the more the testicle moved. I stimulated hither and thither, but the two testicles were never moved at the same time. I soon discovered the cause of this remarkable fact. When I stimulated the right lobes of the cerebellum, and the right half of the commissure, the left testicle always moved; when, on the other hand, I stimulated the left lobes, and the left half of the commissure, then as regularly the right testicle rose up. I had thus the movement of the testes entirely under my control, so that I could make one or other move as I wished; and I continued the experiment for full half an hour.

The cerebellum is, then, the part at which the nerves of the testes have their terminal point; the nerves also cross each other in the brain as those of all the rest of the body do; and they must lie tolerably superficial in it, because a deep irritation does not succeed in producing the motion of the testes. It seems probable to me, that the union of the nerves takes place in the region of the first cervical vertebra, because stimulus of this part of the cord is very often accompanied by erection and discharge of semen, as in the hanged, &c.

"This simple observation is of the greatest importance in many physiological and pathological phenomenon. Thus, from this connection, the hitherto inexplicable sympathy between the testicles and parotid gland is accounted for by nervous communication. Perhaps also the relation of the testes to the growth of the beard is explained by this connection, since the trigeminus nerve may be traced in its ultimate roots to the part where the union of the nerves of the male sexual organs may be conceived to take place; and the nervous trigeminus is distributed in the face, and, most probably, contains organic fibres, which are concerned in the growth of the hair.

"It cannot be thought remarkable, that in so many diseases of the cerebellum, the sexual organs should still not suffer. For, in the first place, the whole cerebellum is certainly not to be regarded as the central point of the sexual nerves, but only a part of it; and if this part does not suffer, the sexual organs will remain healthy; and, in the second place, one would be wrong in thinking that every disease of the cerebellum must act in such a manner on those organs as to procure a distinctly observable disease. One may suppose that if the part where the nerves meet were compressed, impotence would probably result; but how many men are impotent without even knowing it." — *Müller's Archiv.*, Heft v., 1840. — B.]

LECTURE CVIII.

SYMPTOMS OF ENCEPHALITIS—Conclusions as to contraction and paralysis—Remarkable cases of encephalitis—Abscesses in the brain—Sympathetic affections—Enteritis simulating cerebritis—Prognosis in cerebritis—Remote neuralgia a symptom.

TO-DAY we again take up the subject of encephalitis; and allow me here to observe on the extraordinary variety and complication of the symptoms of this disease. Unless you study with extreme care a

great number of separate cases of cerebral disease, you will never be able to get clear ideas on the nature of this affection, so peculiarly interesting to the pathologist and the practical physician. More circumstances seem to combine in creating a variety in the symptoms of cerebral affections than in those of any other viscus of the body. We have in the case of cerebral disease all the variety of symptoms depending on the peculiarity of the part engaged, on the complication of local encephalitis with arachnitis, on the result of pressure, the nature and extent of effusions, the difficulty created by the phenomena of neurosis, and many other circumstances.

At my two last lectures I drew your attention to some cases of local encephalitis, in which the disease was pointed out by certain affections of the muscular and generative systems. There are several other circumstances connected with this part of the subject, which are also deserving of attention, and it is necessary that you should be aware that there are other sources of diagnosis in cases of local encephalitis besides those already mentioned. There is no doubt, that, though in many cases the occurrence of contraction, spasms, and pain in the extremities, precedes that of paralysis, yet we may have paralysis from the local cerebritis coming on *without these precursory signs*, and as suddenly as in cases of apoplectic effusion. This important fact you must never lose sight of.

Of this I have now seen several instances. I recollect a remarkable case of a man who had been bled in the cold stage of an ague, with the effect of stopping the intermittent. In a few days symptoms of pneumonia set in with great prostration of strength. These were followed by signs of disease of the brain, which were that the patient became suddenly nearly insensible, and on that day was observed to have his hand constantly placed on the right side of the head. Next day, without any preceding spasms or contractions being observed, he was found paralytic in the left upper and lower extremities, with paralysis of the left sterno-mastoid, and loss of sight in the left eye. On dissection we found softening of the two anterior thirds of the right hemisphere, which were of the consistence of thick cream. The disease engaged the corpus striatum, but the optic thalamus was healthy.

Another remarkable instance occurred lately in a person labouring under aneurism of the innominata and hemiplegia. Here the paralysis came on suddenly, and its cause was found to be an abscess of the brain. I must observe, however, that there were some precursory signs in this case, though contraction and spasms were not observed. The patient had violent headache, and was subject for some time to occasional numbness and pain in the affected arm.

I repeat it; you may have the greatest variety in the succession and combinations of the symptoms of this disease, and this observation applies to the lesion of muscular motion, sensation, the state of the intelligence, and the organic functions. You must study numerous cases to get an accurate idea of this disease. I would advise you to examine the writings of Lallemand, Bouillaud, Abercrombie, and Serres on this subject, and then consult the last edition of Andral's *Clinique Médicale*, where you will find the value of the symp-

toms discussed in a most impartial and philosophical manner. In this splendid work you will find many cases of cerebritis, in which the symptom of spasm and alternate flexions and extensions was wanting. Indeed he looks upon it as a symptom which cannot yet be called pathognomonic.

We may, I think, come to the following conclusions on this subject: —

1st. That local encephalitis is often accompanied by various forms of muscular contraction in the parts afterwards to be paralysed.

2d. That in some cases the paralysis is not preceded by muscular contraction, though various lesions of sensibility may occur.

3d. That the paralysis may be gradual (which is the most common case), or sudden.

4th. That the contraction may be intermittent, periods more or less elapsing when the symptom is absent.

5th. That in general the contractions occur in the first, the paralysis in the second stage.

6th. That in a few cases the reverse occurs.

7th. That in some cases general or partial convulsions, and in others tetanic symptoms, precede the paralysis.

You will see in the *Gazette Médicale*, for October, 1833, the particulars of a most interesting case, recorded by Bérard, jun., of fungous tumours of the dura matter, which was not accompanied by any alteration of muscular motion. This was removed with the adhering portion of the dura matter when the patient was attacked, for the first time, with loss of consciousness and convulsions of the trunk and extremities. The operator, justly concluding that the sudden removal of the partial resistance of the brain was the cause of the symptoms, applied a piece of agaric to the denuded surface, and made gentle pressure upon it, when he found that immediately the convulsions ceased, and the intelligence was restored. Thus, gentlemen, does disease often become a second nature, and its want is the cause of symptoms.

As far as we see of the brain, this pathological fact appears certain, that injuries of the upper part of that organ are accompanied by more marked and distressing symptoms than similar lesions of the lower part. There seems, indeed, to be a decided difference between the sensibility of the superior and inferior parts of the brain. The great proportion of those cases in which there was extensive latent disease of the brain, have been cases in which disease predominated in or towards the inferior surface of that organ. In this situation it has been proved by numerous examples that you may have extensive disease without those symptoms of muscular or mental derangement, which ordinarily characterize inflammatory affections of the brain. I recollect the case of a patient who was brought into our wards complaining of feverish symptoms, with pain of the left temple, extending to the eye of the same side. With the exception of this pain, he had no cerebral symptoms of any kind; his intellect was sound, and he was quite free from muscular pain, rigidity, spasms, or paralysis. He was ordered to take some opening medicine, and to have leeches applied over the seat of the pain, but

derived no benefit whatever from the application. This led me to suspect that something unusual was going on, and more particularly when I observed that the leeches were repeated without any decided benefit. One morning on going into the ward I looked about for him for some time to no purpose; in fact, his countenance was so altered that I could no longer recognise him. During the night the globe of the eye was almost suddenly thrust forward by an enormous œdema of the soft parts of the orbit, and the pain became excruciating. It was then conceived that the pain complained of on admission was the result of disease of the bones of the orbit, and that abscess had formed behind the eyeball. Under this impression, and in accordance with the earnest request of the poor sufferer, it was determined to make an incision to give exit to the confined pus. A curved bistoury was cautiously though deeply introduced over the eyeball, but on withdrawing it only a small quantity of serum escaped. The swelling went on increasing, and the eyeball was pushed forward so as to be raised above the level of the nose. A curved bistoury was then carried extensively round the orbit, but without giving exit to any matter. Under these circumstances I came to the conclusion that it was an example of deep-seated abscess of the brain, with symptomatic œdema of the orbit. This œdema of superficial parts, in cases of deep-seated disease, is, you know, a thing of common occurrence, and may be observed in many instances of hepatic abscess, acute pleuritis, and other inflammations. In fact, there is such a remarkable sympathy between deep-seated parts and the integuments over them, that you may have this œdema in deep-seated inflammations of the organ. The patient now became gradually worse, his agony was intolerable, and the protrusion continued undiminished, but he had not either delirium or convulsions. He sank into a state of profound coma, in which he remained for about twenty-four hours, when death put a period to his sufferings. On dissection there was no pus found in the orbit, and its bones were healthy, but in the inferior part of the anterior lobe of the brain there was an abscess about the size of a large walnut, resting on the cerebral surface of the orbit. I have since learned from several of my friends that they have witnessed cases of the same description. It is an interesting disease, and one which you should be acquainted with. I think the existence of the following symptoms should lead you to suspect it. First, pain in the head, preceding the appearance of tumour of the orbit, and this pain not affecting the orbit itself; for observe in this case the pain was referred to the temple and not to the orbit. The next thing is the pain resisting ordinary treatment, and being followed by a sudden œdema of the parts within the orbit, and protrusions of the eyeball. These two circumstances, when occurring in conjunction, should, I think, lead you to suspect acute internal disease. Again, in those cases where abscess supervenes on caries of the internal table of the bones of the cranium, the affection is much more chronic than in this or similar instances of deep-seated abscess of the brain. With respect to this remarkable symptom of local inflammation of the brain, this external œdema, I shall relate the history of another case, as I am anxious to throw as much light as possible on

this obscure subject. It may appear strange, that when a dense bony plate and an extremely strong membrane (besides other parts) intervene between the integuments and the seat of disease, that local œdema of external parts should take place as a consequence of internal inflammation. Strange however as it appears, it is true, and the intervention of the skull does not prevent it, as will be seen by the following case:—

A boy was admitted into the Meath Hospital, complaining of severe pain in the situation of the mastoid process. He was of a scrofulous habit, and had for a length of time a discharge of matter from both ears, with slight loss of hearing. Sometimes before his admission the discharge had been very copious, but on being exposed to cold it was diminished in quantity, and he was immediately attacked with severe pain behind one of his ears. When he came into the hospital he was screaming with agony, but had no delirium, and the muscular system was unaffected. But what was chiefly remarkable in this case was, that on the second day after admission, a distinct tumour formed in the upper portion of the neck, about an inch and a half behind the mastoid process. So distinct indeed was it, that it was generally believed that the disease was periostitis of the base of the skull, which had run on to suppuration. An incision was made over the tumour, and the knife was carried down to the bone, but no matter could be discovered. The patient then became gradually worse, the pain was dreadful, but there was no convulsions. Shortly before death he had a few slight muscular twitches, with delirium, and died in great agony. During the whole course of the disease, the discharge from the ear had continued, and was remarkable for its fetor. On examining the brain, we found neither abscess nor arachnitis. On slitting up the longitudinal sinus, a remarkable fetid odour was perceived, which increased as the incision was prolonged in the direction of the left lateral sinus. Here there was a quantity of extremely fetid matter, of an almost cheesy consistence, and mixed with blood; and a communication was discovered between it and the internal ear, the bones of which were carious, and its cavity filled with the same kind of pus. Here we have a curious example of œdema of the external parts depending on deep-seated disease.

I shall now relate the particulars of a case in which, although the symptoms of an affection of the brain were better marked than in the foregoing, still they were by no means so decided as one would have expected from the appearances revealed by dissection. A patient was brought into the Meath Hospital, with symptoms which were thought to be those which mark the ordinary form of delirium tremens. The man had been a great drunkard, but for some time back had given up the use of ardent spirits. He complained of severe and constant pain of the ear, which he stated to be of twelve weeks' standing, and that it was this which first induced him to give up drinking, as he found that it was always aggravated by the use of spirits. On admission, he appeared to labour under a highly excited state of the nervous system; he had general tremors, and was incapable of keeping up a connected conversation, though he could an-

swer a few questions accurately. Here we observe a remarkable difference between this and the last case detailed, in which there was not the slightest evidence of any lesion of the intellectual powers. In the present case, the symptoms were pain, tremors, and incapability of supporting a rational conversation, but no decided constitutional symptoms. The pain, which had never abated since its commencement, became now violently exacerbated, he moaned frequently, and kept his hand constantly applied to the affected side of the head. To this last symptom I beg leave to direct your attention, as it is an exceedingly common one in cases of local inflammation of the brain. After a few days the mouth was drawn slightly towards the affected side, and it was found that the tongue was protruded in the opposite direction. Symptoms of fatuity now became more distinct, followed by coma, and the patient sank. During the whole course of the disease he had no spasms or paralysis of any of the limbs. On dissection, there was a circumscribed abscess found in the substance of the middle lobe of the brain. The abscess itself was encysted, but the substance of the brain around it was soft, particularly at its inferior part, where it was found to be connected with a carious state of the squamous portion of the temporal bone. There was a considerable degree of softening in that part of the brain which lay between the abscess and the corpus striatum. Here we have a case in which pain of the ear is chiefly complained of; but, in addition to this, it was observed that the patient could not sustain a connected conversation, that there was some fatuity, that the mouth was drawn to one side, and that coma came on before death. Under such circumstances there could be less hesitation in pronouncing the disease to be an affection of the brain; and accordingly we find, on dissection, unequivocal marks of disease of the middle lobe, in addition to the caries of the temporal bone.

I might detail many cases of a similar kind, without being under any apprehension that I should be occupying your time to no purpose, for the recital of such cases is better calculated to convey information on this obscure subject than any lecture. I shall, however, content myself with one or two more. A man, addicted to the use of ardent spirits, was brought into the surgical wards of the Meath Hospital in a state bordering on coma. It was thought at first that he was labouring under typhous fever, and, under this impression, no particular attention was paid to the cerebral symptoms for the first day or two. At the end of this period, it was learned that he had fallen in going up stairs, while in a state of intoxication. His head was shaved, but no signs of wound or contusion discovered, though his friends persisted still in their statement that he had fallen while intoxicated and hurt his head. When admitted into my wards he appeared moribund; his pulse was perceptible at the wrist, he had extreme coldness of the limbs, and a disposition to the formation of gangrenous spots about the ankles. He was in a state of stupor; but when roused answered questions tolerably well, and said that he had no pain in his head. The remarkable feature, however, in this case, was a great degree of muscular rigidity, affecting all the extremities. The forearm was flexed, and he had not the

power of extending it. The penis was in a state of permanent semi-erection, but there were no seminal emissions. Here was a case in which, taking all circumstances into consideration, the cause of the disease seemed to be in the brain. He had been drunk, and was supposed to have got a fall while in that state; he was comatose, from which, however, he could be roused; and he had rigidity of the limbs, with erection of the penis. With this view I came to the determination of treating it as a case of general inflammation of the substance of the brain. I concluded that there was no arachnitis, from the fact of his answering correctly when roused, while I felt convinced that if there was not actual inflammation of the substance of the brain, there was at least very intense and general irritation. The treatment in this case was successful. After warming the extremities by wrapping them in flannel, and the use of artificial heat, the head was shaved, a large number of leeches applied, and an ice cap ordered to be worn constantly. The leeching was repeated, and he used the ice cap for four days. On the second day after this plan of treatment had been entered upon, there was some improvement, but on the following day the accuracy of our diagnosis of inflammation of the brain appeared, for the patient had violent spasms of the right arm and leg. These however subsided, the coma, rigidity, and other symptoms also disappeared, and the patient slowly but perfectly recovered. In addition to the means of treatment already detailed, the patient's system was placed under the influence of mercury.

A question might arise as to the exact nature of this case. Was it a case of actual inflammation of the substance of the brain, or was it mere sympathetic irritation produced by some other disease? It may be said that it was a case of gastro-enteritis, with a sympathetic affection of the head. It certainly might be so, but the great probability is, that it was not; because such symptoms as were exhibited in this instance are very rarely the result of gastro-enteritis; and if it was a gastro-enteritis it is not likely that such complete success should have followed treatment directed to the head. These circumstances make it likely that it was a general irritation or inflammation of the substance of the brain itself; and, if so, the case strongly illustrates the utility of mercury, leeching, and cold applications in reduction of encephalitis. The man was brought into the hospital in a dying state, and recovered under the influence of physiological treatment.

While I am on this part of the subject, namely, the possibility of the head being sympathetically engaged in some instances to a very remarkable degree, I may say that the following conclusions on this point seem to be fairly drawn: — That when an affection of this kind depends upon a gastro-enteritis, the signs of cerebral irritation are *general* rather than *local*. In children who are labouring under apparent symptoms of cerebral affection, it has been long known that the irritation of the brain may depend upon a variety of causes. In adults, too, the symptoms of cerebral irritation may be the result of various affections, of gastro-enteritis, worms in the intestinal canal, hysteria, hypochondriasis, and many other diseases. In most

of these cases, however, particularly with respect to children, the symptoms are general, being pain, delirium, coma, and convulsions on both sides. But we very seldom witness the occurrence of symptoms of local irritation of the brain as produced by sympathy with some other disease, though it is a fact that they may occur occasionally, and without our being able, after death, to discover any existing local encephalitis. A young female was admitted into one of the surgical wards of the Meath Hospital for some injury of a trivial nature. While in the Hospital she got feverish symptoms, which were treated with purgatives, consisting of calomel, jalap, and the *black bottle*, a remedy which deserves the name of the *coffin bottle*, perhaps better than the pectoral mixture so liberally dealt out in our dispensaries as a cure for all cases of pulmonary disease. She was violently purged, the symptoms of fever subsided, and she was discharged. A few days afterwards her mother applied to have her readmitted, and she was brought in again and placed in one of the medical wards. Her state on admission was as follows: — She had fever, pain in the head, violent contraction of the fingers, and alternate contractions and flexions of the wrist and forearm. These muscular spasms were so great that the strongest man could scarcely control the motions of the left forearm. In addition to these symptoms, she had slight thirst, some diarrhœa, *but no abdominal tenderness.* On this occasion a double plan of treatment was pursued; the therapeutic means being directed to the head in consequence of the marked symptoms of local disease of the brain, and to the belly, from the circumstances of abdominal derangement observed in this and in her former illness. She died shortly after with violent spasms of the hand and forearm; and as she had presented all the ordinary symptoms of a local inflammation of the opposite side of the brain, we naturally looked there first for the seat of the disease. After a careful examination, however, no perceptible trace of disease could be found in the substance of the brain, which appeared all throughout remarkably healthy. She had all the symptoms which, according to Serres and Foville, would indicate disease of the optic thalamus, or the posterior lobe of the opposite side, yet we could not find any lesion whatever of its substance after the most careful examination. But on opening the abdomen we found evident marks of disease; *the lower third of the ileum, for the length of six or eight inches, was one unbroken sheet of recent ulcerations.* This case I look upon as a very singular one, showing that we may have well-marked symptoms of a *local* irritation of the brain depending on a sympathetic cause. It is fortunate, however, for the study of medicine, that such cases form the exception and not the rule. I may remark here on the latency of the enteritis as to the pain. There was no abdominal tenderness, a fact illustrative of the great law which so particularly applies to gastro-enteric disease, *that when the sympathetic affections are prominent, the usual or local symptoms are proportionally latent.*

With respect to the prognosis in cases of local encephalitis, the following conclusions seem to be well grounded: — As a general rule, the prognosis is to be unfavourable, from the nature of the organ, its

importance to life, and the frequent complicated and obscure nature of cerebral affections. In local encephalitis you have always two things to apprehend — the acuteness of the disease, and its subsequent effects. The patient may die of acute inflammation, or, if you control this, of the chronic disorganization which frequently supervenes, terminating in apoplexy, paralysis, and other consequences. On the other hand, it is consolatory to reflect that experience has proved the possibility of curing both general and local inflammation of the brain. There are numerous cases on record in proof of the success of well directed treatment. The annals of surgical science are filled with cases of extensive injury of the brain successfully treated; and it is equally true, that medicine can exhibit many instances of well-marked idiopathic inflammation of the brain brought to a favourable termination. In making our prognosis on a case of local encephalitis, much will depend upon the extent to which the muscular system is affected. Spasm of one extremity is more favourable than spasm of both; and an affection of the muscles of the face is not so unfavourable as of those of the extremities. The next thing to be considered is the age of the patient. In the very young, and in persons advanced in life, our prognosis is not to be so good as in the case of one removed from these extremes, as neither of the former admit of such active treatment; but of the two, it is better to have to manage the disease in a child. It is also singular how well children will often bear active treatment.

There is another point which should not be omitted. There are, in some cases of local inflammation of the brain, muscular contractions and extensions, alternating with a state of rigidity, while in other cases the rigidity is permanent. It is not easy to say which of these cases is the worst, but I believe that the most unfavourable are those in which we have chiefly violent contractions and extensions. Again: with respect to the cessation of the spasms, it may be considered, either as a favourable or a most unfavourable symptom. The circumstance of the cessation of the spasms must have been produced by some modification in the state of the cerebral affection. If it be accompanied by a return of the power of transmitting proper motion to the affected limb, it is then a sign of great value, as showing that the cerebral irritation is nearly gone. But if the spasms subside, in consequence of the supervention *of resolution and paralysis*, then the cessation is a symptom of a most unfavourable kind, as showing that actual disorganization has taken place, which seems to be incurable.

It may be necessary to remind you that if the patient has, combined with these spasms, alternations of delirium and coma, it affords grounds for making a bad prognosis, as such symptoms indicate that the inflammation has extended to the periphery of the brain, and the arachnoid membrane. The state of the intellect is also a matter of importance; the more intact and undisturbed it is, the greater is the chance that the affection of the brain is confined within a small compass. Here, however, I am anxious to impress this upon your minds, that the absence of delirium should not mislead you, or induce you to form any favourable conclusions on that account alone, in

cases of encephalitis, for it is a fact that we may have extensive and fatal disease of the substance of the brain without delirium. I need not tell you that convulsions, or paralysis of one side, do not indicate so unfavourable a prognosis as where both sides are engaged. Lastly, you should bear in mind that cases of inflammation of the substance of the brain are very subject to relapse. All these circumstances should be taken into account, and a favourable prognosis should be always formed with a great deal of caution.

I alluded in a late lecture to the occurrence of pain in some particular part of the extremities, as a premonitory sign of this disease. A remarkable case, bearing on this point, has come to my knowledge, and I think I cannot better employ the remaining part of our time than in giving a brief abstract of it. A lady got a pain in the lower part of the tendo-Achillis, which was considered to be rheumatic, and very little notice taken of it. There was no swelling, heat, or tenderness on pressure, in the painful part, and the nature of the disease was so imperfectly understood that all the efforts of her medical attendants were directed to the heel, but without any benefit whatever. Matters remained in this state for some time, when she was suddenly attacked with convulsions and coma, and died. On opening the head some hours after her demise, a large abscess, together with an apoplectic effusion, was found to exist in the opposite hemisphere of the brain. There are various other examples of a similar kind. I have no doubt that many of those anomalous pains are frequently connected with incipient disease of the brain. I know the case of a gentleman, labouring under a painful affection of the face, which had got the name of tic douloureux, and had been subjected to all the variety of treatment which persons labouring under that affection so commonly undergo. But it has since been proved that his complaint is by no means analogous to what has been termed tic douloureux, for it has been most successfully treated by shaving the head, and applying leeches and an iced cap over the seat of the suspected irritation. At present, whenever an attack comes on, he immediately gets a bladder, containing a quantity of pounded ice, applies it to his head, and in this way obtains relief. This shows that the severe pain in his case, which many would confound with a local affection of the nerves of the face, is decidedly the result of a morbid sensibility of the cerebro-spinal centre.

LECTURE CIX.

ENCEPHALITIS—Treatment of, in the adult—Importance of energetic means—Dangerous effects of opening the temporal artery or jugular vein—Copious blood-letting from the arm—Difficulty of producing syncope—Employment of cold—Good effects from purgatives—Encephalitis caused by piles—Treatment—Beneficial effects of blisters—Mercury—Dangerous effects of emetics—Dessault's treatment—Use of opium—Violent counter-irritation of coma—Applicalion of boiling water—Treatment of partial encephalitis—[Softening of the brain—Its acute and chronic forms.]

WE have now to enter upon the treatment of inflammation of the brain; and you will find that a knowledge of the general principles

of the treatment of cerebral inflammation will be quite sufficient to guide you, even in the management of cases which present apparent exceptions to the ordinary symptoms. The truth is, that the principles which should regulate the treatment of inflammation of the brain are nearly the same in all cases.

I shall commence with the treatment of the acute form in the adult. Acute phrenitis in the adult is an exceedingly severe disease, characterized in its first period by an high exaltation of the functions of the brain, and in its second by a corresponding depression. In this form of disease we have generally high fever, a strong, bounding pulse, throbbing of the carotids, intense pain of the head, great brilliancy of the eye, with intolerance of light, vivid redness of the face, a ferocious countenance, and furious delirium. Under such circumstances there is no time to be lost; the brain is a delicate organ, and cannot bear much disease, and its powers of recovering from idiopathic disorganization seem much less than those of the lungs or abdominal viscera. Indeed, we must believe that, notwithstanding the assertions of Lallemand, it remains to be proved that recovery can take place after the stage of softening has set in, in idiopathic encephalitis. The brain differs from the lungs or digestive organs in having no excretory duct for the products of inflammation, and hence one cause of the greater danger of its idiopathic inflammations than its traumatic, where an opening is formed in the skull. In such a case you have to apprehend two pathological lesions, the inflammatory softening of the substance of the brain, and the inflammation of its serous membranes, with effusion into their cavities. The patient, too, may die from congestion, or even an apoplectic effusion may occur, illustrative of the proposition of Broussais, that all encephalic irritations may produce an apoplexy. I have seen this termination, even in the infant under a year old; in such a case I once saw an apoplectic effusion which had supervened in the course of an arachno-cerebritis, and which amounted to several ounces of blood. Every moment is precious, and no consideration should induce you to put off, even for an hour, the adoption of the most rigorous measures. In the first place, you must bleed; and here let me remark that bloodletting should be performed so as to make a decided impression on the symptoms. It will often happen, that, from the state of uncontrollable fury which the patient is in, it is dangerous and almost impossible to bleed him. Here you must endeavour to moderate the delirium, and there is no way by which you can accomplish your purpose so fully as by cold dashing. Where there is high delirium, I believe you will always find it the best plan to precede venesection by throwing a few basins of cold water over your patient's head. This will procure an interval of comparative tranquillity, during which you can open either a vein or an artery with convenience and safety. Of course, if anything like collapse ensues (which is possible) you will not bleed immediately. The object of the cold pouring, under these circumstances, is to obtain such a diminution of the fury as will allow of your bleeding the patient with safety, as to the operation. If you cannot reduce the cerebral excitement by this means, it will then be necessary to put on the strait

waistcoat *pro tempore*. There is a difference of opinion among medical men with respect to the mode of abstracting blood; some prefer taking it from the arm, some from the jugular vein, and some from the temporal artery. Now, I am inclined to think that it is better to open a vein in the arm, and that venesection performed in this way will be found to answer every purpose. It is said that if you take blood from the temporal artery or jugular vein, you deplete the brain more directly than you would by opening one of the brachial veins. This may be true, though I think it still remains to be proved that the drawing of a smaller quantity of blood from these vessels will have a more powerful effect on the system than from the arm. If you open the temporal artery, there are two disagreeable circumstances which you should be prepared to meet. In the first place, the patient is in a state of furious delirium, you don't know how long this may last, and it may happen that in one of his paroxysms he will tear off the bandage, and, if not watched, bleed to death. A case of this kind occurred not long since in the person of a gentleman of this city, who had the temporal artery opened. He tore off the bandage, and a terrible hemorrhage ensued; assistance was procured, and the bandage readjusted; he tore it off a second time, and died shortly after; his death being evidently accelerated if not actually caused by the quantity of blood lost. Again, it is possible that an aneurism may be formed as a consequence of the operation, which may excite a determination to the head, and tend to keep the patient in a state of excitement. Thirdly, you must employ a bandage to secure the artery, and to this there is a strong objection, in consequence of the pressure which it makes on the external vessels of the head. I am, therefore, strongly opposed to opening the temporal artery, in cases of acute inflammation of the brain, accompanied by high mental or muscular excitement. Now, with respect to the jugular vein, you are aware that to command this vessel pressure is also required. How this pressure can be made without interfering with respiration and compressing the veins of the neck, so as to add to the existing congestion of the head, I am at a loss to know. I would advise you, therefore, when you bleed in phrenitis, to prefer opening a vein in the arm; by making a free incision you can draw blood in such a way as to make an impression on the system, fully equal to that produced by either of the foregoing modes; and without subjecting your patient to the same degree of inconvenience or risk. The quantity of blood to be taken away must be regulated by the age, strength, and constitution of the patient, as also by the intensity of the disease. Where you have to deal with a young man of robust constitution, your first bleeding may amount to thirty ounces. You will often find it difficult to produce fainting in this disease, for the excited condition of the brain keeps up a constant determination to that organ, and prevents syncope. The same difficulty is met with in cases of hypertrophy of the left ventricle, which causes a great determination to the head.

Your next step is to have the head shaved. Never omit this. The very circumstance of freeing the head from the covering of hair, and permitting the free contact of air with the scalp is of advantage; and if you wish to employ cold applications, you cannot

do so properly without premising this operation. After you have done this, you should apply a large number of leeches to the scalp, or if you cannot readily procure leeches, employ instead of them light scarifications to the temples and nape of the neck, and keep on the cupping-glasses until you have obtained a sufficient quantity of blood. By acting in this way with promptness and decision, you arrest the violent symptoms and gain time.

In treating a case of this kind it is a very common practice to use cold applications. They are for the most part applied in shape of a cold lotion to the head, but I need not tell you that this is a very imperfect mode of using them; and indeed I have seen but very few persons who were acquainted with the proper mode. Persons are in the habit of supposing that the mixture of a certain quantity of saline ingredients with water should produce a very cold lotion, and so it does indeed while the salts are dissolving; but as soon as this is accomplished, the mixture rapidly acquires the temperature of the surrounding air. The solution is generally prepared by the apothecary (and sent in a bottle, as if they could cork up the cold), but the cold is quickly lost, and, in a few moments after the lotion has been applied, you will find it tepid, and passing into a state of vapour. Now, if you wish to derive any benefit from the use of cold applications, you must stand by yourself, and see the thing properly done. The object is to have the scalp kept constantly cold, and this can be done only by the repeated application of cold lotions. If you prefer saline lotions, you should have them made by the bedside, and applied *while in the act of solution*, or you should put a quantity of ice into your lotion, for while a single piece of the ice remains undissolved, the temperature of the lotion will be very little above the freezing point. A very good way is to have a jar of cold water with a quantity of ice in it, and to apply cloths dipped in it every minute, taking care not to immerse the hot cloth into the iced water until it has been wrung out in another vessel of water. You may also use the ice cap, though this is a painful remedy. But the mode of using ice to the head, which I prefer in all cases, and particularly in that of the child, is to take a piece of smooth ice, about the size of a dollar, and half an inch thick; this is to be placed in the hollow of a fine cup sponge, and steadily moved over the whole shaved scalp. By this mode you prevent the pain which the iced cap produces, and the sponge absorbs the water produced by melting, and the application may be continued for an indefinite length of time. But one of the best modes of applying cold to the head is that recommended by Dr. Abercrombie, and, as far as my experience goes, I can safely affirm that there is scarcely any remedy of such unequivocal value in acute inflammation of the brain or its membranes. Dr. Abercrombie's mode is this — the scalp being first shaved, you direct the patient's head to be held over a basin, and then taking a jug of cold water, pour its contents over the head from some height in a small continuous stream. This measure, simple as it may appear, is one of extraordinary efficacy. In fact, so great and instantaneous is the depression of the vital power produced by this mode, that it must be used with caution. There are numerous cases of persons in the highest state of maniacal excitement, reduced in a few moments to a low and weak

state by this powerful remedy. There are also instances of its rapidly depressing effect in the early stages of acute hydrocephalus. I have used it more in the phrenitis of adults than in the hydrocephalus of children; but in the latter disease I know many instances of its value, and believe it to be only secondary to the application of leeches. In acute inflammation this form of cold affusion should be employed every hour or half hour, according to circumstances, and if you wish to increase its efficacy you can do it by placing the patient's feet in warm water at the time of its application. Here, then, gentlemen, is the first set of remedies you should employ in a case of acute phrenitis; a full bleeding from the arm, premising it, if there be great maniacal excitement, by dashing a basin of water over the patient's head; shaving the head, and applying a large number of leeches, or if these are not within reach, the use of cupping; and, lastly, the constant application of cold lotions, or the use of the cold affusion after the manner employed by Dr. Abercrombie. These are the great measures which should be boldly and promptly put in practice, in order to counteract the first violence of a case of acute inflammation of the brain.

You will next act upon the bowels by purgatives. This is a matter of the deepest importance, for there is hardly a disease in which the judicious administration of purgatives has been followed by more decidedly beneficial effects, than in inflammation of the brain, where the digestive tube has been in a healthy condition. Purgatives are also found to be of great benefit in the simple hydrocephalus of children, and in several cases it has been observed that the disease did not yield even after active bleeding, until purgation had been employed. Dr. Abercrombie speaks in the highest terms of the value of purgatives, even after coma has set in. The purgatives which are generally used are those of the drastic kind, and they may be given by the mouth, or in the form of enemata.

Such are the rules for the treatment of the ordinary form of acute encephalitis. I shall now make a few observations with respect to the local applications. It may not be necessary to repeat the venesection, particularly if the means which I have recommended be put in practice in a regular and proper manner; but it will in most cases be requisite to repeat the leeching. *Even in the advanced stage of the disease, and after coma has made its appearance, Dr. Abercrombie lays great stress on the benefits derived from the application of leeches;* and I think I have myself saved some lives by the employment of leeches, even after the supervention of coma. In all violent cases I would recommend strongly to you the using relays of leeches from the first, to keep up a continual detraction of blood. In addition to this, the patient must be kept perfectly quiet, all loud sounds and the stimulus of light avoided; the room should be kept cool and well-aired, the bed-covering light, the attendants few, and the nurse should be a person of cool temper and steady disposition.

These are the principal measures to be employed in the treatment of acute inflammation of the brain in the adult; there are certain cases, however, in which you may add to these measures others of a different kind, particularly in cases where the disease has occurred as a consequence of the metastasis of inflammation from other parts.

Suppose you have a case of rheumatism, or of some suppressed evacuation in which there is a metastasis to the brain. Under such circumstances, while you employ the means I have mentioned for the purpose of subduing cerebral inflammation, you will also put in practice the best measures for restoring the original disease. Here, however, you should bear in mind, *that your attempts to bring back the original disease are always to be looked upon as secondary to those for the direct removal of the existing irritation of the brain.* Some practitioners, in such cases, content themselves with endeavouring to restore the original affection, but this is playing a dangerous game. An organ of vast importance to life is affected, and you cannot calculate how far the inflammation may proceed. You should never neglect taking proper steps at first to reduce inflammation, while at the same time you need not neglect the means calculated to bring back the former disease. If the encephalitis be caused by the suppression of bleeding piles, or a sudden checking of the menstrual flux, leeches to the anus or vulva are found useful along with the direct treatment. If the disease be produced by the repression of an exanthematous eruption, the same principles apply. You should never omit employing the means for bringing back the original affection, but you should always recollect that they are to be secondary to the measures adopted to directly relieve the cerebral excitement.

With respect to the use of blisters, the same rules apply here as in other cases of disease treated of during the course. They are never to be used in the early stage of the disease, and while active inflammation is present; and as a general rule, I believe it is better to apply them to the nape of the neck, or the inside of the legs, than directly to the head. There is only one case in which you can apply them with advantage to the head itself, and this is where there is coma with a cool skin. Here the stimulus of a blister is frequently found to be highly useful.

As to the use of mercury in cases of acute cerebral inflammation, I think we have not as yet a sufficient number of facts on which to form any decided opinion. If we look to hydrocephalus, we shall find that there are many cases in which the symptoms did not yield to the ordinary measures until mercury was employed; this, however, we do not find to be so much the case in the acute inflammation of the brain in the adult. I shall return to this subject on a future occasion.

I have little doubt that emetics are very dangerous in this disease, from the determination to the head which they produce.

Any of you, gentlemen, who has vomited, cannot forget the violent sense of tension about the head with which the act is accompanied; and, if the brain be in a state of acute inflammation, you can readily conceive how injurious such an effect must be. The use of emetics in this disease has been adopted in consequence of a misconception of the opinions of Dessault. He attributed extraordinary efficacy to the use of tartar emetic, in cases of injuries of the head. But you must be aware that Dessault did not give tartar emetic so much with the view of exciting emesis, *as of producing a*

degree of nausea calculated to keep down inflammatory action. Moral, who was a pupil of his for five years, makes a statement to this effect, and says that so far from proving beneficial when it vomited, the tartar emetic was always attended with unfavourable results. When it acted on the skin, or by stool, he says the effects were favourable; but when it vomited, the symptoms of cerebral excitement were always increased. Under these circumstances, I think you should be cautious in having recourse to the use even of tartar emetic, after the manner of Dessault; for even in this way you run the risk of vomiting. On this point we have eight very instructive cases given by Lallemand. In the first two cases, where emetics were used, the head had been merely threatened. The emetics were followed by profuse vomiting, and this by symptoms of *violent cerebral excitement and rapid death.* The third case was that of a patient who had apoplexy; the emetic was followed by symptoms of inflammation of the brain and death. On dissection, there were marks of inflammation discovered round the clot. Now it has been observed, in several instances, that where the substance of the brain round an apoplectic clot became inflamed, that, in addition to the phenomena of apoplexy, symptoms of a spasmodic affection of the muscular system supervened. Here we see, that after the use of an emetic these symptoms appeared, and their nature was verified by dissection. In the remaining five cases, where emetics were employed, the cerebral affection was rather increased than diminished; and, in some of them, disease of the digestive tube was superadded. Weighing these circumstances calmly, I think the use of emetics in acute inflammation of the brain may be considered dangerous.

With respect to opium, I must say that I am strongly opposed to its employment, at least in the early stage of encephalitis. I have seen many cases of hydrocephalus in children, in which opium seemed to be decidedly injurious; and I believe that in all cases where there is congestion of the brain, its employment will be attended by bad effects. But when all the symptoms of active inflammation have passed away, and when there remains a peculiar nervous condition of the brain, characterised by symptoms of mental excitement and persistent watchfulness, somewhat resembling delirium tremens, here, I believe, that you may have recourse to opium with much benefit. In many cases where the antiphlogistic treatment had been properly employed at the commencement, there frequently remains a neurotic condition of the brain, accompanied by great irritation and absence of sleep; and in such cases I have seen much good resulting from the use of opiates. When I speak of fever I shall return to this subject.

In the treatment of this disease, I am anxious that you should always bear this principle in mind — that you cannot be too cautious in adopting means of coercion. Coercion has always a bad effect: it should never be resorted to, except in cases of extreme necessity; and you should never suffer the patient's attendants to employ it without your express permission. It is a common practice in hospitals, where the attendants always wish to save trouble, to put on the

strait waistcoat as soon as the patient exhibits symptoms of delirium. What is generally the result of this treatment? The poor sufferer becomes irritated by confinement, and uses the most violent efforts to liberate himself; his struggles increase the excitement of the brain, and prevent the measures you employ from taking effect. I have known many melancholy cases, illustrative of the abuse of the strait waistcoat. I shall give you one: — A female, of delicate habit, was attacked with fever and some delirium. She was supposed to labour under disease of the brain. They put a strait waistcoat on her, and tied her down to the bed, where she remained for several days in a most deplorable state. A medical man, who was called in to see her at this time, found her in the situation described, with her head shaved and blistered, and her strength sinking. It struck him that there was something peculiar in the case, and he asked her several questions with the view of testing her sanity; and, finding that she answered rationally, he immediately directed that the strait waistcoat should be taken off. She then told him that, during the whole course of her illness, she had laboured under pain of the right side. He examined her side, *and found a large tumour in the situation of the liver*. There was also an eschar on the back. She died shortly afterwards; and, on dissection the liver was found to be in a state of extensive suppurative disease; the brain perfectly healthy. It is unnecessary for me to make any comment on this case.

While, however, I deprecate coercion as a common mode of proceeding, I fully admit that cases will occur that demand it for the safety of the patient. The dreadful tendency to suicide is one of the characters of this disease, and must never be forgotten in any case. All that I wish to impress upon you is, that coercion must be used with great caution, and only so long as it is absolutely necessary. When we come to treat of the nervous system in fever, I shall recur to this subject.

In all cases of cerebral disease you should never omit inquiring into the state of the bladder, for there is often retention of urine. This is to be obviated by drawing off the urine with a catheter, two or three times a day.

You will meet with cases of cerebral inflammation in the last stage, with profound coma, general paralysis, an imperceptible pulse, and tracheal rattle. It is a melancholy thing to be called to a case of this description, where the ordinary means furnished by medicine are so inadequate to the removal, or even the alleviation of symptoms; and yet it is a fact that, even under these circumstances, cases have been cured by the adoption of an extraordinary measure. This consists in the employment of enormous and sudden counter-irritation, by pouring boiling water over the lower extremities, while, at the same time, ice is applied to the head. This is certainly an extraordinary and barbarous method; but it has succeeded in rescuing the patient, as it were, from the jaws of death. One of the most singular cases of this kind is recorded by Lallemand — that of a man upwards of sixty, who, in consequence of a fall on the head, was attacked with encephalitis, which was mistaken for an essential fever until the tenth day. At this time he was first seen by Lallemand, who found

him labouring under severe and long-continued syncope; the right extremities flexed; the hand firmly closed; the surface on this side insensible; the eyelids closed; the eyes turned up, squinting, and insensible to light; complete loss of hearing and intelligence. The body was covered with a cold viscid sweat; the respiration frequent and stertorous, and the pulse absent. Lallemand proposed pouring boiling water on the ankles, and, at the same time, applying ice to the head, an advice which was consented to with great reluctance by the other medical attendants. At the moment the boiling water was applied, there was a sudden motion of the whole body; the left arm was agitated, the eyes opened, and the pulse could be felt at the wrist. In half an hour the boiling water was applied to the thighs with still greater effect; colour returned to the face, and the pulse became fuller. From this time improvement went on. Deep suppurating wounds were produced by the boiling water which took more than six weeks to cicatrise. The patient's recovery was perfect.

In Dr. Mackintosh's work you will find this practice recommended. It is indeed an extreme remedy, and one which, for many reasons, practitioners would have repugnance to use; but it is well to be acquainted with such a powerful remedy, and to know that it has succeeded under the most desperate circumstances.

With respect to partial encephalitis, the principles of treatment are the same. In this form of disease you will often have to contend with the prejudices of the patient, and sometimes of practitioners who do not recognise its existence. Its symptoms, you will remember, may at first appear slight or insidious, and to the superficial observer less referrible to the head than elsewhere; yet the disease is full of danger, slight though it appear. The recent researches on this subject have shown, too, that it is commonly a comparatively acute disease. Andral gives a table, showing the periods in one hundred and five cases: in eighty-nine of them death occurred within a month. The liability, too, of secondary complication, with general congestion, arachnitis, or apoplexy, must be always borne in mind.

When the symptoms of a local encephalitis are decided, I think you should always commence by bleeding from the arm, and then apply relays of leeches and cold lotions to the opposite side of the head. You will also find the application of tartar emetic ointment, so as to bring out an eruption as soon as possible, of great value in cases of this kind. Above all things, take care to relieve the symptoms by prompt and decided measures before the stage of paralysis comes on; for when this arrives, I believe you can do very little in the way of cure. I have seen three cases in which, after the depletions, the symptoms was relieved by bringing the patients rapidly under the use of mercury; and I think local inflammation of the brain may be treated by mercury as well as localised inflammation of other parts. My late lamented friend, Dr. Leahy, communicated to me the particulars of two cases in which pain, spasms, and other symptoms of a local encephalitis were present, and in which complete relief was obtained as soon as mercurial action was brought on. I recollect an old lady who got pain in the right side of the head, with contraction

of the finger of the left hand, and alternate flexions and contractions of the forearm, accompanied by slight lesion of the intellectual functions. She was leeched three or four times, blistered, and purged, without any decided relief. I then determined to try the effect of calomel, and was gratified to find that, according as her mouth became affected, the pain and contraction of the fingers, as well as the motions of the forearm, diminished considerably, and as soon as full ptyalism was established all her symptoms disappeared. This case is particularly interesting, inasmuch as it shows that the ordinary treatment by leeching, counter-irritation, and purging, failed in giving relief, so that we are justified in attributing some value to the use of mercury. In the advanced stages of this disease, it seems right to employ a seton in the back of the neck; and I would advise all who have been attacked to continue the use of this remedy for a great length of time.

The term *ramollissement*, or softening of the brain, is one which is very extensively used, and I fear often without any precise idea of its meaning. In ninety-nine cases out of a hundred this ramollissement will be found to depend upon local inflammation of the brain; of this I do not entertain the slightest doubt. I think we may very safely consider it as analogous to the softening of the lungs, liver, or spleen, or from inflammation of their texture. There is a peculiar softening of the brain in old persons, which we cannot connect with actual inflammation, but in all cases in the child, and in almost every case in the adult, ramollissement of the brain will be found to depend on inflammation. I do not mean to infer from this that it is in our power to cure every case of softening of the brain, for when it once sets in, the great probability is that the texture of the affected part is destroyed; but we can cure many cases by subduing the inflammation from which it derives its origin. Of course we cannot expect to accomplish this in the case of old persons, where the symptoms come on without any inflammatory phenomena, as in that peculiar softening of the brain which forms the subject of Rostan's work, and occurs in persons beyond the age of seventy. This appears to be a species of senile gangrene. That form of ramollissement, which occurs in adults and children is, however, very different from this, being, in the vast majority of cases, the result of inflammation. You will hardly ever dissect a case of partial encephalitis in the adult, or of hydrocephalus in the child, without finding more or less of this inflammatory softening.

[As the remarks of Dr. Stokes, in this and a subsequent lecture, on *ramollissement* or softening of the brain, are more allusive than explanatory, I subjoin some additional particulars.

A Diminished Consistence or Softening of the Brain, *Encephalomalacia*, is found in various fevers, in rickets and tubercular disease of man and animals, in consumption of the lungs and diabetes, and in mental diseases, but especially in dropsy of the brain. More generally, however, and also more distinctly, the softening is of certain parts only of the brain, either in consequence of inflammation, or as an effect of a peculiar process of conversion. M. Durand-Fardel, in

the latest and best work on Softening of the Brain (*Traité du Ramollissement du Cerveau*—Paris, 1843) states, that in 88 cases observed by himself and others, the convolutions, including the subjacent white matter, were the seat of softening in 53 cases. Of these last the convolutions were alone affected in 15 cases. The corpora striata were softened in 15 cases. The disease is not restricted to the gray substance of the brain. Rostan (*Traité Elementaire de Diagnostic, de Prognosis, &c.*, tome ii., p. 279), says that softening or *ramollissement*, as he terms it, of the cerebral or pulp, results from inflammation, 1, when the colour of the altered part is rosy; 2, when it contains a certain quantity of pus; 3, when febrile phenomena have been observed during life. M. Durand-Fardel divides ramollissement or softening into acute and chronic: the first variety or stage occupying a period of from twenty-five to thirty days. Acute softening of the brain is properly an inflammation characterised by congestion, tumefaction, adhesions, &c.

Softening of the brain has not an inflammatory character, according to M. Rostan, 1, when the colour of the altered part is whiter than natural, and when this whiteness cannot be attributed to an intimate mixture of pus with the cerebral substance, which is quite common; 2, when the sanguineous injection is displayed by a number of points, or even by true ecchymoses in the diseased part: in these two cases the softening may be the effect of an abortive hemorrhagic effort which merely produced irritation, such as, for example, that which gives rise in other organs to a scorbutic disposition; 3, when, during life, there was no febrile symptoms which could induce a suspicion of the existence of any irritation; but, on the contrary, all the phenomena were evident which would point out an undoubted scorbutic or hypothenic state. The last or the non-inflammatory variety is much more common than the other in old persons.

The local symptoms of functional disturbance, or the derangements of cerebral function, are the same in both varieties; but it is not so with the general symptoms. The immediate functional phenomena are divisible into two periods. In the first, there is often but not generally pain of the head, vertigo, and a weakness of the intellectual and moral faculties, drowsiness, formication, pricking sensation and numbness in one limb; together with a difficulty in taking hold of objects, particularly if they are of small size. The sensibility is usually diminished; and vision is disturbed, being less accurate than common, and sometimes there is entire blindness; so also with the hearing, which is impaired.

If the softening is inflammatory this first period is shorter, and is marked by greater intensity of the symptoms; more acute pain of the head; abruptness of reply; and often delirium; speech is disturbed, and articulation difficult. The sensibility of the limbs is frequently great; the patient complains of pain in them, more or less violent; they are sometimes stiff and contracted: the senses are very irritable, and unable to bear their appropriate stimuli. The functions of organic life present nothing characteristic; the disturbances of function in it being met with in other diseases. The pulse, we are told, is softer, slower, and weaker than natural in the non-inflammatory va-

riety; but in the inflammatory, it is strong and frequent, with hot skin and great thirst. We ought to be aware, however, of a peculiarity mentioned by M. Fardel, viz. — increased secretion of the follicles of the mouth and conjunctiva.

In the *second* period the patient loses the use of a limb, or even of one side of his body, suddenly or gradually, but for the most part suddenly. In general, the intellect is not impaired; although the patient is very slow of speech, and only succeeds in making himself understood by painful gestures. Sometimes there is complete coma. If the coma and paralysis have come on suddenly, the patient usually recovers his consciousness on the day after the seizure. This is explained by the complication of cerebral congestion with softening of the brain. The symptoms soon return, however, with increased violence; the intellect and the functions of the senses are entirely destroyed, complete coma supervenes; the limbs become immoveable, and death closes the scene.

In the inflammatory softening, in place of paralysis, there are pains darting through the limbs, contraction, convulsions, and more or less intense cephalalgia. In both varieties of the disease, when there is headache, if we ask the patient where is the seat of the pain, he slowly raises his sound hand to the head, and commonly points out the side of it opposite to that paralysed.

In this second period the changes in the nutritive functions, or organic life, are of a marked nature. There is loss of appetite; we see the teeth dry, the tongue rugous, chapped, brown, and even black, deglutition painful, and finally impossible. Sometimes there is vomiting of alimentary matters, and then of bile, with an involuntary excretion of urine and feces; often there is constipation; the breathing is laborious, and towards the end stertorous; the pulse is weak, often irregular and intermittent; the skin is cold.

The *organic changes* in the brain noticed after death vary in consistence, colour, seat, extent, and number. The membranes are almost always infiltrated with serosity, and exhibit a gelatinous aspect. The effusion here, as on other occasions, must be regarded as consecutive on the softening, but it is not the less a contributing cause of the comatose symptoms seen towards the termination of the disease. When the softening has been inflammatory, the membranes are sometimes dry, red, and injected; in some cases they are covered with suppuration, and adhere to the softened cerebral portion. The consistence of the brain varies from that of thin mush to the natural firmness of the organ. When the softness is inconsiderable, there must be a change of colour, in order to enable us to recognise it. The colour is rosy, red, yellow, greenish, according to the degree of inflammation; it is of the colour of wine-lees in scorbutic ecchymosis and in abortive hemorrhagic effort; and it finally is of a pure milk-white in those subjects in which there has not been, during life, any inflammatory symptom. In acute softening the characteristic colour is at first red, and afterwards yellow. In the chronic form, it is yellow and of a lime colour, assuming the form of cellular infiltration.

To be somewhat more precise, we should, after M. Durand-Fardel,

describe the origin and associated appearances of the different colours in the several stages of softening. Redness is met with in various shades, consisting of vascular injection, sanguineous infiltration, and uniform deep coloration. The injection is almost entirely seen in the white or medullary substance, and in the central parts of the brain. Rarely is there an acute softening, especially of the gray substance, accompanied with vascular injection (sanguineous congestion), without at the same time our seeing a certain portion of blood infiltrated into the softened tissue. This is a common feature in the acute phlegmasiæ of other organs, and depends on the escape of blood by rupture from the small vessels of the part. Besides this sanguineous infiltration we generally meet with a uniformly red coloration of the softened parts. In the gray matter, particularly of the convolutions, this replaces the vascular injection. This infiltration seems to be the result of imbibition of blood by the cerebral tissue: it varies from a rosy hue to a deep red. In the medullary substance it forms a kind of areola round the sanguineous infiltrations.

Redness is a constant appearance at the onset of the softening now under notice, and is much more marked in the gray substance which seems diffused through the whole of the softening.

The yellow colour is also an important feature in cerebral softening. Believed by M. Lallemand to be a sign of pus either actually present or of anterior formation, it is described by M. Durand-Fardel to be an index of the presence of blood, either recently effused in a part of the brain adjoining that which is the seat of coloration, or it may be the remains of an old effusion or infiltration. Analogous colour is observed in ecchymosis from contusions, also around leech-bites, after venesection, &c. In all the acute affections of the encephalon, in sanguineous effusions on the arachnoid (apoplexy, meningeal hemorrhage), we see on the second day from the effusion on the internal surface of the dura mater and on the surface of the brain through the arachnoid, this yellow tint caused by the transudation of blood. In sanguineous effusions in the body of the brain (apoplexy and cerebral hemorrhage), as absorption goes on, we find a yellow colour of the adjoining healthy part; and even a yellow and after a while an ochrous hue of the fluid of the excavations.

In chronic softening of the brain the yellow colour is almost constantly met with, replacing the red colour of the acute softening; the yellow is most evident and constant in the cortical substance as the red had been antecedently.

When softening is seated at the surface of the brain, it is usually accompanied by some tumefaction of the latter; the convolutions are flattened, the dura mater is tense, and the meninges are dry.

Chronic softening causes a pulpy state of the brain with absence of red colour. The surface of the convolutions is more or less coated with yellow laminæ; and if the disease be deep-seated in the brain, the nervous tissue proper is partially absorbed, and in its place we find cellular tissue infiltrated with a whitish turbid fluid. In some cases we see the softened portion has disappeared, leaving a state of parts analogous to that of ulceration elsewhere.

The softening may be either superficial or deep-seated. If the

first, the convolutions are deformed, swelled, and rounded to a variable extent; and the gray or cortical substance is removed with the slightest friction. In the second case, the softening may occupy all parts of the brain; but the striated bodies, optic beds, and the middle lobe, are the most frequent seats of the lesion. Its extent is variable, from the size of a French bean to that of an entire hemisphere. The lesion is commonly unit; but sometimes both hemispheres are affected: finally, we meet in certain cases with a great number of softened points. There are ecchymoses like scorbutic spots. The ventricles in general contain a quantity of serosity which might impose on some the belief of there having been hydrocephalus. The arteries of the brain are frequently ossified.

For many interesting facts and ingenious suggestions respecting softening of the brain, I would refer the inquisitive reader to the *Recherches Anatomico-Pathologiques sur l'Encephale et ces Dependances*, by Professor Lallemand of Montpelier. — B.]

LECTURE CX.

Analysis of Symptoms of Cerebritis—Inconstancy of pain—Arachnitis, pain of—Intermittent pain—Headache—Phenomena of the eye—State of the pupils—Various affections of the functions of vision—Researches of Parent, Duchatelet, and Martinet—Relief by convulsions—Brain considered as a secreting organ—Dangerous effects of opium; delirium—Phenomena of organic life—Vomiting in hydrocephalus—Sympathies of the digestive and respiratory systems—Treatment of hydrocephalus—Of internal remedies.

Before we leave the subject of inflammation of the brain, I shall draw your attention to a brief analysis of some of the more prominent symptoms of this disease; and here I am anxious to impress upon you, that the true mode of studying this subject is not by reading the descriptions given by this or that systematic writer, but by the careful perusal of *monographs*, in which the details of a great number of cases, occurring under different circumstances, are accurately reported. You would be mistaken, indeed, if you were to conclude that you had acquired a thorough knowledge of the symptoms of phrenitis or arachnitis by reading the description of Cullen, Thomas, or Mason Good. The only mode of studying the subject properly is, to take accurate notes of every case which you meet with, and to study with care those monographs in which a number of cases, attended by different symptoms, are detailed with impartiality.

I would not occupy your attention further with this subject, but that there is much error prevailing with respect to inflammation of the brain and its membranes. Persons are in the habit of supposing that these symptoms are always constant and well-marked, but, the truth is, they are subject to very great varieties. The first symptom, to which I shall call your attention, is *pain*. This, you will recollect, is a prominent symptom of most visceral inflammations, where the disease is situated on, or close to, the surface of the organ; but, when it

is deep-seated, this symptom becomes more or less obscure. Now, in a case of arachnitis, we have a double source of pain — one depending upon the affections of the serous membrane, the other arising from the circumstance of disease being situated on the surface; and hence it is that, in the great majority of cases of arachnitis, pain is a constant and prominent symptom. Still, if you were to conclude that pain is *always* present in arachnitis, you would be wrong — for there are many cases on record in which it was either partially observed or completely absent. You will be greatly assisted in your pathological studies by attending to the different results of inflammation of analogous structures, for we find that in some of the inflammatory affections of serous membranes there is little or no pain. We may, for instance, have pleuritis, pericarditis, and even peritoneal inflammation latent, so far as pain is concerned; nay, many persons have gone so far as to say, that it is only where the muscular tissues of the belly are engaged that we have pain in peritonitis. I have seen pericarditis run through all its stages without any pain being complained of by the patient. Now, if this absence of pain be a matter of no unusual occurrence in some inflammatory affections of the pleura, pericardium, and peritoneum, there is no reason why it may not occur in some cases of arachnitis. Still, it must be acknowledged that pain is one of the most remarkable and constant symptoms of arachnitis, and that, of all the serous membranes, the arachnoid seems to be endowed with the greatest sensibility.

We might inquire here, whether the pain of cerebral inflammation be significant of any particular lesion of the brain. I believe that upon this point the state of our knowledge is very unsatisfactory. Pain as a symptom of cerebral inflammation occurs in very different cases. We may have it in connection with disease of the superior, lateral, or inferior parts of the brain; we may have it in cases where the result of the disease is a serous, hemorrhagic, or purulent effusion. The rule, then, to be borne in mind, is this: first, that it is present in the great majority of cases of arachnitis; next, that it may accompany many different lesions; thirdly, that it may be absent; and lastly, that, with the same lesions, we may have pain in one case and absence of it in the other.

The next subject for inquiry is, does the seat of pain generally point out the seat of inflammation? Andral distinctly affirms that it does not. In some cases, pain of the frontal region has been found to accompany disease of the ventricles, and pain in *one side* of the head, an affection of the arachnoid covering of both hemispheres. We see the same thing occurring in the case of other serous membranes. Thus, in the pleuritic inflammation of phthisis, pain is very seldom felt in the situation of the disease, but generally lower down; and I have seen some cases in which pain has been complained of only in the sound side. I recollect a case of very extensive pneumonia, in which the patient complained only of some pain in the region of the kidney and small of the back.

The pain which accompanies arachnitis generally sets in at an early period of the disease, and is characterized by great intensity — two circumstances in which it resembles the pain of pleuritis. In most

cases, it is found that anything that impedes or oppresses the circulation of the brain, increases this pain; and hence it is that some practitioners are led to think, that, if pain of the head be relieved by pressure, it cannot be inflammatory. Now, I wish to call your attention to this point, because, in some cases where evident marks of arachnitis were found after death, it was observed that during life the pain of the head was relieved by pressure. The patients have been found with a bandage tied firmly round the head, from which they experience decided relief, and yet a *post-mortem* examination gave unequivocal proof of the existence of arachnitis. So far, then, as these cases go, it appears that the mere fact of pain being relieved by pressure, does not prove that it is unconnected with an inflammatory cause. The pain, too, of an arachnitis may be intermittent, and continue to exhibit this character even for a considerable length of time. I have seen many instances of this in children, where the little patient was seized with acute pain of the head at a particular time of the day, which, after a few hours' duration, subsided, and then returned again the next day precisely the same hour, and continued in this way for several weeks, until at length his friends were surprised by the unexpected supervention of coma, convulsions, or blindness. I knew two cases of this kind in which the intermittent character of the pain was so prominent as to engross the practitioner's whole attention; so that the real nature of the affection was overlooked, and bark prescribed. I have now witnessed three or four of these regular quotidian attacks of pain in children, which, after continuing for days and even weeks, were suddenly followed by perfect blindness — in some cases with and in others without coma.

You might here ask, whether pain is to be considered as a diagnostic of arachnitis? I cannot say it is. We constantly meet with severe pain in the head without arachnitis, and every one knows that the headache of fever is by no means an indication of inflammation of the brain. In many cases of hysteria, the headache and determination of blood to the head are violent, and yet unconnected with inflammatory action. I know a young lady who is frequently attacked with most agonizing headache, accompanied by violent throbbing of the carotids and great heat of the face and scalp. Yet, in this case it is plain that the pain cannot be inflammatory, for she has been subject to these attacks once or twice a week for the last six years, and yet continues otherwise in a state of good health. If her disease were to be measured by the violence of the pain and determination of blood to the head, it would be natural to expect that death would have long ago put a period to her sufferings. This is another proof of the truth of the opinion, that there is no single pathognomonic symptom of disease. Bear this in mind. I might go farther, and say, that, whether we looked to symptoms or to signs, the rule was the same. The man who merely looks to a single sign or symptom will frequently err; it is only from the whole group of signs and symptoms presented by a disease that we can arrive at any accurate diagnosis.

The state of the eye, in cases of arachnitis particularly, has attracted much attention. On this subject much valuable information has been obtained by the laborious investigations of Andral, of which I

shall give an abstract. He states that the phenomena of the eye, in cases of cerebral inflammation, may be reduced to three classes; its motions, the various conditions of the pupil, and the state of vision. With respect to the first of these, it may be observed that in some cases we find the eyeball in constant motion; in others, it is quite fixed; while in others the balance of muscular power is lost, and there is a constant tendency to strabismus of one eye or both. Of all these varieties in the state of motion, the last appears to be the most valuable, so far as the diagnosis of arachnitis is concerned. By many persons this strabismus is looked upon as a sign that *effusion* has taken place, and that the disease has reached its incurable stage; a position which I am inclined to doubt, from having seen cases recover in which this symptom was present. However, Andral looks upon strabismus as a very valuable sign, and thinks that, of all the lesions of motion of the eye, it is the most important with respect to the diagnosis of *arachnitis of the ventricles.* With respect to the condition of the pupil, it is stated in books that in the early stage you have a contracted, and in the advanced a dilated pupil, and that the latter condition signifies that effusion into the brain has taken place. Now, the truth is, that this statement must be received with great caution, and as admitting of numerous exceptions; for it has been established that the same lesions of the brain are sometimes accompanied by very different conditions of the pupil, and *vice versâ.* Parent and Martinet, who have investigated the subject carefully, are the best authorities on this point, and I shall give a brief abstract of their experience. In cases where *both pupils were dilated,* they observed that in some there was effusion into one of the ventricles, in others into both. In cases where there was no dilatation, they observed that in some there was serous or purulent effusion under the arachnoid, while in others, in which there was no effusion whatever, the pupil was dilated. Lastly, it was found that in some cases, where only one pupil was dilated, there was effusion *into both sides of the brain.* You might here ask, whether effusion into the substance, or on the surface of one side of the brain, is connected with a dilated condition of pupil? In reply to this, it may be stated that effusion into the substance — not of one, but of both hemispheres — has been known to be accompanied by a contracted state of the pupil to the last. You may also have one pupil contracted and the other dilated; nay, you may have *an alteration of these conditions* — the right being dilated to-day the left to-morrow. The mere circumstance, then, of dilatation or contraction of the pupil is no sign, when taken by itself, as to the seat or even the existence of effusion; for you may have either condition with or without effusion and you may have dilatation of the pupil of one eye with an effusion, into both sides of the brain. As a general rule, however, it seems to be made out, that, in most cases of cerebral inflammation terminating in effusion, there is often, towards the advanced period of the disease, some dilatation of pupil, and that this condition generally marks the occurrence of effusion.

With respect to the affections of the function of vision, there are great varieties. Some patients have double vision — others see

sparks of fire, or *muscæ volitantes.* There are many other phenomena of the kind, causing a great variety in the symptoms; and this variety is found to depend more on the susceptibility of the brain to irritation, rather than on the mere existence of irritation of the serous membrane investing it. The same rule applies to all cases of serous inflammation, the phenomena of inflammation varying according to the susceptibility of the organ which the inflamed membrane covers. Thus, for instance, one patient will have pericarditis with palpitations of the heart, another without them; their occurrence or non-occurrence merely showing that the heart is more or less susceptible to irritation. So it is with respect to the brain, and the symptoms of deranged vision are connected with the greater or less susceptibility of the organ, which we know varies very considerably in different persons. This remark applies to all the forms, and, I believe, all the phenomena of meningitis.

In acute disease of the brain and its membranes, we often have convulsions and paralysis, and in these symptoms also we find great variations: in some we have convulsions of one side, in some of both, in others we have paralysis, but scarcely any convulsions. The same remark also applies to these symptoms, as to some already mentioned — namely, that we cannot from them alone form an accurate estimate of the situation or amount of disease. You may have convulsions and paralysis of various kinds with the same kind of lesion, and you may have a variety of lesions with the same paralysis and convulsions. The only thing that appears to be pretty well established is this — that, generally speaking, in cases where the right side of the brain is engaged, you have convulsions, and paralysis of the left side of the body, and *vice versâ.*

Before I proceed to speak of delirium, I think it necessary to say a few words more with respect to convulsions, as I find Andral has not touched on a point to which I beg to call your attention. The occurrence of convulsions in a child, labouring under symptoms of inflammation of the brain, is always looked upon as formidable; and indeed it is natural that convulsions, to persons unacquainted with pathology, should seem to point out a great intensity of disease. I have, however, been long of opinion that convulsions occurring during the existence of hydrocephalus in children, or of meningitis in adults, are not so dangerous as persons generally think. I will even go so far as to say, that the worst cases I have seen in which a cure was effected, were those in which there were the greatest and most violent convulsions; and that, in most of the cases which appeared to go on without any benefit from medicine, there were scarcely any. I am of opinion that convulsions are often of benefit by giving relief to the brain. This statement must appear somewhat paradoxical, but I trust I shall be able to prove to you that it has some foundation in truth. Broussais has taught that there appear to be two great modes of reaction in the economy, to obviate the effects of abnormal stimulation applied to important viscera — fever and convulsions. The irritations which attack the cerebro-spinal system may be relieved by convulsions; those which attack the viscera may be relieved by fever and secretion. This

doctrine, I think, might be expressed otherwise. The irritations of organs are often relieved by an increase, with or without alteration, *of their secretions.* But, as we have used the term *secretion* to express something material, we apply the proposition merely to the viscera of organic life. Now, it may also be extended to the organs of animal life. A violent expenditure of nervous power may relieve the brain or spinal cord, and delirium and convulsions prevent or modify organic changes, just as secretion from the lung or bowels may prevent ulceration.

I have said that the brain might be relieved by convulsions. Let us, holding this assertion in view, compare the phenemona and results of apoplexy with those of epilepsy. In the first place, it is to be remarked that the earlier phenomena of both are the same — namely, an active congestion of the vessels of the head. Any one who has seen the first stage of both must admit this. But let us follow them up through the remaining stages. In the one, we have the determination to the head, followed by convulsions more or less violent and protracted, which, however, subside after some time, and the patient gets well; in the other, there is either death from the violent determination of blood and probable effusion, or if the patient recovers, there is very often paralysis, showing that injury has been done to the substance of the brain. Now, here we perceive that the case of determination without convulsions is that in which there is either death or recovery with paralysis; there are no such bad consequences to be dreaded where the determination to the head is followed by convulsive fits. In apoplexy we have congestion followed by death, or recovery with paralysis; in epilepsy we have congestion, convulsions, and relief. It is plain that, if we admit the identity of the phenomena in the early periods of both, we must then also admit that the only cause of relief we can ascertain is convulsions. This idea of the subject will explain how it is that a man may continue for years subject to the repeated attacks of cerebral congestion, and yet to continue to enjoy tolerable health. It will also explain why it is unnecessary and sometimes even dangerous to bleed in epilepsy. It also shows why it is so often unaccompanied by paralysis, because the brain is relieved by the expenditure of its nervous energy on the muscular system. I think we should generally look upon the occurrence of convulsions, in a case of cerebro-spinal irritation, in the light of an attempt at a crisis made by nature itself. What is a crisis? An organ labouring under irritation is suddenly relieved by a new process taking place, either in itself or in some other part; and when we come to examine what these modes of relief are, we find them to consist in the occurrence of supersecretion, hemorrhage, exanthematous eruptions on the surface, or convulsions. There is no doubt that, when we look to the results of the sudden supervention of a copious secretion in an inflammatory affection of any secreting organ, the source of relief is manifest. If we take two cases of hepatitis or bronchitis — one attended with copious secretion, the other without any secretion at all — it will be easy to conceive how much more dangerous the latter is, and how much more difficult to manage. Now, if we consider the brain

in this point of view, we find that it is not a secreting organ, in the ordinary acceptation, and that the only mode in which it can relieve itself is by the expenditure of its excess of nervous energy on the muscular system, or by the same expenditure of mental energy, as in the case of high delirium. I think we might fairly draw an analogy between this mode of relief and that which, in other diseases, is the result of hemorrhage or secretion. One fact, at all events, appears certain, that in two most remarkable cases of different diseases — each, however, characterized by the same phenomena in the early stage, namely, active determination to the head — we find that the case which turns out favourably is that in which convulsions occur (namely, epilepsy); while in apoplexy, where these symptoms are absent, we have either death or recovery with paralysis.

If this opinion be well grounded, it would militate strongly against the practice of checking the convulsions of meningitis by opiates. I feel convinced that this practice is wrong and dangerous; its effects may be as injurious as the arresting the reactions by astringents in a case of acute inflammation. There are two ways in which we can explain its bad effects. In the first place, opiates prove detrimental by checking the convulsions, which appear to be a mode of relief adopted by nature; and, next, they must do mischief from their well-known tendency to add to the existing cerebral congestion. I have now seen a good many cases of meningeal inflammation in which convulsions took place, and where opiates were employed to remove them, and feel compelled to state that the opium has certainly relieved the convulsions, but the patients have afterwards fallen into a state of profound coma, from which they never recovered. I have witnessed this so often, that I should not discharge my duty properly, did I not warn you against the employment of opium in arachnitis. The same rule most commonly holds good in cases of visceral inflammation, where an organ is in a state of irritation, and has its secretions suppressed. Here also opium, by arresting secretion and increasing congestion, will be productive of bad effects. I allude here particularly to the treatment of pneumonia by opium, as recommended by Dr. Armstrong, who lays great stress upon its use in full doses after having premised a single bleeding. I have had some experience of this mode of treatment, and find that the effect of the opium is not to remove, but to convert a manifest into a latent disease. I have seen the pain, dyspnœa, and cough subside, but the fever continued, and the destructive process of the lung went on as usual. This is the result of my experience.

I shall now make a few observations on the occurrence of delirium in disease of the brain. In one of my former lectures I alluded to the important fact, that, in the majority of cases of meningitis, where delirium was present, there was inflammation of the convexity of the brain. I stated also, that, when inflammation attacked the base of the brain, we might have it going through all its stages without delirium, and pointed out the importance of this in favour of the phrenological doctrines. Andral admits the occurrence of delirium in case of inflammation on the convexity of the brain, but his reasoning upon this subject appears to me to be inconclusive. He

divides affections of the convexity of the brain into those which are characterized by delirium through their whole course, and those in which coma is the most remarkable feature; and seems to think that, where coma is the most remarkable symptom, the results of the case are unfavourable to phrenology. But we shall find, on examining these cases, that, in many of them where coma was the predominant feature, there had been delirium in the commencement. He gives the details of thirty-nine cases accompanied by delirium all through, in thirty-six of which there was disease of the convexity of the brain, either simple or complicated with arachnitis. As far, then, as his first set of cases go, they are in favour of the opinion that inflammation of the convexity of the brain is most commonly attended by delirium. It appears also, that in those cases in which coma was the most remarkable symptom, there was more or less delirium in the commencement; so that, whether we take the cases in which there was delirium all through, or those in which there was coma, the conclusions appear to be in favour of the doctrines of phrenology.

I shall now proceed to make some remarks on the phenomena of organic life in cases of cerebral inflammation. In the first place, with respect to the tongue, we find that in simple arachnitis it is but slightly affected; there may be some trifling degree of foulness, or it may be quite clean and moist. You will observe the value of this, as connected with the diagnosis of irritation of the brain from disease of the digestive system. There are many cases of irritation of the digestive system putting on the semblance of hydrocephalus to such a degree as even to mislead an experienced practitioner. Now, if it be true that in simple arachnitis the tongue remains clean, it furnishes us with very material information, as, under such circumstances, our attention will be directed to the true seat of disease. Andral says, that in some cases of arachnitis he has found the tongue red, or dry, or foul, but that at the same time there was disease of the digestive system. The majority of his cases, however, were simple, and exhibited no marks of an affection of the tongue or digestive system.

There is one more symptom on which I wish to offer a few observations, and that is the occurrence of vomiting in the hydrocephalus of children. In all cases where there is obstinate vomiting, particularly in children, you should have your suspicions roused, and look carefully to the state of the head. Vomiting is a symptom which occurs in many cases of arachnitis; in some it is slight, in others more constant, while in a third class it is harassing, incessant, and produced by swallowing the most unirritating substances. The nature of the fluid rejected from the stomach is various — being sometimes bilious, sometimes mucous, sometimes only consisting of what had been recently drunk. In some of these cases you will find the symptoms of incessant vomiting, unaccompanied by pain of the stomach, tenderness of the epigastrium, or any other sign of disease of the digestive system. I have even seen it coexisting with a good appetite. Many persons have been lost by such cases having been mistaken for disease of the digestive system, the practitioner being ignorant that vomiting was here only symptomatic of disease of the brain.

No matter what the situation of the meningitis may be, it is now established that you may have vomiting as a common symptom. I recollect the case of a delicate child, about seven years of age, who laboured for some time under catarrhal fever, on the subsidence of which she got an attack of vomiting, which came on at different times in the day, but without headache, delirium, or intolerance of light. This vomiting continued from day to day; and, at the end of the week, the pupils became suddenly dilated, and coma set in, under which she died. There is one very remarkable circumstance connected with this subject, with which I am anxious you should be acquainted. *Where this incessant vomiting is present, you will have the other symptoms of meningitis more or less latent.* This illustrates a law before alluded to, that, where the phenomena which are the result of sympathy with an affected organ are very prominent, those which characterize the disease of the organ itself are more or less latent. If we take the reverse of the former case, and consider a case of gastric disease, we know that the irritation of the stomach will produce violent cerebral symptoms, and that here also the same law is exemplified — for we shall have absence of pain, tenderness, and vomiting. The great value of this rule is, that a knowledge of it will put you on your guard, and that the mere absence of the peculiar symptoms of an affection of an organ possessing extensive sympathies, should not lead you to conclude that there was no disease of that organ. In some remarkable cases of gastritis, the principal symptoms observed were convulsions and delirium; there was no vomiting or thirst, very little pain on pressure, and nothing remarkable in the condition of the tongue. The same latency of inflammatory disease is frequently seen in cases of delirium tremens.

With respect to respiration and the state of the pulse in meningitis, there is very little to be said. You may have meningeal inflammation with every variety of pulse — strong, weak, full, rapid, slow, or intermittent. Generally speaking, the pulse is, towards the close of the disease, feeble and intermitting, but you may have the disease running through all its stages, without any peculiarity in the character of the pulse. Respiration seems to be very little affected, and this would appear to favour the opinions of Sir Charles Bell. There is no doubt, at least, that the sympathy of the brain with the respiratory system is much weaker than with the digestive.

TREATMENT OF HYDROCEPHALUS.

I shall occupy your time but very briefly on the treatment of hydrocephalus of children, as it appears to me to be a disease in which, of all others, the principles of treatment are most simple. The old idea of this affection was, that it was a species of dropsy, depending on the relaxed state of the cerebral vessels, and hence the term hydrocephalus. Modern pathology has shown that the occurrence of serous effusion is a mere accidental circumstance, as it is present in one case of arachnitis and absent in another. When it does occur, however, *it is the result of inflammatory disease*, and it is to the prevention and cure of this that the practitioner

must direct his attention. With the symptoms of this disease I shall not take up your time, as you will find them sufficiently detailed in books; but, with respect to treatment, I shall say that, hydrocephalus is a disease *much more* under the influence of treatment than persons generally think. It is said that, when once effusion has taken place, the case is hopeless, and nothing can be done. This remark appears to me to be unnecessary, for there is no symptom from which you can venture to assert that *effusion* have set in. You may, from the inflammatory state of the brain, have delirium, coma, deafness, blindness, and paralysis, without any effusion of serum; and in many cases, life has been saved, even after the appearance of all these symptoms.

This term *effusion* is one of the bugbears of medicine. Many patients are lost from the prevalence of false ideas connected with this subject; for, as soon as *effusion* is supposed to have set in, the efforts of the practitioner are given up. Hundreds of patients die of bronchitis and pneumonia, in whom life might be saved if the symptoms of *effusion* had been treated for those of inflammation; and so it is with respect to the brain. This effusion is not the disease — it is not even a constant result of the disease. We have no certain means of ascertaining its existence; and we know that, by a persistence in antiphlogistic treatment, life may be often saved, even after all the supposed symptoms have occurred.

Take this with you as a rule in medicine: always to keep your eye more upon the causes than the effects of disease.

The treatment of hydrocephalus in the child should always be active, and conducted on the same principles as those of general encephalitis in the adult. Shaving the head, bleeding when practicable, *repeated leeching*, *cold affusion*, *calomel*, and *purgatives* — these are the great measures upon which we are to rely for success. It is satisfactory, too, to reflect that many cases have been saved by the prompt and steady adoption of this simple mode of treatment.

OF INTERNAL REMEDIES.

The use of mercury seems to be that on which you should most rely. Some of the most singular recoveries have occurred after ptyalism has been produced. Let me remind you, however, that the rules connected with this mode of treatment, which I pointed out in speaking of hepatitis, apply equally in this case. There is a terrible consequence of mercurial action in the lymphatic temperament, with which you should be acquainted; I allude to violent and destructive inflammation of the soft parts of the mouth and face, which has got the name of the *mercurial cancrum oris*. An œdematous inflammation of the cheeks, lips, and tongue, takes place, and if not checked, rapidly runs on to extensive ulceration. I have seen one cheek, half of the nose, and lower eyelid, and the opposite angle of the mouth, utterly destroyed, in a case where but five grains of calomel were used. This drawing represent the disease, after a frightful perforation of the cheek. In this case the quantity used was nine grains. I have seen the disease from the use of so small

a quantity as a grain and a half of calomel! These facts show that there is a state of the constitution in which a minute dose of calomel may have terrible effects. The same, too, may arise from the external use of mercury. I recollect the case of a young woman in the Meath Hospital, whose head was rubbed with *one dram* only of mercurial ointment, for the purpose of destroying vermin. She was attacked, and with difficulty saved.

The disease may also come on suddenly in a patient who has been for some time using mercury in considerable doses; but this is the rarest case.

You recognise this disease by the sudden supervention of great swelling of the lips and cheeks, so as to completely alter the expression. The tongue is also swollen. All these parts are hot and tender to pressure. The breath is fetid, and the internal surface of the mouth excoriated, and often covered here and there with patches of lymph. At other times we have a circumscribed œdematous swelling, occupying the centre of the cheek, which runs on to ulceration; but most commonly the ulceration of the external parts begins at the depending angle of the mouth.

In a case of this kind, if you are called before ulceration has taken place, I believe you can often save your patient, and prevent destruction of the face. Treat the disease as a violent inflammation; use repeated leeching, poulticing, and the warm bath. *While you do this, you must keep up your patient's strength by light nourishment and wine.* Apply to the internal ulceration the mel æruginis, the nitrate of silver, or the chloride of soda. I have now saved many cases by bold and repeated leeching. I remember one case of a man in which ninety leeches were used; he recovered perfectly.

In the treatment of this affection, it is of the utmost consequence to attend to the position of the patient. By keeping him as much as possible upright, or by preventing him leaning constantly on one side, we do much to prevent the occurrence of the ulceration of the angle of the mouth.

As far as I can see, hydrocephalus, when taken in time, is a very manageable disease; and there is only one case in which it is difficult to treat, and that is where the cerebral affection is accompanied by symptoms of gastro-enteric disease. In several cases of hydrocephalus, this complication certainly exists; and you have first symptoms of disease of the digestive tube, and then of the head. Such cases as these are involved in great difficulty, and in their treatment you run the hazard of falling into a twofold mistake. The first is your acting on the supposition that the disease of the head is only sympathetic, and that it will subside as soon as the abdominal symptoms are removed; the other is occupying your attention exclusively with the head. Now, there is one rule with respect to this, which I think will serve to guide you through many difficulties, *and this is, never to neglect the head.* Though you have first an affection of the digestive system, and then of the head, it is better (even though the symptoms of the latter still continue) to pay attention to the head. You can do this at the same time that you are attentive to the condition of the digestive organs. Another rule is,

that the cases of disease in which the purgative plan does not answer are generally those in which there is a primary inflammation of the digestive tube. Dr. Cheyne, in speaking of the treatment of hydrocephalus, says, that some cases are benefitted by purgatives, others not; and that the latter are those in which there is disease of the intestinal canal. In such cases you will not irritate the bowels, or add to the existing inflammation by purgatives. Let the bowels be kept open by enemata, and direct your attention immediately to the head. Children with largely developed heads, and of a strumous diathesis, are very subject to this disease; and I feel convinced that the present rage for the early mental education of children has a strong tendency to produce it in subjects of this description. I believe there are many cases of fatal hydrocephalus from which the poor victims would have escaped, but for the pernicious efforts of the parents to make them literally prodigies. I have observed many cases of this kind among the children of persons who, having been originally situated in an humble sphere, and deprived the benefits of education, accumulate wealth; and then feeling in their new condition the want of education, are anxious to communicate it to their offspring; and, with that view, have them educated with too much care, and from too early a period. The child is constantly kept at his books — his little mind is perpetually tasked — a degree of cerebral excitement is kept up — and, while he is delighting his gratified parents with the manifestations of a precocious intellect, his health is neglected, and the seeds of disease are insensibly sown. One of the most ordinary consequences of this early application of the mental powers is hydrocephalus. These little creatures, too, have a congenital disposition to disease of the brain, for they have generally large heads. Such cases are examples of the results of an arrest of development. A relative condition of head exists similar to that which occurs during fœtal life, and this is always accompanied by a remarkable susceptibility to inflammation. This peculiar development of head also produces a precocious state of intellect, which is increased by the pernicious habit of obliging children to study at too early an age. Where you meet with children suffering under these circumstances, you will not discharge your duty properly if you do not point out to the parents the mischievous tendency of their conduct. In such cases as these it may be justly said that ignorance is bliss.

LECTURE CXI.

DR. BELL.

MENINGITIS—Its organic seat—Not a unit—Different membranes—Their connection with each other and with the brain—*Arachnitis*—Value of chief symptoms—Anatomical lesions—Pia mater, its organic lesions—Varieties—simple and tuberculous—*Tuberculous Meningitis*, or acute hydrocephalus—the most frequent and the most important kind of meningeal inflammation—History of discovery respecting it—Its morbid anatomy—Stages or periods—*Symptoms* analyzed—the pulse in different stages—breathing—vomiting—constipation—retraction of abdominal parietes—decubitus—expression of the face—cephalalgia—delirium—convulsions—coma—*Diagnosis*—Diseases from which tuberculous meningitis is to be distinguished—*Prognosis* unfavourable—*Causes*—Age—sex—hereditariness—antecedent diseases—external injury—*Treatment*—Prophylactic—Curative—Blood-letting—cold—tartar emetic—purgatives—mercury—revulsives and counter-irritants—blisters—Iodine—Tuberculous meningitis in the adult—Complication of worms with tuberculous meningitis—Wrong pathology—A curable disease—CHRONIC HYDROCEPHALUS—Tubercles of the brain.

MENINGITIS (from μηνιξ, a membrane), is a term which rests on an anatomical basis, and, as such, would at first seem to allow of a ready appreciation of distinctive symptoms. But a little inquiry soon shows that this simplicity of view is fallacious, and that meningitis is a general, not a specific term, that it indicates inflammation, not of any single membrane but of all the membranes of the brain; and that we have no very clear diagnosis between the inflammations of these several membranes, nor between them nor any one of them and inflammation of the brain, or encephalitis. For a long time no attempt was made to connect the observation of symptoms with anatomical lesions of the membranes or even of the brain; and the vital phenomena were all expressed vaguely by the words phrenitis, delirium, cerebral fever, or, with some attempt at modification of stage, by the word coma. Even now, after considerable pains have been taken by competent and conscientious observers to introduce and establish a more rigid system of investigation and induction, we are far from having reached a satisfactory result.

The difficulties in the way of separating the affections of the several membranes of the brain from each other, and of each respectively from cerebral disease proper, if not absolutely insurmountable, are, in the nature of the case, very great. Taking general anatomy as a standard, it seems easy to point out the three investing membranes of the brain, viz.: the dura mater, the arachnoid, and the pia mater, and to infer from the differences in their tissues — fibrous, serous, and cellulo-vascular — that they possess different vital properties in health, and must exhibit lesions of different kinds when diseased. But special or minute anatomy apprises us that there is not that entire separation of membranous tissue in each case which would allow an isolation of either physiological or pathological phenomena. Thus, if we look at the dura mater, we find it intimately connected, on one side, with the bones, cranial and spinal, which it invests, by means of vascular and cellular prolongations; and on the other, closely adherent to the arachnoid membrane by means also of cellular tissue and vessels, the latter of which come from the

dura mater, while their absorbent and exhalent terminations are on the free surface of the arachnoid. The ready and almost entire separation of the two parts of the arachnoid — that lining the dura mater and that investing, to a considerable extent, the pia mater and the outer convoluted surface of the brain, in fact the space constituting the arachnoid cavity, is not an anatomical feature. We are to look for this in the connection between the outer surface of the cerebral arachnoid and the pia mater which, at first sight, seem, indeed, to be sufficiently contrasted; the former being smooth, of extreme thinness and transparency throughout, the latter on the contrary is made up of network of vessels with some intermediate cellular tissue. A little farther inspection, however, shows that the arachnoid is but a kind of epidermis, as has been ingeniously remarked, for the pia mater, through which absorption and exhalation go on by the intrumentality of vessels supplied from the latter. There is then, in fact, community, one might almost say, unity of physiological action between the arachnoid and pia mater; the completion of function taking place in the first, by means of vascular tissue supplied by the second. Hence, in reference to the arachnoid, to which, of late years, so important a part has been ascribed in meningeal inflammations, although we class it properly enough among the serous membranes, and point out the increase of natural secretion and the formation of morbid ones on it in disease, we cannot deny that, as it has two sets of connections, one with the dura mater, another with the pia mater, it will modify and be modified in a somewhat distinct manner, in its two sides, at this time.

We have shown how the membranes are thus united anatomically one to the other. Their connection in this way with the brain by the pia mater is still more manifest. This membrane would seem to be chiefly intended as a means for equal and regular distribution of blood to the brain, which it covers, not merely on its outer convolutions like the arachnoid, but it dips down between these, investing each, and finds its way into the cavities or ventricles; sending its vessels, now become more and more attenuated, into the substance of the brain itself, which it nourishes by this means and fits for the performance of its important functions.

It is very easy to see, from this brief anatomical prodrome, that inflammation of the pia mater can hardly exist without the surface, at least, of the brain being similarly compromised, nor, *e converso*, is it probable that primary inflammation of the brain could last beyond a short period without causing, at any rate, afflux and congestion in the pia mater. In either case, whether we suppose primary or secondary inflammation of the pia mater, we cannot deny the probable concurrent disorder of the arachnoid; or, if it be alleged that arachnitis is of primary origin, we must also admit that its persistence almost necessarily implicates the brain through the pia mater.

Looking at the separation between the two free or inner surfaces of the arachnoid, those corresponding with its cavity and the connections between the other outer surfaces, in one direction with the dura mater and in another with the pia mater, there would seem to be room for a natural division of membranes into cranial and cerebral, of which

the first would consist of the dura mater and its adherent arachnoid lining the cranial cavity, and the second the pia mater and the arachnoid covering the brain and its convolutions and prolonged into its cavities. But although this division would seem to separate sufficiently the lesions of the pia mater from those of the dura mater, it would not for any practical purpose separate the two halves of the arachnoid, nor this latter from either of the other two membranes.

The dura mater is liable to affections implicating parts of its tissue, as when one or more of the bones of the cranium or of the spine are diseased, or when morbid growths of a fibrous nature occur in it. There is another morbid feature, noticeable in the cellular tissue intervening between the dura mater and the arachnoid, to which M. Foville (Art. Meningite, *Diction. de Med. et de Chir. Prat.*) directs attention. If we look at the arachnoid surface of the cranial membrane, we find several stains, of various sizes, disseminated over it, of a brown, or deep yellow colour, somewhat raised and separating the serous membranes from the dura mater. It is easy to make the surfaces at these particular parts glide over each other, a result owing to the absorption in a great measure of the intervening cellular tissue. Not unfrequently blood is found infiltrated in some of these spaces, causing projection, adequate to compress the brain and to give rise to the characteristic symptom of this state.

We are ignorant of the diagnosis of this morbid change, which we can hardly designate as inflammation; nor can anything be said of its treatment. It is chiefly met with in subjects whose brain has been diseased for a length of time, and in whom abnormal appearances, as regards the supply of blood, are met with in all parts of the head.

Morbid alterations of the arachnoid membrane, and chiefly *arachnitis* or *arachnoiditis*, have most engaged the attention of the pathologists and medical writers who of late years have directed their attention to meningitis. To it are they inclined to attribute the delirium and convulsions in the acute stage of meningeal and of cerebral inflammation, and the morbid depression of mind and slowness of muscular movement bordering on paralysis in the chronic form of these diseases; in which we must include that so unfortunately designated by the term hydrocephalus or water on the brain — as if a symptom, an effect, a temporary crisis, should be called the disease itself.

I shall not go over the same ground that Dr. Stokes has occupied in describing the chief features of arachnitis, but would merely advert just now on the difficulties of the diagnosis. Pain of the head, so much insisted on as a constant symptom, is present in a majority of cases, but by no means in all. The seat of pain does not always correspond with that of the lesion of the membrane; sometimes indeed it is remote from this latter, and it is, in cases, either more diffused or more limited than the lesion itself. Great differences are observable in the kind of pain experienced by the persons suffering from arachnitis.

Equal uncertainty exists regarding the alterations of the different senses which, like the intellect, is in the first stage generally excited, and in the last diminished and almost abolished. Headache generally precedes delirium. This last in its turn is commonly followed by coma.

More reliance is to be placed upon the disorders of motility, manifested at first by general restlessness and agitated movements, and subsequently by convulsions, either partial or general, which after a time yield to paralysis.

There are usually three periods, characteristic of arachnitis; viz., 1, that of headache, vomiting, and febrile disturbance; 2, that of delirium and different disorders of motility; 3, that of coma and collapse.

The anatomical lesions in arachnitis are manifested in the cavity of the membrane. Sometimes we find a turbid and milky serosity, with purulent flocculi interspersed; sometimes there are false membranes organised, and again without any appearance of this kind, extending from one side to the other of the free surface of the arachnoid. M. Foville lays stress, as a result which has only obtained in the arachnoid, of all the serous membranes, on a layer of pseudo-membrane being formed on both surfaces, the cranial and the cerebral. Between these two surfaces partial adhesions are often formed by strips projecting from one side to the other. There are cases again, in which the arachnoid is found to be remarkably dry at its free surface. This membrane is never or very rarely found injected, changed in colour, or thickened. Appearances of this nature have been reported, when, in fact, they depended on fluid between the arachnoid and the pia mater, and in morbid states of this latter seen through the arachnoid. Serous effusions as well as the formation of pus are more frequently met with in the ventricles than in the large cavity of the arachnoid.

With the anatomical changes of the arachnoid are associated a series of symptoms of a marked character. How far we can refer the latter to lesions of this membrane alone is another matter, respecting which there is, as I have already explained to you, great difficulties. In the case of the pia mater, the connections and relations between this membrane and the encephalic organs prepare us for expecting notable derangements of the function of the mind and of sensibility and motility, and we find, in fact, such a correspondence; but to what extent these symptoms are those of inflammation of this particular meninges, or of cerebritis, is a question involved in great doubt, and to the satisfactory solution of which we have as yet but few positive data.

The anatomical or organic lesions of the pia mater are more frequently met with than those of either of the other membranes. Its tissue may be infiltrated either with clear colourless and transparent serum, or with a turbid and lactescent fluid, or with pus; or it may be found in a state of scirrhous induration. At other times, again, are seen serous cysts of various sizes and numbers, cartilaginous or osseous laminæ, tubercles and adhesions between portions of the pia mater which dips down between the convolutions. These changes of tissue are various in their situation and extent; and hence this meningitis (*pitis*) may be either general or partial. In the latter case we distinguish, 1, that of the convexity of the hemispheres; 2, that of the base; both of these occupying one or both sides; 3, a ventricular meningitis, alone or co-existing with the two first varieties, the chief

lesion recognisable in which being an effusion, has caused it to be called acute hydrocephalus; 4, finally, a spinal meningitis, which, also, may be either general or partial, confined to the upper or the lower portion or to one side.

Tuberculous Meningitis, the *acute hydrocephalus* of authors. I shall not attempt a formal exposition of the symptoms, causes, and treatment of the meningitis which consists in an inflammation of the pia mater; but shall restrict myself to a brief review of the chief species, the tuberculous, which, only noticed distinctly within the last fifteen years, is now admitted to be the most common as it is the most alarming of all meningeal inflammations. But first, let me say a few words on the history of the detection of this disease, which I find in the work of MM. Barthez and Rilliet, and a notice of it incidentally under its common title of acute hydrocephalus.

Sauvages was the first to give a description of acute hydrocephalus under the title of eclampsia. He pointed out the co-existence of this disease with scrofula and rickets. Anterior, however, to him, Duverney, St. Clair, and Paisley, had recorded cases of the disease, and had noted the coincidence of hydrocephalus with pulmonary and mesenteric tubercles. To Robert Whytt are we indebted for the first, as on the score of accurately described symptomatology it is still the best description, under the title of Dropsy of the Brain (1768). It was reserved for Quin, of Dublin, father and son, to show that dropsy was not the essential feature of the disease, but that this latter depended on a morbid accumulation of blood in the vessels of the brain, which sometimes attained the point of inflammation, and which produces often, but not always, an effusion of water before death. Ford, adopting in part the ideas of Quin, introduced a more definite pathology, by pointing out a double origin; viz., inflammation of the pia mater, and a scirrhous (tuberculous?) induration of the brain. Since then, authors, while generally agreeing as to the inflammatory character of the disease, have advanced different opinions respecting its seat and extent. Goelis and Piorry call it arachnitis, so also, if I remember right, do MM. Parent-Duchatelet and Martinet in their work on arachnitis. Coindet located it in the ventricles of the brain, and gave it the name of internal cephalitis, whilst M. Brachet attributed it to disease of the lymphatics. M. Senn, in his monograph (in 1825), gave the name of meningitis to acute hydrocephalus, and referred the seat of the disease to the pia mater.

But, a step farther was requisite, beyond the admission of mere inflammation, in order to place meningitis in its proper light. M. Guersent, without actually making it, pointed out the way to others, when he adopted the title of granular meningitis, and noticed the frequent occurrence, at the same time, of tubercles in other organs. Still although he separated granular meningitis from the other kinds of inflammation of the cerebral membranes, he did not look on the granulations as tubercles.

M. Papavoine was the first to show conclusively the tuberculous character which meningitis so generally assumes. His cases, two in number, are detailed under the title of *tuberculous meningitis*, in the *Journal Hebdomadaire* (1830). After having described, with

great minuteness, the meningeal granulations, he divides these tuberculous productions into two forms; the laminated and the granular. He points out the fact of the tuberculous affection having preceded the inflammation; and indicates the co-existence of meningeal granulations with tubercles in other organs. Finally, he shows that the granulations may exist without occasioning inflammation, — a proof of which was furnished in his second case.

Subsequently, MM. Fabre and Constant presented a memoir on this subject to the Institute, which obtained a prize from that learned body. To Dr. Gerhard (*Amer. Jour. Med. Science*, April, 1834), and to his friend and associate in Paris, in this and other useful labours, Dr. Rufz, in an inaugural dissertation (1835), and M. Piet, in his thesis (1836), we are indebted for interesting monographs on this disease, for which they still retain the title of tuberculous meningitis. These writers have established, as so many general laws, the conclusions which M. Papavoine had drawn from his own observations, viz., 1, that the meningeal granulations are of a tuberculous nature; 2, that they are analogous to the granulations of other serous membranes; 3, that they are found only in subjects whose other organs contain tubercles. M. Piet was, we are told, the first to show that the meningeal granulations may exist without giving rise to noticeable symptoms. To the number of investigators of this disease should be added Dr. Green, who, in the *London Lancet*, has recorded his observations, and given a division of tuberculous meningitis into acute and chronic.

Tuberculous Meningitis is distinguished by the following anatomical traits: 1. A deposit of tuberculous matter in the lamellæ of the pia mater, presented under the form of either flattened or rounded granulations, which are disseminated through different parts of the membrane, at the hemispheres and at the base of the brain, varying in size from that of the grain to a pin's head, more generally opaline or white, sometimes gray and semitransparent; commonly isolated, though sometimes grouped. In some rare cases granulation is the only meningeal lesion.

2. An inflammation characterised by a secretion of concrete pus, or of false membranes on the pia mater, which, itself, is thickened, yellowish, or greenish, friable, and sometimes adherent to the cerebral surface. This inflammation is usually coincident with the presence of tuberculous meningitis, although in a few instances it may be independent of this latter. Of 35 cases noticed by MM. Barthez and Rilliet, a union of tubercle and inflammation of the pia mater existed in 27; simple meningitis without tubercle in 4; and meningeal granulations or tubercles unaccompanied by any phlogosis in 2 cases. Most commonly the inflammation is at the base of the brain.

3. A peculiar condition of the arachnoid, manifested by its being glutinous or sticky to the touch.

4. A softening of the central parts of the brain; the tissue thus changed is white, of a creamy appearance, and is generally situated at the *septum lucidum*, and the *fornix;* seldom extending to the inferior portions of the ventricles.

5. An effusion of serosity in the ventricles, varying from three to six drachms, and sometimes even more.

6. A deposit, in the other organs, of tuberculous matter, which is generally in an incipient state and assumes the acute form.

Acute meningitis usually shows itself in the midst of full health, although, on occasions, it may follow another disease. It has been divided by different authors into stages or periods, but without conformity among them in this respect.

The division of Whytt may still be retained as the best, although neither it nor any other can be supposed to draw positively the line within which each group of symptoms is constantly seen. The first stage is marked by loss of appetite, paleness, frequency of the pulse, emaciation, vomiting, headache, languor, and grinding of the teeth; the second, by slowness and irregularity of the pulse, beginning stupor, cries, and delirium: the third, by accelerated pulse, paralysis of the eyelid, dilatation of the pupils, strabismus, convulsions, subsultus tendinum, and contractions of one or more limbs.

In their detailed description of the symptoms of acute meningitis, MM. Barthez and Rilliet speak first of the *circulation*. They pay, on the occasion, a merited compliment to Whytt, in their acknowledging, that they who write seventy years afterwards and who proceed with all the requirements of the analytical method, cannot do anything more than confirm, with some slight modifications, the results to which he was led by his remarkable talent of observation. He has best appreciated the characters of the pulse. Their own summary is as follows:

The pulse is moderately accelerated at the outset of the disease. It is irregular, with or without slowness, in the middle period; very frequent and small on the evening before, or on the day itself of death, rarely some days beforehand. Febrile complications, antecedent or subsequent to the meningitis, affect the frequency but not the regularity of the pulse. The authors insist more on the indications furnished by the pulse, from the fact that in a large number of diseases of all kinds, simple and complicated, acute and chronic, they have rarely found the pulse to be at once irregular and slow in any thing like a fixed manner, except in tuberculo-inflammatory affections of the brain and its dependences.

Heat of the skin usually occurs with acceleration of pulse, and undergoes considerable mutations when this latter becomes slow. Both the pulse and heat ought to be regarded, in this disease, as influenced more by changes of innervation than as evidences of any febrile reaction. The pulse is not strong and full, or resisting, as it is in so many other acute diseases of a really febrile character.

The usually pale colour of the face is sometimes replaced by flushing of the cheeks, which may be induced by change of posture or speaking to, or trying to engage the attention of the little patient. As the disease advances and on the approach of death the face assumes a violet hue, — particularly over the cheek bones.

Sweats, sometimes general but more frequently over the face, occur in a proportion of the cases of acute meningitis (hydrocephalus), and precede, it may be by two or three days, the fatal termination. They correspond, not so much with the degree of heat of the surface as with the small and frequent pulse and violet hue of the face.

The *breathing* is most commonly irregular. The inspirations, which are either quickened or retarded, small or full, are sometimes interrupted by long sighs or yawns; and at other times there is a temporary suspension of the respiratory movements, so that it might almost be said the child seems to forget to breathe. Once manifested, irregular respiration continues to the end. For the most part the number of respirations is between 20 and 28; and it has been observed that while the breathing had been accelerated by an antecedent disease, it fell in a marked manner so soon as acute meningitis supervened. There was often no appreciable proportion between the number of pulsations at the wrist and of respirations.

The state of the *digestive functions* will furnish us with important symptoms guiding us to a diagnosis in the case. The appetite, though less than common, is seldom entirely lost; nor is the thirst very urgent during the first period of the disease. The teeth and gums are, for the most part, moist throughout. So, also, is the tongue at the beginning; its colour is white or yellow in the centre, red or of a rosy hue at the top and sides — an appearance, by the way, quite common in many other diseases.

Vomiting has been always regarded as an indication of meningitis, nor do recent observations invalidate this opinion. It commonly comes on at the beginning of the disease, and lasts for two or three days. The matters ejected are various in their nature; consisting sometimes of the ingesta; sometimes of bilious fluids. The derangement of stomach is here secondary to, and caused by, the disease of the brain.

Constipation occurring with vomiting should excite solicitude, as serving to indicate the probability of incipient hydrocephalus or meningitis. It is met with in about three out of four of those attacked with the disease; and towards the conclusion it is replaced by diarrhœa. It is worthy of remark, and the fact has been stated by Drs. Gerhard, Piet, and Green, that diarrhœa dependent on intestinal ulcerations is sometimes suspended in a marked manner by the surperventon of meningitis.

Among the symptoms referrible to the abdomen is a retraction of its parietes, by which they approach the spine and leave a hollow in the middle. The general appearance has been compared to a boat. This phenomena does not depend on constipation, since it is met with in diarrhœa as well, nor on contraction of the recti muscles, but on retraction of the intestines, which are collapsed and with their sides in approximation, drawing after them the abdominal parietes. The retraction once begun, it continues until death: it is seldom seen before the sixth day of the disease. I have observed a similar appearance in the last stage of cholera infantum, when the brain is also affected and symptoms of meningitis have been manifested.

Pains of the abdomen, increased by pressure, come on in different periods of meningitis, although seldom at the beginning.

The *decubitus* varies; but it is seldom dorsal; the patient likes to change his posture. Often he lies on his side with his thighs bent on his abdomen and the legs on his thighs; and moans or cries out when he is turned on his back.

The *expression of face* seldom presents any diagnostic sign.

Of the *cerebral* functions. Cephalalgia is represented, although it has seemed to me, not with entire accuracy, as a constant symptom, which moreover appears from the outset of meningitis, and lasts at any rate until the coming on of delirium or coma. Disorder of the intellect is perhaps too generally looked upon as either unfailing or seldom wanting in this disease: but the opinion is erroneous. Children will sometimes reply very precisely and accurately to the questions put to them, and even volunteer explanations, when it is evident from other symptoms that they are already struck with the disease. As this latter advances the intellect is apt to suffer some disorder and perversion of its faculties, manifested by a peculiar look, expressive of wonder, or in other cases of indifference.

Delirium occurs at various periods of duration of the disease, or from the fifth to the twenty-fifth day; and presents degrees of intensity, from that of violent ravings to quiet mutterings. *Somnolence and coma* are symptoms seldom absent in the advanced period of meningitis. *Convulsions, subsultus tendinum, spasms, and rigidity* of portions of the muscular system, are farther evidences and symptoms of deep disorder of the nervous system. *Paralysis* sometimes occurs, but of a partial and temporary kind. Of the disorders of the senses, those of the eye are most numerous and noticeable. The pupil is sometimes contracted, sometimes dilated; there is strabismus, convulsive movements of the eyeballs, &c. Intolerance of light is manifested at an early period of the disease. Strabismus is found in one-half and dilatation of the pupils in three-fourths of the entire number of the sick.

In thus describing and analysing the symptoms of tuberculous meningitis, I do not attempt to separate those which belong to simple meningitis from those connected with the presence of granulations. The distinction could not, in the present state of our knowledge, be drawn; nor can we say when the phlegmasia began, or whether the tuberculisation preceded or was subsequent to the first symptoms. In subjects in whom nearly the same cerebral symptoms were observed during the progress of the disease, there has been found after death granulations without meningitis in some, and meningitis without granulations in others.

In forming the *diagnosis* of tuberculous meningitis we have to avoid confounding it with simple inflammatory meningitis, cerebral hemorrhage, cerebral congestion, cerebral disorders occurring at the onset of eruptive fevers, slight gastritis, typhoid enteritis, typhoid fever. I cannot now place before you the features of these different diseases in contrast with those of tuberculous meningitis. The very knowledge of the fact of similarity in some respects, by inducing a more careful inquiry and comparison, will go far to guard from erroneous and hasty judgment in diagnosis.

The *prognosis* is of the most sinister kind in tuberculous meningitis; so much so, indeed, that not a few observers deny that a case of this disease with all its distinctive traits and lesions has ever been cured.

Causes. — The strongest predisposing cause of tuberculous meningitis is tender age. That of the greatest tendency is from 6 to 10 years; afterwards, in the order of frequency, it is 3 to 5 years, 11 to 13 years, and 1 to 2 years.

As respects sex, MM. Rilliet and Barthez incline to believe that boys are more subject to the disease than girls. M. Foville advances a directly opposite opinion.

The particular constitutional liability to the disease is not always manifested by a weak and sickly frame: it shows itself sometimes in those of a full and apparently robust habit. This remark does not apply to those children in whom meningitis supervenes on confirmed phthisis, and who may be supposed to be already weakened and emaciated by this last mentioned disease. Dr. Gerhard believes the ultimate cause to be the lymphatic temperament, which is, however, that of children generally.

Tuberculous meningitis, like all the forms of tuberculosis, is hereditary, or rather a ready predisposition to the disease is inherited. Nor is it necessary, in proof of this fact, to seek out cases of cerebral disease in the parents. Any variety of tuberculosis in these latter would be an adequately predisposing cause of the disease now before us, in their children.

Antecedent diseases, such as measles, the suppression of eruptions of the scalp, &c., are sometimes a cause of tuberculous meningitis. It is a question agitated of late, and especially by M. Trousseau, whether inflammation of the meninges is not often a cause as well as precursor of tubercles of the membrane. Without positively denying the fact, we are not, however, justified at present in admitting its occurrence with any degree of frequency. Among the exciting causes, external injury, by fall or blow on the head, is far from being uncommon.

The *treatment* of meningitis has been already sketched by Dr. Stokes. If we put faith in the prognosis which I have described, it would seem to be of small avail to administer medicine with the hope of its displaying a decidedly curative effect in this disease; but when we know that a no small number of diseases, including one to be speedily mentioned, may simulate tuberculous meningitis, we find encouragement to make every attempt to save life in the case.

Reference being had to the early and inherited predisposition to tuberculous meningitis, we might expect much good from *prophylaxis;* and accordingly it should be our endeavour, while giving the child adequate nourishment, to avoid all excitants of the brain, to keep the head cool and the hair short, and at the same time the lower extremities well covered and warm. All appeals to over or even much exertion of the intellect should be carefully avoided, and the more carefully, the more ready and precocious the mental faculties of the child. Revulsives in the shape of blisters and setons have been recommended, but the indications ought to be very clear, if not urgent, for the use of such means, the real efficacy of which is not so well proved as some of their advocates would persuade us.

The *curative* treatment will be shaped in reference to the two elements of the disease, viz.: inflammation and tuberculisation of the meninges. The first, as the most urgent, is to be met by active depletion; local bloodletting being preferred to general in a great majority of cases. The leeches should be applied to the anus or perineal region, or on the inside of the thighs, rather than on the temples or mastoid processes, at which latter spots there would be a risk of afflux

of blood towards the brain being produced. The bleeding from the leech bites ought not to be continued more than an hour, or two hours at most. Cups between the shoulders or on the sacrum may be used instead of the leeches.

Auxiliary to depletion will be the application of cold by means of ice or affusion of cold water on the head, or prolonged irrigation by a small stream on the part. Sedation by means of tartar emetic deserves freer trial than it has yet obtained. Purgatives are, especially of the active and even drastic kind, a favourite remedy with American and English practitioners, but less so with the French. Calomel, given in large and repeated doses at short intervals and pushed to the point of salivation, is extolled both in England and the United States. You must be aware, however, of an important fact, which I think I have mentioned before, viz., that it is difficult to salivate a child, but it is not so difficult to cause tenderness and ulcerations of the gums, and to poison the system with mercury. To be effectual, mercury must, Dr. Chapman thinks, "be applied in a very resolute manner," internally and externally. Digitalis in full doses has been extolled as part of the reducing treatment. Goelis says this medicine abates the violence of the convulsions and other nervous symptoms of the second period of the disease. Sulphate of quinia seemed to be of service when the disease assumed a distinctly remittent or intermittent type.

After suitable depletion, and when we deem the period proper for counter-irritation, a large blister to the neck or between the thighs has been seen by Billard (*Diseases of Infants*, Stewart's Translation) to be followed with success. Some stress, and deservedly, is laid by Dr. Mills, of Dublin, on the use of the tartar emetic ointment, applied to the vertex or occiput, of such strength and with such frequency as soon to cause a pustular eruption and purulent discharge, which will be found especially useful in cases of repelled scabies, preceding the disease in question. In the acute form we cannot expect anything from a caustic issue on the vertex, as recommended by some. A large camphorated blister, to cover the whole scalp, has been used with often obviously good results, even at the beginning of the disease. In addition to the revulsive measures already mentioned, warm pediluvia, or the semicupium, and sinapisms to the extremities, should be likewise employed.

In consideration of the tuberculous element of the disease, the early, free, and continued use of alkalies would seem to be called for, and, with still greater hopes of benefit, that of iodine. The best preparation, that less contraindicated by the presence of any symptoms of inflammation, is the iodide of potassium, used by inunction, and internally, largely diluted.

Tuberculous meningitis in the adult subject was described in my lecture on the Symptomatology of Phthisis, and you have therefore now placed before you a tolerably full history of a disease which is one of the most alarming and unhappily fatal to which you will be called, and which, until within these few years, has not been observed in its affinities with tuberculosis.

Before dismissing the subject entirely, I must direct your atten-

tion to a complication of worms with tuberculous meningitis, in which the former was regarded as the chief disease, and the cerebral symptoms as merely sympathetic and secondary. But although the pathology be erroneous, there is one encouraging feature in the history of the disease with these double features, viz., that it has been frequently cured. Cases must have been seen by nearly every physician who has had even a tolerable range of practice, in which, with fever, hot and dry skin, constipation, unequal appetite, and the occasional discharge of worms, there have been irritability, restlessness, frequent moaning, grinding of the teeth, and cries during sleep, with heat of the scalp, headache and sometimes convulsions. These terminate fatally by neglect and mismanagement; but if treated after a rational plan, by local bloodletting, calomel followed by castor oil, or calomel and jalap, revulsives and cooling regimen, the result will often be restoration to health.

Chronic Hydrocephalus. — If acute hydrocephalus be really acute meningitis, simple or tuberculous, it might be supposed that chronic hydrocephalus would be represented by chronic meningitis. There are, in fact, effusions on the brain, and in the ventricles in chronic meningitis; but these do not constitute so characteristic a feature of the disease as they do in chronic hydrocephalus; which last, moreover, is almost entirely confined to infancy and childhood, whereas the other is restricted, mainly, as we have seen, to adult and to advanced age.

There is, however, this much in common to acute and chronic hydrocephalus, independently of the effusion, that the tuberculous element is found in a majority of both forms. Each, also, may display two varieties, the simple and the tuberculous; and in both the last merits the most consideration.

Chronic hydrocephalus may be either congenital or acquired. In the first kind, the size of the head prevents the passage of the child, and requires the operation of craniotomy for its expulsion from the uterus of the mother. In the second, the disease may follow the acute form, but more generally by far comes on slowly and almost insensibly until it has made considerable progress. It is of the second kind, or acquired, on which alone I propose to offer a few remarks at this time.

Hydrocephalus, both in its acute and chronic forms, may consist either of effusion on the arachnoid, that is, in the arachnoidean cavity, or in the ventricles. In the first case it is the result of hemorrhagic congestion and effusion; in the latter of tubercles or of encephalic tumours. In some instances the dropsy is manifested by serous effusion between the lamellæ of the pia mater, and in others, again, by œdema of the brain itself, the tissue of which becomes pale and softer than natural.

The chief form of hydrocephalus is that of the ventricles, which latter are enlarged in consequence; this change is more particularly observed in the lateral ventricles and next in the fifth, but less in the third. The communications between the ventricles are, also, enlarged. The consistence of the walls is sometimes increased, but, at other

times, is greatly diminished. Accompanying the dilatation of the ventricles is a thinning and unfolding of the cerebral substance; the hemispheres seem to have partially disappeared, and reduced to delicate laminæ of only a few lines in thickness.

The external surface of the brain is also changed, the arachnoid cavity contains but a few drops of serosity; the pia mater is thin and pale, and scarcely indented with a few red vessels, and it is closely applied to the brain, although, at the same time, it is easily detached from this latter. The convolutions are flattened, pressing on each other, and not separated by the usual anfractuosities. Through the walls of the former hemispheres it is easy to see the fluctuations of the contained fluid.

In the arachnoidean hydrocephalus, the fluid is sanguinolent serum, or yellow serosity, in quantity more considerable even than in the ventricular variety. One effect of this effusion is a separation of the brain from its cranial case, and its being pushed towards the middle of the base of the skull, just as the lung is pushed by pleuritic effusion against the vertebral column. The brain at this time is apparently small, but as its dimensions cannot be very materially diminished, we are less surprised to discover that an examination. by spreading out its several parts, shows the cerebral mass to have undergone little alteration in this respect.

The cranium is enlarged with the extension of the brain, and at times acquires an enormous size, while the face, retaining its customary proportions, seems to be smaller than natural. The fontanelles and sutures are not only open but greatly dilated; the bones of the cranium become extremely thin. In some cases the disease comes on after the sutures are closed, and the size of the head continues unchanged; but still more frequently, in this variety, the bones become gradually detached from each other, and are only held together by a fibrous structure.

The symptoms of chronic hydrocephalus are at first, when the disease is forming, irritability of disposition or unequal mood, and that state of the senses and nutritive functions which are so generally associated with disturbed brain. To these soon succeed great derangements of the nervous system, marked by muscular feebleness, alternating sometimes with epileptic fits. The memory and senses are weakened, and there is sleeplessness, and a dull heavy pain of the head. The pupil is dilated, and there is often strabismus.

As the disease advances, the debility is greater, the patient is unable to support himself in an erect position, and he indicates a preference for keeping the head lower than the rest of the body. The intellect is greatly weakened and after a time entirely lost, and the moral faculties in a measure are abolished. In a few cases, however, the mind is not sensibly affected, or some one faculty may remain unimpaired to the last. The sexual propensities are often strong, and in some cases of children the organs are prematurely developed.

The duration of this disease is very various, the prognosis bad, and the treatment of course unsatisfactory and discouraging. The causes of chronic hydrocephalus have been referred to a scrofulous habit, mechanical injuries by falls, &c., and the repulsion of certain

eruptions. A more definite attribution is to tuberculous growths, which, particularly at the base of the brain, compress the sinuses and interfere with the circulation, particularly the return of blood by the veins, and in this way give rise to dropsical effusions on the brain.

This would be the place to speak of tuberculosis of the brain, and to point out in detail the various affections which have been vaguely attributed to congestion or inflammation, and, as in the case of chronic hydrocephalus, to dropsy of the encephalic organs. I must be content with simply pointing out the connection between tubercle and effusion in the ventricles constituting the chronic disease, having indicated previously and in some detail the connection of tubercle of the meninges and effusion, constituting the acute form of hydrocephalus.

The treatment will consist of the use of such alteratives as iodinic preparations, including the iodide of potassium and the iodide of iron, alternating with other chalybeates and vegetable bitters and diuretics. Of the external remedies, the warm bath, frictions, and an issue or perpetual blister will be the most worthy of attention.

LECTURE CXII.

DR. BELL.

EPIDEMIC MENINGITIS—Its appearance of late years in France and other parts of Europe—Prevailed in former times—Not confined to the military—*Etiology*—Change of habits of young recruits—Excessive fatigue—Crowded barracks—In Gibraltar civilians, and of these the poor most suffered—Young persons most liable—In Tennessee occurred in civilians—Subjects young—*Symptoms*—Analogous to those of sporadic meningitis—Two successive periods—First stage—Excitement and collapse—Cephalalgia—Convulsions—Tetanic rigidity—Second stage—Collapse—Invariably coma—Differences in mode of attack—Suddenness—Sometimes a third stage or typhoid—Occasional incipient symptoms—Case—Predominance of some one symptom—Periodicity of the disease—Suspicion of its congestive character—*Progress* and *duration*—*Termination*—*Diagnosis*—Difficult to distinguish from congestive or intermittent fever—*Morbid anatomy*—Evinces three stages; congestion, inflammation, and suppuration—Appearance of the membranes and of the brain and spinal marrow—Suppuration mainly seen in epidemic meningitis—Gastro-enteritic complications—State of the blood—*Treatment*—bloodletting—revulsives—M. Rollet's use of actual cautery—blisters—purgatives—mercury not serviceable—great value of opium—sulphate of quinia—CHRONIC MENINGITIS—A disease chiefly of old persons—Its stages symptoms, and termination.

MENINGITIS, or rather *cerebro-spinal* meningitis, has within a few years past, assumed in different parts of the world the character of a formidable epidemic. By some of the writers who have described its progress and peculiarities, reference has been made to the history of epidemics, in order to show that an analogous disease has at different times, from 1510 to 1805, prevailed with more or less intensity in various parts of Europe. With what degree of correctness this opinion is advocated, I cannot now stop to inquire. I may repeat, after M. Casimir Broussais, that retrospective medical history seems to show that the disease has prevailed epidemically in different countries of Europe under the names of *cerebral fever*, *phrensy*, *cephalalgia*, *&c.*, chiefly in the years 1503, 1510, 1517, 1545, 1553, 1559, 1571, 1580, 1582, 1616, 1661, 1757, 1788, and 1805. The symptoms

were violent delirium, convulsive agitation, general rigidity of the limbs speedily followed by prostration and coma; sometimes the pulse was full and frequent, at others slow and feeble. Death supervened at an early period; sometimes in a few hours, but more generally in three or four days; but it was observed that the malignity of the disease was manifested less by the number of deaths proportionate to those attacked, than by the rapidity of the case towards a fatal termination. Still, however, as we learn from Ozanam, epidemic cephalalgia, combined with epidemic catarrh, in 1580, carried off ten thousand persons in Rome, twelve thousand in Venice, and two thousand in Madrid.

Many writers mention the presence of worms; and they, also, spoke much of sweats and eruptions, which were sometimes critical, and often not; and of chills, paroxysms, remissions and intermissions, sometimes at the beginning, but more commonly towards the conclusion of the disease.

M. Broussais completes his brief sketch of antecedent epidemic cerebro-spinal meningitis, after Ozanam, by reference to a few and imperfectly recorded cadaveric inspections, and the outlines of treatment, which latter, as resting on no recognized pathological basis, was necessarily uncertain and contradictory in different quarters. He proceeds, afterwards, with the proper subject of his history, by a statement of the different accounts of the disease, as it has appeared in France, which have been drawn up chiefly by the army surgeons and physicians. First appearing at Bayonne, Bordeaux, and Rochelle in 1837, and afterwards at Versailles and St. Cloud in 1839, it seemed to be fixed in these two latter towns up to 1842. From Versailles it branched off in one direction to Caen and Cherbourg in 1840 and 1841; and in another to Metz, Strasburg, Nancy, and Colmar, in a period between 1839 and 1842. In a different direction it was met with at Laval, Mans, Chateau-Gonthier, Tours, Blois, and Joigny, in 1840 and 1841. Finally, it gained the neighbourhood of Rambouillet. During all this time the disease, with few exceptions, as in the Landes and at Laval, Rambouillet, and Strasburg, was confined to the soldiery.

In another quarter of the kingdom, but still in the south, the disease began at Narbonne and Foix in the year 1837; and thence in 1838 broke out in Toulon; but in the beginning of 1839 it showed itself at Nimes, where its attacks were confined to the garrison. In the winter of 1839–40 it appeared at Avignon, and again in the following winter. In this town the soldiers were the first attacked, but subsequently some of the civil population were sufferers from the disease. In 1840, it broke out at Montbrison, and at Lyons in the winter of 1841–42. Finally, it branched off in another direction to Perpigan in the winter of 1840–41, and seemingly retraced its course to appear at Aigues-Mortes the following winter. In this last town, no part of the civil population was exempt — children suffering equally with the military.

Epidemic meningitis has appeared in other countries besides France. It has been noticed in different cities in Italy during the winters of 1839–40 and 1840–41, and more particularly in the kingdom of Na-

ples, where the physicians designated it by the term convulsive or apoplectico-tetanic typhus, &c. In Gibraltar the disease prevailed in the early part of the present year (1844); but almost entirely among the civil population.—(Gilkrest—*Med. Gaz.*)

I took occasion in the early part of the year 1843, to direct the attention of the professional public, through the pages of my journal (*Bulletin of Medical Science*, February, 1843), to a description of an epidemic encephalo-meningitis in France, and to the occurrence of a similar disease in Tennessee, in the beginning of the year 1841. Valuable additions to our prior knowledge on this subject are presented in a monograph (*Histoire des Meningites Cérébro-spinales, &c.*), by M. Casimir Broussais, son of the celebrated teacher and reformer. I gave, in the Bulletin of *May* last, a tolerably complete sketch of the contents of this work, constituting, in fact, a miniature monograph, in which the features and characteristics of the disease and treatment were, I believe, faithfully exhibited. Under this impression I shall now reproduce it for your benefit; believing, also, that you will not yet, for some time to come, find in other quarters so satisfactory a picture of this new and formidable disease. I shall, as occasion requires, here and there introduce some lines from the descriptions of the epidemic as it occurred in Tennessee and Gibraltar.

Etiology. — As the disease in question attacks a great number of persons in a definite period, and cannot be referred to causes depending on season or locality, it ought, M. Broussais thinks, to be called rightfully an epidemic. The causes of cerebro-spinal meningitis, as it has been observed of late years in France, are predisposing and exciting. Of the first we may enumerate fatigue, recent arrival at quarters, and crowded barracks.

Young men designated by lot, who have been accustomed to rural life, leave their homes, and march in columns under the direction of an officer, to join the regiment with which they are afterwards to be incorporated. Before leaving home they indulge in festivities, and all along the road they are in a violent state of excitement, kept up, still farther, by the forced marches to which they are subjected in order to make up for lost time on the way. On arriving at their corps, new feasting and feting are indulged in; and then comes the additional deleterious influence of crowded barracks, for there is not always an exact proportion preserved between the fresh recruits (conscripts) and those detached to join other corps. If to these causes we add regret at leaving their homes, and especially the exercises and manœuvres which some of the young conscripts practice with ardour, others with reluctance, we shall have a union of causes capable of disposing the organism to disease. But then occurs the question — Must we expect to see a particular disease in preference to any other? At any rate, we find an enormous disproportion of those attacked with the disease among new recruits. M. Faure-Villar reports in his memoir, that of 154 sick with the epidemic in 1839, there were 103 recruits; and that, of 66 deaths, 56 were of this latter class. It was the same with the epidemic in 1841: all the patients at first were among the recently arrived recruits; and it was only at a later period that the older soldiers were attacked. At Bayonne, in 1837

and 1839, M. Lalanne observes, that a great majority of the sick and those who died from the epidemic were composed of recruits; that most of them laboured under nostalgia, and that the disease seldom extended to those men who had been more than two years in the service.

At Metz, M. Gasté notes with peculiar emphasis the crowded state of the barracks of the artillery, which furnished nearly all the diseases in 1839–1840, from November to March; and from this crowding he inferred the evolution of a miasmatic poisoning. At Laval in 1840, out of 44 deaths, there were 37 new soldiers, and the increase of cases was always in proportion to the arrival of recruits.

While all the medical officers dwell on forced marches, the fatigue and recent arrival of the young and new soldiers, only some of them allude to the crowding of the barracks, and the greater number have not indicated any cause of local insalubrity. All of them speak of the strong constitution and plethoric habit of the soldiers; but without its following that weakness of constitution was a passport of exemption. If it be asked, again, why these causes have given rise to meningitis rather than to articular rheumatism, typhoid affection, or any other malady? — the reply will be, that various other inflammatory affections prevailed conjointly with the epidemic in question, such as pneumonias, gastro-enterites, measles, and scarlet fever. At Strasburg, we learn from M. Tourdes, the mortality from meningitis did not equal that from the typhoid affection, during the year in which the former prevailed epidemically.

If, continues M. Broussais, we add to the causes already enumerated, the influence of a spring sun, an influence long continued during the exercises and manœuvres of newly recruited regiments; and if at the same time we bear in mind the use and abuse of spirituous liquors, we shall certainly find a series of causes capable of disturbing the organism of a great number of men at the same time. The spring months, or March, April, and May, furnish the larger number of cases of the disease. Sometimes winter took the lead in this respect. Summer only once. The modifying influence of a vitiated air from crowded barracks was manifested in Metz, in the typhoid form of meningitis being the most frequent. In Gibraltar the poor suffered most, and most of the cases were of subjects under 18 years of age, or between 2 and 15 years, and very few beyond the age of 30. Both sexes were attacked in nearly equal numbers.

M. Broussais, on the evidence of all the members of the medical corps of the army, rejects contagion, as at all operative in the etiology of epidemic meningitis.

The *symptoms* of epidemic meningitis are, in general, the same as those of the sporadic; but in making this remark, we ought to add that the disease presented itself with considerable varieties of stage and degree. Our attention, however, will be more particularly arrested by two successive periods of the epidemic; viz., of excitement and of collapse; but we ought to be aware that these do not always show themselves in a uniform order of succession, by excitement preceding collapse. The reverse, or the introduction of the disease by collapse, is sometimes the case, although of less frequent occur-

rence. When the patient, from the first, suffers from prostration, somnolency, &c., the prognosis is unfavourable, and the result generally fatal; to such a degree that sometimes death takes place in the state of stupor. The two stages or forms of the disease are designated by the authors of the several memoirs on the subject, under the terms of ataxic and lethargic, inflammatory and typhoid.

In the first stage, or that of excitement, the eyes are sparkling; the face red; the pulse is strong and frequent; speech abrupt: complaint is made of cephalalgia, of more or less intensity, and of an acute pain at the nucha. There may be, at the same time, irregular movements, convulsive mobility of the muscles of the face, and convulsions of the limbs; and loud and repeated complaints made by the patient. In the midst of all these symptoms consciousness remains entire, or the intellect is but slightly troubled by acute delirium, which, is however, of transient duration, coming and going at intervals. Often a tetanic contraction of the jaw and back, trismus and opisthotonos, are met with. Dr. Richardson (*West Journ. Med. and Surg.*, December, 1842) states, that in nearly all the bad cases, the head was drawn back on the shoulders, and the whole spine, from the head to the sacrum, was bent like a well strung bow. So great was the extension of the body that many patients could not lie on the back at all. He never saw such a contraction of the spinal muscles, except in the species of tetanus called opisthotonos.

Great intolerance of light and sound exists, to such a degree that the smallest ray of light or a noise the least discordant is apt to provoke convulsive movements.

This form of the disease, which is, also, most commonly the first stage, is replaced in serious cases by the other form, which is really then the second period. The latter is characterised by a general collapse, insensibility, coma; but these symptoms are not always present from the first. The symptoms immediately preceding death, as Dr. Richardson observes, were much like those observed in children who die of acute arachnitis terminating rapidly in effusion. Some patients complain of fatigue, uneasiness, prostration, ennui, and acquire an undeserved reputation among their comrades for being idlers, loungers, or, in barrack phrase, *clampins* — malingerers. M. Broussais received in the hospital of the Val-de-Grace a soldier in a state of coma, which terminated fatally in twenty-four hours, — in whom no other symptoms than those just described were seen. A vast purulent layer under the arachnoid enveloped the whole of the brain.

In such cases the pain of the head is obtuse and heavy, in place of being acute and lancinating; the eyes are dull and half closed; speech indistinct and laborious: there is a swimming of the head and vertigo, especially when the patient attempts to get up and walk, and his limbs totter under him. After a period of variable duration, these preliminary symptoms are replaced by a violent agitation, called period of reaction, or by a complete stupor. The series of bad symptoms may begin with this latter; so that, more than once, soldiers in the ranks, and apparently in good health, have fallen down suddenly, deprived of all consciousness. It is under such circum-

stances that the pulse is slow, sometimes full, at others weak; the pupil is most commonly dilated and immoveable; there is complete general insensibility: or, on the other hand, such an exaltation of sensibility, that the least contact with any part of the body elicits a plaintive cry from the patient. It is not unusual to hear, also, acute cries spontaneously uttered, interrupting from time to time the stupor and coma, and to see the patient carry his hand mechanically to his head, and sometimes to cry out — My head! my head! — as if he felt in that region the most acute pain.

More frequently the stupor is not so great as to prevent the patient giving some signs of consciousness when he is suddenly called by name, by moving his head and trying to articulate a few words which die away on his lips, and half opening for a second his eyelids, which close almost as suddenly.

Whether or no the symptoms now described be those of the second period, or as, rarely happens, they introduce the disease, if the latter is prolonged for any time there are manifested symptoms of a third stage, being the typhoid, in which the tongue is dry, the lips incrusted, the common calls of nature cease to be attended to, and the bladder is distended with urine or is continually allowing it to escape,— as do the fecal matters. This state is often complicated with paralysis of some sense or with hemiplegia. Dr. Richardson met with partial deafness in almost every case, and blindness in others.

M. Broussais does not deem it requisite to describe the initial symptoms of meningitis, because they may often be wanting, and, besides, they are not peculiar to this disease. Such are a chill and vomiting. In Dr. Richardson's patients, a chill or chilliness ushered in the attack. Almost all the writers on the subject designate, however, as a pathognomonic sign, rachialgia, which, according to M. Tourdes, is only absent in the purely cephalalgic variety and in the suddenly destructive cases. Constipation and suspended secretions were common features of the disease.

Among the numerous cases recorded by M. Broussais is one headed *Coma —reaction — collapse* — of a young soldier, of a thin but robust frame, who had sickened in the evening, and suffered through the night with a chill, followed by headache and fever. On the following morning he was sent to the hospital, and in a very short time after his arrival there the physician found him in the following state: Complete loss of consciousness, cold skin, pulse extremely small and slow, great alteration of the features; eyes fixed and sunken, cheeks hollow, skin of a livid hue, of a choleric appearance, hands sodden and blue.

Reaction followed this state of coma, and was manifested in convulsions and restlessness, so great as to compel the use of a straight-jacket. To this succeeded entire collapse, from which the patient partially recovered; but he finally sank under the disease, on the seventh day from the attack.

Some one symptom may predominate and impress its peculiar feature on the disease, so far as to give the designating term, precisely as in pernicious (congestive) fevers; and then we have cephalalgic, or delirious, or convulsive, or vertiginous, or tetanic, or comatose meningitis.

If we analyse some of the most marked deviations from the normal state, we shall find that the pulse, though often very slow, is still more commonly quite frequent. In some few cases its beats have been found to be as low as 48 to 50; but in 31 cases out of 65 they exceeded 90, and were only below 60 in ten cases. Cutaneous eruptions were noticed in this epidemic, both in France and in Tennessee, as they had been in that of the sixteenth century. In general, neither the cutaneous eruptions, nor epistaxes, nor urinary deposits, were critical.

Periodicity is quite common in epidemic meningitis. M. Lallemand, in 1820, had pointed out the occurrence of this feature in the recurrence of spasmodic phenomena accompanying arachnitis, and MM. Parent-Duchatelet and Martinet, in their treatise on this latter disease, had also spoken of remissions and exacerbations as frequently seen. They showed, also, that inflammation of the arachnoid would take a distinctly intermittent type, — quotidian or tertian; and that even traumatic arachnitis was distinguished by complete intermission — a quotidian return of symptoms — which persisted until death. In all these cases, they detected suppuration of the meninges, leaving no doubt of the fact of inflammation during life.

Intermission was frequently noticed in the epidemics of phrenitis and cerebral fever, in the sixteenth century. The same phenomenon was, we repeat, quite common in the recent disease; to such an extent, indeed, that the amelioration, or a subsidence of all the symptoms, led to a hope of recovery from the disease, which, however, was dashed by a return of the exacerbation on the following day. So decided and characteristic was the periodicity in some places, that, at Toulon, M. Leonard, after having admitted the existence of an epidemic meningitis, finally believed in the disease being an epidemic pernicious fever. At Bordeaux and Lyons, similar discrepancy of opinion prevailed among some of the physicians of those places. We are disposed to dwell on this point the more, as its promulgation may contribute to a more enlarged and better pathology of the fever, or class of fevers so prevalent in our own country, and designated among us here at home by the general term *congestive*.

In its *progress* and *duration*, epidemic meningitis resembled closely other epidemics. Thus, a solitary case would be seen long before the mass were attacked, and before a suspicion of the coming epidemic was entertained: and again, after its apparently entire subsidence, a case would show itself, renewing alarms which subsequent cases did not justify. The actual duration varied from three to fourteen months; the approximative average might be stated at seven months. The Gibraltar epidemic lasted from the early part of January to the 20th of May, 1844. In the civil population to which the disease was restricted in that town, amounting to 16,000 persons, 450 cases of all grades occurred; of these the deaths were 42.

The *termination* was, in large proportions, fatal, as scarcely one in two of those attacked were saved. Secondary disease was apt to occur in those who survived the first, and finally carried them off. Convalescence was often slow and lingering. The violence of the epidemic diminished towards its close.

In treating of the *diagnosis*, M. Broussais admits, that it is by no means easy to distinguish it, especially at the onset, from pernicious, or congestive intermittent fever. Its frequent complication, also, with gastro-intestinal inflammation is another source of fallacy. If we look for characteristic symptoms, we should expect to find them in the strabismus, muscular agitation of the features, convulsions, acute and fixed pain of the head and chiefly at the nucha, violent delirium, acute cries, coma and general insensibility or, at other times, excessive sensibility. But in the cerebral symptoms we should find little to point out a meningitis rather than a congestive fever.

The *prognosis*, as may be inferred from what was said respecting the termination of epidemic meningitis, is of course unfavourable. Summing up the returns procured from different places in which the disease prevailed, M. Broussais shows us, that there were 592 deaths in 1035 sick,—giving on an average 1 death in 1·76, or in somewhat less than two cases. We might say, with a near approach to accuracy, that the deaths were to the attacks as eight to fourteen—a mortality only paralleled by that in cholera, or in malignant forms of the exanthemata.

Morbid Anatomy. The chief seat of organic lesion in epidemic meningitis, was the cerebro-spinal apparatus, and of this the meningeal envelopes more than the nervous substance itself. The kind of lesion consisted in inflammation of different degrees of intensity. M. Forget indicates three degrees or stages, viz., congestion, inflammation, and suppuration.

The meninges, and especially the cerebro-spinal pia mater, was deeply injected; the bloodvessels and sinuses gorged with blood, and between the arachnoid and the pia mater there was found sometimes a lactescent serosity, turbid, yellowish, and semigelatinous, with a slight opacity of the arachnoid; at other times drops of a purulent appearance, yellow, disseminated along the vessels, and still more frequently laminæ in form of ribbands or plates, of a whitish-yellow substance and consistent, resembling very closely concrete pus — seen either at the convexity of the brain or upon its lateral parts, or more commonly still at the base, towards the pon varolii, following also the course of the vessels, the fossa of Sylvius, between the convolutions, and spread over anfractuosities, which they rarely penetrated. In the spinal cavity this purulent layer presented itself in slips in the anterior or posterior face of the medulla, but in preference on the former. In some cases, in place of a simple pseudo-membranous layer, there were met with true purulent collections, but always sub-arachnoidean. Frequently, the spinal nerves, as far as the junction of the anterior and posterior roots, were buried in pus.

But although the common seat of lesion was between the pia mater and the arachnoid, every now and then effusions were seen in the cavity proper of the arachnoid itself, of a turbid or lactescent or even bloody serosity. Most usually this effusion was met with in the ventricles, by M. Tourdes, in 26 out of 43 cases. The parietal arachnoid was always found healthy.

Whenever pus was seen on the medulla spinalis, it was also found on the brain; but at times the suppuration in the latter was not met with

in the former, and hence M. Tourdes infers that the inflammation always began in the encephalon, and only extended consecutively to the spinal marrow. On this account, he divides meningitis into cerebral and spinal. M. Chauffard frequently met with softening of the cerebral substance and even in the medullary portion.

M. Broussais takes occasion, after describing the *post-mortem* appearances in those dead of the epidemic, to dwell on the fact of the infrequency, in common practice and times, of suppuration of the cerebro-spinal meninges. During the twelve years in which he has been attached to a large (military) hospital, he has only met with 49 cases of acute meningitis, or encephalo-meningitis, in 15,000 cases of other diseases; and of the 17 fatal cases, suppuration was not constantly met with, and was not always extended to the spinal meninges. In the epidemic disease, these suppurations took place with surprising rapidity. The shortest period is of a case reported by Mr. Leonard, of Toulon, which ran its course to suppuration in 15 hours. Other cases are recorded in the volume of M. Broussais, in which this change occurred in 36 and 48 hours.

It is worthy of remark, that in a large majority of the fatal cases, in which, during life, there was manifested great disorder of the cerebral functions, the substance of the brain was not at all, or but slightly, affected. Several cases are recorded confirmatory of this fact.

If, next, we inquire into the extent of gastro-enteritic complication with meningitis, we learn that lesions of the intestinal canal were often seen, particularly in those who outlived the first few days of the disease. They consisted in redness, arborizations, and dots on the stomach and intestines, and sometimes patches in the glands of Peyer. Of 46 cases examined or recorded by M. Tourdes, 8 exhibited no change in the intestinal canal, 32 showed a lesion of the follicles, but which was often slight, since in two cases only were ulcerations met with. This was the general result of observations made in other places. Seldom were the lesions of the digestive organs of any gravity, or extent or depth, and in many cases they were entirely wanting. They were then accessory or secondary, more evidently even than the changes in the substance of the encephalo-spinal centres. The disease was not, therefore, a gastro-cephalitis, or a gastro enteric meningitis; but a meningitis sometimes complicated with gastro-enteritis, and sometimes with encephalo-myelitis. The complications varied in frequency according to locality.

According to M. Tourdes, the typhoid form of the meningitis was not always accompanied by a follicular, or pretended follicular, lesion of the intestine.

Passing over the morbid alterations in other organs, which were only occasional or accidental, M. Broussais dwells for a while on the state of the blood in epidemic meningitis. According to the observations of M. Faure-Villars on the disease, as it prevailed in Versailles in 1839, the left cavities of the heart contained very little blood, but the right ones held large yellow fibrinous coagula of some consistence. This appearance has been specially noticed also in the Landes, at Strasburg, Nancy, Aigues-Mortes, Lyons, and Col-

mar, in connection with the plasticity of this fluid during the lifetime of the patients; the blood drawn from whom was, for the most part, buffy, and had little serosity. M. Tourdes informs us, as a result of four analyses of the blood made according to the process of M. Dumas and followed by MM. Andral and Gavarret, that the fibrin was in more than its normal proportion, viz., from 3·70 to 5·63; that the globules had also undergone a still greater change, since they were found to be from 134 to 143; and that the solid matters of the serum were from 58 to 64, and the water was 780 to 796 in 1000. The analyses were made of blood procured in two cases at the first venesection, once at the second, and once at the third. The chief alteration of the blood was, first in the globules, then in the fibrin.

Treatment. The various therapeutical measures had recourse to for combating epidemic meningitis were, generally, bloodletting from the arm, the jugular vein and temporal artery; local bloodletting by leeches or cups applied to the neck, the nucha, and along the spine; the application of cold, by means of ice, to the head; revulsion to the extremities, by sinapisms, blisters, and stimulating frictions; cauterisations by red hot iron along the spinal column; then derivatives on the digestive organs, such as emetics and purgatives; some special medicines, viz., calomel, mercurial frictions, and opium; and finally, the sulphate of quinia.

First of the remedies in the order of precedence, both as regards the time at which it was had recourse to and its efficacy, is *bloodletting.* Arteriotomy, by opening the temporal, and venesection at the jugular and the veins of the foot, were abandoned, after some trials, as uncertain and inconvenient, in favour of venesection at the arm. There was considerable unanimity of opinion in favour of this last remedy in the first period, and in the variety of excitement or of reaction, of meningitis. But while some advise free depletion at the outset, others are in favour of moderate and even small, although it may be frequent, bleedings. There are some again who, fearing subsequent weakness, recommend a sparing detraction of blood. In general, free bleedings from the arm at the beginning of the meningitis, have been found quite efficacious; and when the evacuation was carried to the extent of producing syncope, it was remarked that the disease was at once arrested. M. Broussais very properly tells us, that it is impossible to indicate, even in a general way, the quantity of blood which should be drawn from the patient at each venesection, as this will depend on the state of the pulse and the immediate effects of the operation. If a weak pulse rise, or a strong pulse preserve its character after the flow of blood, we must let this continue, even were we to abstract twenty ounces. M. Rollet went as far in some cases as to take away nearly forty ounces, or a kilogramme. The author, in a note, refers to a case of a most alarming meningitis at the Val-de-Grace, in which he abstracted a still larger quantity, and the patient, contrary to all expectation, was cured. But when the pulse is rendered weak, and a moisture overspreads the surface, indicating imminent syncope, the farther flow of blood ought to be stopped, even though we may be

required to open the vein again a few hours afterwards, when the pulse rises and the face is once more flushed. An important caution is given, in telling us not to proportion the bleeding to the cerebral restlessness and delirium; but, on the contrary, that we should be aware that these violent states of nervous erethism speedily exhaust the powers of life, as Broussais (the father) had been always in the habit of pointing out, and that at this time copious sanguineous evacuations would bring on a sudden and speedily fatal collapse.

Hence the state of the pulse, the heart, and the capillary circulation, will serve as a means of measuring the quantity of blood to be abstracted. One thing, remarks the author, is certain, that general copious bloodletting when well borne, is of sovereign efficacy at the outset of the disease, *the only sovereign remedy in the disease* of which we are now treating; and that small bleedings, no matter how frequently repeated, cannot be substituted for a free and prompt depletion. The disease is rapid in its course, and all half way measures, every act of temporising, can only be followed by a fatal result.

In the forming stage, when the premonitory symptoms only are present, bloodletting does wonders; and some of the French surgeons attribute the saving of the lives of entire companies to the use, thus early, of the remedy. At the same time that we employ this means of cure, early recourse should be had to cups repeatedly applied to the nucha and along the spine, and leeches to the temples, forehead, neck and behind the ears; keeping up, as M. Gama advises, a continued discharge by successive applications of 6, 8, or 10 leeches, every 2, 3, or 4 hours. But as much as this mode of evacuation is serviceable after general bloodletting, its inefficiency would be signal if reliance were placed on it alone.

Bloodletting having been carried as far as seems justifiable or necessary from its ascertained effects, recourse is next had to refrigerants and revulsives. The first are procured in a bladder half filled with pounded ice, or in compresses dipped in cold water and vinegar applied to the head. Cold affusions are with difficulty employed, and hence are not among the directly available remedies in general practice.

Revulsives, usually indicated in the second stage of the disease, are sometimes required in the first, as where there is an inversion of the usual order of phenomena — prostration and stupor preceding excitement and reaction. In such cases recourse is had to blisters, sinapisms, and boiling water to the extremities, ammoniacal frictions to the different parts of the surface, &c., repeated at short intervals. Sometimes the torpid sensibility is roused by these means; but they are not always adequate to produce the effect desired; and then cauterisations, as practised by M. Rollet, will be found a powerful therapeutic means. They consist in the application of iron at a white heat, which is to be passed six or eight times tranversely on so many different parts of the back on each side of the spinal processes. In the worst cases, M. Rollet relates that the first applications of the actual cautery do not elicit from the patients any sign of sensibility; and it is only at the third, fourth or fifth repetition that they make a slight muscular movement, which indicates that they experience a

sensation. Some utter cries during the last applications, but relapse immediately into their original comatose condition. An hour or two after the cauterisation, reaction begins; and when it is suitably established, but without waiting too long, M. Rollet advises that we should have recourse to general and local bloodletting, to an extent proportionate to the strength of the patient.

At this juncture, the patient must be watched with unceasing vigilance, and measures taken to abate reaction as it shows itself by sanguineous evacuations, repeated every two, three, or four hours, ice being applied at the same time to the head. M. Rollet has seen this decisive treatment crowned with entire success, even in cases of a desperate nature.

Difference of opinion prevailed respecting the true remedial value of a blister on the scalp after the latter has been shaved clear of the hair. This application does not answer in the first period of the disease, whatever may be its symptoms; but when, consecutively to those of excitement, the patient, already weakened by bloodletting, falls into a state of collapse with insensibility, feeble pulse, and entire deficiency of reaction, this kind of derivation on the head may be practised. At this epoch effusion is most to be apprehended, and vesication on the cranium is the most active counteracting agency. If fears be entertained of the too great proximity of the blister to the seat of the lesion, it may be applied to the back of the neck.

Emetics have been generally rejected in the treatment of epidemic meningitis, except by a few who thought that they had to do with a congestive (pernicious) fever.

Purgatives, on the other hand, have found more favour, especially after the employment of the antiphlogistics already described, and in aid of external revulsives, they ranking among the internal ones. Any restriction in their use depended on the complication of gastro-enteritis with the meningitis. Calomel, which "had become among a certain number of anglomaniac physicians a kind of routine prescription in nearly all diseases, and especially in cerebral affections," finds no favour with M. Broussais. He refers also to the adverse testimony of M. Forget, who, so far from realising its therapeutic virtues, discovered it to be absolutely deleterious in the disease now under consideration; especially by its readiness to induce intestinal lesions. He abstained after a while from the prescription of any purgative except with a view to its use as an enema, to act exclusively on the lower bowels.

Mercurial frictions are spoken of in quite disparaging terms by the author, who is sustained in his objections to their use by the experience of most of his colleagues in the army.

Of *antispasmodics*, the only ones favourably mentioned are the water of the cherry laurel, and that of valerian mixed in a mucilaginous draught, after antiphlogistics and revulsives. M. Mialhe recommends, in preference, the distilled water of bitter almonds, as furnishing more definite proportions of cyanhydric acid. Perhaps the cyanuret of potassium would be still better on this account.

Among *narcotics*, the only one entitled to consideration in the treatment of the epidemic was opium. By M. Chauffard at Avig-

non, and M. Forget at Strasburg, this medicine was employed, as we learn from them, with the happiest effects. But as M. Broussais very justly remarks, large deductions must be made from these praises, when we learn that opium was not used by either of these gentlemen until towards the decline of the epidemic, when, as it is well known, many articles seem to exert effects which were not manifest at an earlier period of the disease. We can readily understand and believe, however, that, under wise restrictions, such as those laid down by M. Forget, and as had been long ago by Sydenham in inflammatory diseases, the use of opium would be competent to combat the nervous disturbances, — cephalalgia, delirium and spasms, which persist after the subsidence of reaction. The time for recourse to it was from the fifth to the seventh day of the disease; and the dose in M. Forget's hands, which was quite equal to all the effects desired, was of a syrup equivalent to about half a grain of opium.

Sulphate of quinia, declared by some of the army surgeons to be the only medicine by which they succeeded in saving their patients, was, on the other hand, by a majority denounced as positively detrimental. In some cases in which the meningitis was regularly intermittent after the removal of the state of more evident phlogosis, or where the disease was complicated with periodical fevers, the sulphate of quinia was undoubtedly of considerable service; but only under these circumstances.

No mention is made by the author, of the employment of tartar emetic, as a counterstimulant or sedative in meningitis; nor of diaphoresis, as a means of relieving the phlogosis of the arachnoid, in its second stage, as it often does in inflammations of other membranes.

In speaking of convalescence, M. Broussais adverts to its lengthened duration, and the dangers, and even death, incurred from the neglect of prudential rules by some of the convalescents.

Chronic Meningitis is a disease of infrequent occurrence; having been chiefly met with in the inmates of hospitals for the insane. It may be either primary, or what is more usual, secondary on acute inflammation of the meninges. The anatomical characters resemble those of the acute form — such as thickening of the membrane, effusion, &c. The more characteristic alterations are, false membranes giving rise to adhesions at different points and small granulated bodies erroneously called glands.

Men are more subject to chronic meningitis than women, and it is a disease of old age, or at any rate of adult life, rather than of infancy. It seems to run in certain families. Sometimes it has followed strong emotions and the depressing passions; and in other cases has been referred to the excessive use of alcoholic liquors. The disease has also resulted from external injuries, as bruises and wounds, even of the scalp.

The *symptoms* of chronic meningitis are, in some cases, slow in showing themselves. More commonly there are evidences of cerebral congestion. Headache sometimes ushers in the disease, and is followed by some disorder of the intellect and other phenomena. The

derangements of function is divisible into three periods. In the first, the patient is extravagant on one subject only; he babbles and is restless, and totters in walking. This state may be continued or intermittent, or may last for some weeks or perhaps years. In the second period there is more of general delirium, with great restlessness and impulse to motion, but the movements are more and more difficult. The nutritive functions during this time are often not affected; the patient having even a voracious appetite, and gaining flesh. In other cases he becomes emaciated even to the extent of marasmus. The pulse is usually not affected in this period. In the third period the intellect is entirely gone and mobility also lost; and the patient is in a state of complete immobility, one effect of which is atrophy of the muscles. The nutritive functions are now greatly affected. The emaciation increases; there is diarrhœa, dyspnœa, and copious bronchial secretion.

In each of these periods there may supervene other symptoms, such as apoplectic or epileptic seizure, convulsions, tetanic spasm and rigidity, tremors, &c.

The succession of symptoms in the different periods are explicable by the changes in the membranes, from simple irritation, transmitted to the brain on to effusion on the surface of this latter and in the ventricles, and finally intercurrent cerebral inflammation.

The *termination* of chronic meningitis is generally in death, and this occurs in the third stage, unless some intercurrent disease abbreviates the life of the patient.

The *treatment* is simple, but, unhappily, of little efficacy. It consists of bloodletting, of which we must be sparing in proportion to the duration of the disease; followed by drastic purgatives and counter-irritants, by blisters, moxa, and setons. The patient should be exercised regularly, and not crossed in his notions, except where they are such as would interfere with his personal safety.

LECTURE CXIII.

APOPLEXY—Cerebritis and meningitis—Definition of apoplexy—Simple or nervous apoplexy without disorganization—Complication with other diseases—Congestive or serous apoplexy—Dr. Abercrombie's opinions—Apoplexy with extravasation—Sites of extravasation—Absorption of clot—Apoplexy in children.

WE were occupied at our last meeting in considering some of the most prominent symptoms of meningeal inflammation; and I beg of you to recollect, that all these symptoms, with the exception of pain, are those which ordinarily characterise inflammation of the substance of the brain itself, and are to be explained by referring them to some lesion in the functions of that organ. It appears, then, that the symptoms of meningitis, with the exception of pain, are symptoms of an affection of the brain itself; and this is a point which you must always bear in mind, when you agitate the question as to the possibility of making a diagnosis between meningitis and encephalitis. We have a set of symptoms characterising meningeal inflammation, the

majority of which belong to irritation of the brain itself; and we find that these may exist with or without any *perceptible* alteration in the cerebral substance. Now, in cases where you suppose the existence of meningeal inflammation, and find these symptoms present, it would be venturing too much to assert that there was no complication with organic disease of the brain; and, therefore, we must conclude that, in most cases, it is nearly impossible to distinguish between inflammation of the substance of the brain and of its membranes.

In speaking of the more important symptoms of cerebral inflammation, I alluded particularly to convulsions, and stated that, as far as my observations went, this symptom, formidable as it may appear, is not in reality so unfavourable as it is generally thought to be. In fact, there are many cases of affections of the brain, accompanied by convulsions, in which the danger is by no means so great as in others of a different description; and many of the worst cases are those in which convulsions are absent, or only trifling. I think we may look upon convulsion as being more or less a source of relief to the brain, when labouring under the excitement of irritation or inflammatory disease. You are all aware, that one of the functions of the brain is to regulate and control the motions of the muscular system. If a man exercises his limbs violently for some time, he becomes tired and exhausted; he cannot pursue the same exercise any longer, for in addition to whatever the muscular system may suffer, there has been a great expenditure of nervous energy; and if he should attempt to keep up the same exertions, such a degree of muscular and nervous debility is superinduced that syncope is the consequence. Now, the expenditure of energy produced by the supply of nervous power to the muscles, seems to bear a strong analogy to the secretory discharges from other viscera. In the case of irritation or inflammatory affections of other organs, you are all aware that there is nothing which gives such speedy and effectual relief as supersecretion, or an increased action of the secreting vessels of the affected organ. Now, if we look upon the expenditure of the nervous energy in the same light (and I see no reason why we should not), we can easily conceive why it is that convulsions relieve the irritation of an over-excited brain. I drew your attention strongly, at my last lecture, to the curious and important fact, that if we compare apoplexy and epilepsy, with respect to the danger and the chance of disorganization attendant on each, we shall find the danger is infinitely greater, and the chances of organic change more numerous, in the former than in the latter. In epilepsy, where the convulsions are violent, we seldom have a fatal termination of the fit, and there is rarely lesion of the substance of the brain, until the disease has lasted for a great length of time. This is not the case in apoplexy. Here, as I have already stated, we have two cases of active determination to the head: in one case there are no convulsions, and we frequently find the result to be death, or extravasation with paralysis and slow convalescence; in the other, we have violent convulsions, followed by rapid recovery and no disorganization. From this, it would seem reasonable to conclude, that convulsions are a mode of relieving the brain, adopted by nature, and that their occurrence in hydrocepha-

lus should not be looked upon as unfavourable. Now, if this be true, it must strike you that nothing can be more dangerous and improper than to take any steps to control an attack of convulsion during the prevalence of hydrocephalic symptoms. The true mode of treating them is to adopt measures calculated to relieve irritation of the brain, and not hazard the patient's safety by following the ordinary but mischievous mode of attempting to control the salutary efforts of nature. I allude here particularly to the practice of administering opiates and antispasmodics, a practice which I firmly believe to be fraught with danger.

We have to-day to consider another form of cerebral disease, scarcely less important than those with which we have been hitherto engaged. In all the former instances, we find the determination of blood to the brain followed by that organic change which we term inflammation. But we may have accumulations of blood in the brain, unaccompanied by inflammation, and this brings us to the consideration of apoplectic disease. The term apoplexy, as I suppose you all know, is derived from a Greek word, signifying a stroke or blow. It is a term which, in the present state of medicine, has been very frequently abused, or at least employed in very different senses, and hence the many erroneous opinions respecting it. The true meaning of the term expresses an alteration of the phenomena of the life of relation, that is, of the functions of the cerebro-spinal system. In taking a view of the nature of this alteration, we find that the attack generally comes on in a sudden manner, and that the functions of the brain are partially or completely suspended. You are aware that the manifest phenomena of the life of relation are those which belong to *sensation*, *muscular motion*, and *the intellect ;* and that the system of the life of relation is composed of the brain, spinal cord, and nerves. Now suppose, for example, that a man gets an attack of apoplexy, we find him paralytic — here is a lesion of the muscular function. We find him insensible to external stimulants, he feels no pain — here is a lesion of sensation. We may find his sight, hearing, taste, smell, and touch, are injured ; he lies in a state of insensibility, and is unconscious of everything passing around him — here we have an example of interruption in the performance of the intellectual functions. All these phenomena exhibit the various lesions superinduced by an attack of apoplexy, in the functions of those organs which subserve to the life of relation.

I have said that the term apoplexy is frequently abused in modern medicine. From the circumstance of most cases being accompanied by an effusion of blood on the surface or into the substance of the brain, the term has been also applied to sanguineous effusions into other organs, and we hear every day of pulmonary and hepatic apoplexy ; terms implying the extravasation of blood into the substance of the lung or liver. The analogy, however, in such cases will on examination be found to be coarse, and the application of the term loose and improper. Apoplexy, as a cerebral disease, may occur with or without effusion ; in either case, the disease, *quoad* the lesion of function, s the same ; but to give the name of

apoplexy to hemorrhage into the lungs or liver, is improper. The term apoplexy should be used only with reference to the brain, and applied to a particular train of lesions in the functions of the life of relation, occurring *with or without an effusion of blood, or even congestion.* When we have effusion of blood into other viscera, we may have them unaccompanied by any apparent lesion in the functions of the organ affected (a circumstance rarely met with in the case of the brain); and it would be much better to give some other name to those hemorrhages into the substance of the liver and lungs, than to designate them by one drawn from a loose and imperfect analogy.

The suspension of the phenomena of the life of relation, complete or partial, which constitutes apoplexy, may be connected with any of the following pathological conditions: — First, great congestion of the brain, in which the vascular system of that organ is overloaded, but without extravasation of blood or serum; this is termed *the congestive apoplexy.* In the next place, we may have this congested state of the vessels of the brain with an extravasation of blood on its surface. To the latter form, the *meningeal apoplexy* has been applied. Thirdly, with an effusion of blood into the substance of the brain, which is the most common case, and, lastly, we may have complete apoplexy without morbid appearance, or, if there be such, *quite inefficient to account for this phenomenon.* A man will fall down suddenly, he will lie in a state of insensibility, with stertorous breathing, coma, and paralysis, he will die with all the symptoms of the worst form of apoplexy, and yet, on dissection, the brain may be found, *to all appearances, healthy.* This is what has been termed, by the older authors, the nervous or convulsive apoplexy; of the real nature of which we are still as ignorant as we are of the real nature of tetanus, hydrophobia, and other nervous diseases unaccompanied by perceptible organic change.

This is the *simple apoplexy* of Dr. Abercrombie, of which he gives several most important cases, and refers to others related by the older authors. You will at once admit that it is not more extraordinary that apoplexy should exist without perceptible organic change, than mania, tetanus, hydrophobia, and other affections. Of the fact there is no doubt. Such cases, indeed, are rare; which, in one sense, may be looked on as a fortunate circumstance. But in the progress of other diseases, this nervous coma, or apoplexy, is by no means uncommon. Thus, there is no symptom more common than coma in typhus; and yet, if you examine the head after death, you generally either find no lesions at all, or such as will not be sufficient to account for the symptoms. The coma, which occurs in cases of painters' colic, too, appears to be closely connected with this nervous apoplexy. You will recollect an interesting clinical experiment I made in the case of a patient with painters' colic, who had profound coma. In this case, I thought it probable that the condition of the brain bore no resemblance to sanguineous apoplexy, because the symptoms of painters' colic are seldom or never accompanied by hyperæmia of the nervous or other systems. Under this impression, I prescribed a full opiate, and this not only did not in-

crease the coma, but, on the contrary, produced the very best effect, for the patient was amazingly improved the next morning. I do not so much mean to say, that opium is useful in nervous coma, as that, in this instance, at least the coma was not of the congestive kind. It is not unlikely, too, that the coma of jaundice is of the same description, and unconnected with any decided hyperæmia of the brain. I am aware that in jaundice the coma is supposed by some to depend upon a bilious condition of the blood circulating in the brain; but there are so many cases of persons who have laboured under jaundice for years without having coma, that we must seek for some other explanation. Now, so far as we know of the encephalon in persons who have died of jaundice, it appears that little or no congestion exists; and hence it seems probable that the coma of jaundice is similar to that of nervous apoplexy.

I shall now proceed to the consideration of those forms of apoplexy which are connected with changes more or less apparent in the circulation of the head, and with which we are, consequently, better acquainted. I have told you that simple congestion of the brain may be accompanied by symptoms of apoplexy, or that we may have the disease presenting, in addition to this, an effusion of blood into the substance, or on the surface of the brain. The simplest idea you can get of the condition of the brain in the congestive form, is to consider what its state is in persons who have been hanged. These persons have the vessels of the brain loaded with blood from the violent interruption of the venous circulation. Now, this increase in the quantity of blood circulating in the brain, may arise from two causes, one depending on the interruption of the venous circulation, the other produced by an increased action of the arterial system. Hence in certain cases of disease of the heart, where the blood is sent with great force to the head, there is a strong predisposition to apoplectic attacks. The kind of disease of the heart, however, which has been found most liable to produce this, is not, as you would suppose, Corvisart's active aneurism, but simple hypertrophy of the heart, where the cavity of the left ventricle continuing the same, its walls are increased in thickness and strength, so that, on the natural quantity of fluid, an increased impulse is exercised. Such, at least, is the result of Andral's researches, and there is every reason to place confidence in the accuracy of his conclusion.*

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* [In addition to the names of Broussais, Andral, and Lallemand, we may cite those of MM. Bricheteau and Bouillaud, and Dr. Hope, all of whom have pointed out numerous cases of the connexion between hypertrophy of the left ventricle and apoplexy. Bricheteau relates twenty cases of this coincidence; among others, of General Foy, the celebrated orator, and one of the liberal leaders in the French Chamber of Deputies. Bouillaud found in fifty-four cases of hypertrophy of the heart, that eleven exhibited also cerebral lesions, of which six were of apoplexy and five softening of the brain. Dr. Hope, in a paper read before the College of Physicians (1835), on the connexion between apoplexy and palsy with organic diseases of

About this congestive apoplexy there appears to have been a good deal of misapprehension. You have all heard of *the serous apoplexy*. In this form, it has been supposed that the cause of the compression of the brain, and all the other symptoms, is an effusion of serum, just as an effusion of serum into the cavity of the pleura will produce compression of the lung and dyspnœa. The idea which has been generally entertained is, that the effusion of serum is the cause of *all* the symptoms; and, in consequence, the same active treatment has not been adopted as in the other forms of apoplexy. This opinion will be best refuted by the investigations of Dr. Abercrombie, and I cannot do better than read for you the opinions of this eminent writer on the subject, as given in his celebrated and admirable work, which, I have no hesitation in saying, constitutes one of the brightest ornaments of British medicine.

"This distinction, which has been proposed between sanguineous and serous apoplexy, is not supported by observation. The former is said to be distinguished by flushing of the countenance and strong pulse, and by occurring to persons in the vigour of life; the latter by paleness of the countenance and weakness of the pulse, and by affecting the aged and the infirm; and much importance has been attached to this distinction, upon the ground that the practice which is proper and necessary in the one case, would be improper or injurious in the other. I submit that this distinction is not founded upon observation, for, in point of fact, it will be found that many of the cases which terminate by serous effusion, exhibit in their early stages all the symptoms which have been assigned to the sanguineous apoplexy; while many of the cases, which are accompanied by paleness of the countenance and feebleness of the pulse, will be found to be purely sanguineous; and one modification of the disease in particular will be described, in which these symptoms are very strikingly exhibited, while the disease is found to be sanguineous apoplexy in its most hopeless form.

"Portal has described a series of cases which afford the same

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the heart, relates, that out of thirty-nine cases of apoplexy, disease of the heart was found to be coexistent in twenty-eight.

M. Bricheteau draws the conclusion, that the periods of life at which fatal apoplexy is most prevalent, are those in which disease of the heart (either hypertrophy of the muscular substance, or ossification of the valves and vessels), is of most frequent occurrence, namely, between forty and fifty, and between seventy and eighty years of age.

The deductions for practical guidance, from these facts, are clear. They are, an avoidance of all severe bodily exercise, as well as of all exciting emotions of the mind. We ought also, as Bricheteau recommends, to direct the occasional application of leeches over the region of the heart, instead of to the temples or any other part of the head — the internal use of digitalis, hydriodate of potassa, and other diuretics. See my Lecture CII, in which the connection between hypertrophy of the heart and apoplexy is investigated. — B.]

result; of three, which presented all the symptoms of serous apoplexy, one was saved by repeated bleeding, and in the other two, which were fatal, there was found extensive extravasation of blood. Case XCVI, lately described, forms a remarkable addition to these observations. If any case could be confidentally considered as serous apoplexy, this was such. Dropsical effusion had existed in the body for months, and, in defiance of every remedy, it had been progressively gaining ground. There were symptoms indicating its existence, both in the thorax and in the abdomen; the patient then became comatose, with pale countenance, and died; but though dropsy was found in other cavities, none could be detected in the brain.

"In other parts of the body serous effusion is very seldom a primary disease: it arises as a result either of inflammatory action, or of impeded circulation, and takes place slowly, not accumulating at once in such quantity as to induce urgent symptoms. It is, therefore, in the highest degree improbable, that it should occur in the brain as a primary disease, and accumulate with such rapidity as to produce the symptoms of an apoplectic attack.

"The quantity of fluid effused, bears no proportion to the degree of the apoplectic symptoms. We find it in small quantity, though the apoplectic symptoms had been strongly marked and long-continued; we find it in large quantity when the symptoms have been slight; and, finally, we find most extensive effusion in the brain where there have been no apoplectic symptoms at all. The direct inference from these facts is, that, in the cases of apoplexy with effusion, the persence of the fluid cannot be considered as the cause of the apoplectic symptoms."*

The same error has been committed with respect to hydrothorax, a disease almost never primary, but the result of either pleuritic inflammation, obstruction of the heart or lungs, or some analogous cause. The cause of the symptoms is not the mere effusion of fluid, but some pre-existing disease which has given rise to a serous effusion. In Dr. Abercombie's work, you will find the remarkable fact stated, that there may be a copious effusion of serum in the head, without producing apoplectic symptoms. The following case, mentioned by Dr. Abercrombie, furnishes a remarkable illustration: A patient, who had laboured under hypochondriasis for upwards of thirty years, began to decline rapidly in health. He was extremely feeble, his bowels costive, his sleep disturbed, and his appetite gone. This state continued for some time, and he began to sink, but he never complained of headache, giddiness, convulsions, or paralysis, and his mental powers remained unimpaired until a very short time before his death. Yet, on opening the head, there was an exceedingly copious effusion of serum found under the arachnoid: and in some places this was so great as to give the arachnoid the appearance of

* [This view had been taken so long ago as 1792, by Dr. Physick, in his Inaugural Thesis, *De Apoplexiâ*, printed at Edinburgh. See Dr. J. R. W. Dunbar's Inaugural Essay on the *Structure, Functions, and Diseases of the Nervous System.* Philadelphia, 1828.—B.]

small bladders filled with water. The ventricles were distended with fluid. Dr. Abercrombie gives another case, where the quantity amounted to eight ounces, and notices a case, mentioned by Dr. Marshall, of a maniac who died of mortification of the feet; a few hours before death he became perfectly rational, yet effusion was found both on the surface of the brain and in the ventricles, amounting to more than a pound.

All these facts go to prove, that what has been termed serous apoplexy is only an apoplectic attack depending on congestion of the brain; that in some cases we may have this congestion accompanied by serous effusion, in others not; that the effusion is secondary, and by no means of constant occurrence; and that alterating our practice, and pursuing a less active plan of treatment, in such cases, would be improper. The same treatment should be adopted in the serous, as in the congestive form of the disease, for where the nature of the affection is the same, the same curative means should be employed. Why it is that effusion takes place in one case, and not in another, we cannot tell; such changes are connected with laws of organization, of which we are at present ignorant. We know as little why this should occur as why inflammation of the liver in one case is followed by enlargement, in another by the secretion of pus, in a third by cancer, or in a fourth by hydatids.

We now come to the consideration of apoplexy with extravasation of blood. This is the form of the disease to which the term apoplexy has been restricted by one of the last writers on the subject, M. Rochoux. In this affection, the extravasation of blood, which constitutes the principal pathological feature of the disease, is found to exhibit a remarkable variety as to its seat and extent. In some cases, the blood is effused on the surface of the brain; in others, into its substance; and in a few cases into the ventricles. De Haen gives some cases of apoplexy produced by rupture of the choroid plexus; but in the great majority of cases, where blood is found in the ventricles, the extravasation has taken place in one hemisphere, and, tearing through the substance of the brain, has made its way into their cavities. Of the three varieties of apoplectic effusions, the ventricular is the rarest; the next to this is the meningeal, or that in which blood is poured out on the surface of the brain; and the most common is where it is effused into the substance. It has been also found that certain parts of the brain are much more liable to sanguineous effusions than others; of the reason of this, as of many other phenomena connected with the circulation of the brain, we are still in ignorance. The following table, which you should bear in mind, exhibits a remarkable preponderance in the liability to sanguineous effusions of certain parts of the brain. It has been taken from the "*Précis d'Anatomie Pathologique*" of Andral. The following is a summary of the results of 386 cases of apoplexy.

In 202 cases, the effusion took place into the substance of the hemisphere of the brain, in that part which is on a level with the corpora striata and optic thalami. The portion of the brain next most liable to effusions, are the corpora striata; and here we have 61 cases. Next to this are the optic thalami, in which we have 35 cases. In

that proportion of the hemispheres above the centrum ovale, 27 cases. Lateral lobes of the cerebellum, a proportion of 16 cases. In those portions of the brain anterior to the corpus striatum, 10 cases. In the mesocephalon, 9. Spinal cord, 8. Posterior lobes of the brain, 7. Middle lobe of the cerebellum, 5. Peduncles of the brain, 3. Olivary bodies, peduncles of the cerebellum, and pituitary gland, 1 in each, making 3 — Total, 386. Out of these, we find 325 cases occurring in the hemispheres of the brain, corpus striatum, and optic thalamus.

In the number and size of these effusions we find the greatest varieties. In some cases, an enormous effusion takes place, and many ounces are extravasated into the substance of the brain; in others, the quantity is trifling, being sometimes as small as a pea, or even less. It has been observed that in cases where numerous extravasations were discovered, they were generally found to be in different states, as if they had occurred at intervals, and not simultaneously. This leads us to a knowledge of one of the most important facts in pathology, that in many cases of apoplexy, after a clot has been formed, nature commences, at an early period, a process of cure. This change, which takes place in cases where a patient recovers, seems to be the following: — It becomes, at first, somewhat gelatinous; it is next observed to be more consistent, and it loses its red colour, and takes on a whitish or yellow appearance. The clot is gradually removed; and along with the absorption of the clot there is a process of isolation going on. A fine membranous cyst, furnished with vessels, is formed round the clot. In some cases, the clot is replaced by a quantity of serous or gelatinous fluid; but in the majority of instances this does not occur, and the cyst has been found empty. This is a fact which has been established by numerous observations.

There is the greatest possible difference as to the period at which the absorption of the clot is completed; but we may safely assert, from the number of cases in which, after paralysis, a recovery takes place, that this process is of very common occurrence. In several cases, where apoplexy, followed by paralysis, has happened several times during the life-time of the patient, a number of those cysts, corresponding with the number of attacks, and presenting various appearances according to the date of their formation, have been found. It appears, then, that the cure of apoplexy depends solely on the absorption of the clot; and that, as long as this remains unabsorbed, the patient is in danger. In some cases, absorption does not take place at all, the clot becomes organized; and in this way it is supposed that some of the tumours found in the brain are formed. There are several circumstances which favour the absorption of the clot, but nothing so powerfully as a healthy condition of the whole cerebral circulation. This leads us to the consideration of the importance of paying attention to the head, long after an attack of apoplexy. It inculcates the necessity of avoiding everything calculated to add to the existing congestion; and shows that, in the paralytic or after-stage of an apoplectic attack, we should not neglect to deplete the head from time to time. The great point is to keep the head perfectly free from irritation; for it has been found, that, where a cure appeared to be going on, any

new irritation applied to the brain has had the effect of arresting the absorption of the clot, and marring the process of cure.*

I regret I cannot dwell longer on this subject, as I wish to conclude the pathology of apoplexy to-day. There are, however, two more observations to be made before I close the subject. The source of an apoplectic effusion is very hard to be discovered; it appears generally to come from a number of minute vessels, for we are seldom or never able to trace it to the rupture of a vessel of any size. The age at which persons are most subject to apoplexy, appears to be from fifty to seventy. You should, however, be aware that apoplexy with sanguineous effusion is by no means uncommon, even in persons of a tender age. Billard details an instance of this in a child, soon after birth. There are also several cases mentioned as occurring in children during the first three or four years. Andral gives the case of a boy, of nine years of age, who died of apoplexy, with a vast effusion of blood. One of the most remarkable cases of this kind I ever witnessed, occurred in a child who had been just weaned. This child had been labouring for some time under symptoms resembling incipient hydrocephalus, and then suddenly got an attack of convulsions, followed by coma and paralysis of one side. From a careful study of the symptoms, I ventured to make the diagnosis of apoplectic effusion, and on examining the brain, after death, there were nearly three ounces of blood found effused in the base of the brain.

LECTURE CXIV.

APOPLECTIC EFFUSIONS—Curative process adopted by nature—Periods of life most subject to apoplexy—Connections of temperaments [and sex] with disposition to apoplexy—Researches of Rochoux—Principles of diagnosis—Varieties of apoplexy—Connection of symptoms with pathological appearances—Rostan's division of—Different symptoms of—Double effusions—Rupture into the ventricles—Hemiplegia—Value of the suddenness of paralysis as a diagnostic examined—Symptoms of apoplectic effusions.

AT my last lecture, I spoke of the nature of apoplectic effusions: I stated that they exhibited a considerable variety as to their situation, extent, number, and condition in different cases; that it was frequently a matter of great difficulty to ascertain their source, and that they might occur at any age, but chiefly from that of fifty to seventy. I gave a brief sketch of the process adopted by nature in effecting a cure, and showed that in many cases, where the effused blood is absorbed, there is scarcely any trace of the disease, except a slight cicatrix; but that in some instances, where the sanguineous effusion has been removed, its place becomes occupied by a quantity of serous fluid, and this, with the cyst which contains it, seems to explain what the old anatomists termed *false ventri-*

* [I have known this effect to be caused by the secondary irritation from a distended stomach. The patient, a female in advanced life, was recovering from the first attack, for which active depletion had been used, and rigid abstinence enjoined, when she yielded either to evil appetite, or to evil suggestion of another, and ate heartily of strong, gross food. It was her last meal.—B.]

cles. You will find, by looking over some of the earlier writers on anatomy, that they have described the brain as containing more than the ordinary number of ventricles, and the mistake seems to have arisen from their taking for ventricles those serous cysts or cavities which remained after the absorption of an apoplectic effusion. Of course other causes, such as congenital formation, may give rise to the appearance. You will see in the Museum of the College of Surgeons a fine specimen of abnormal cavities filled with serum in different parts of the brain.

In speaking of the period of life at which apoplectic disease is most frequent, I stated, that though it might occur at any time of life, still there was a particular period at which there is a greater liability than any other. Rochoux has shown that the tendency to apoplexy is greatest towards sixty, and diminishes towards seventy years of age. The number of cases which occur between sixty and seventy are very great, when compared with those between seventy and eighty; and after eighty he considers the liability to be still farther diminished. It seems strange, that persons after seventy should not be so liable to attacks of apoplexy as before that period, but such is the fact. It has been thought that this may be explained by the anemic state of the brain in old persons; it is said, that at such an advanced age general emaciation generally takes place, and the quantity of blood is greatly diminished. This explanation, however, is doubtful, because it is at present well ascertained, that persons of ordinary development, who are neither fat nor thin, and also of persons of spare and delicate habit, are as much, and even more, liable to apoplexy than the fat and plethoric. It has been ascertained by careful investigations, that a high degree of plethora does not necessarily predispose to the disease, and that it is oftener met with in persons not of a plethoric habit than in those who are. These considerations throw some doubt on the opinion that an exemption from apoplectic attacks is connected with an anemic condition of the system. It generally happens, however, that at this advanced period of life, from the general debility of the system and the incapacity for active exertion, a man ceases to employ his thoughts about business, and there is little exercise for the intellectual functions. We now have finished the task; the brain reposes from the turmoil of active and incessant thought; there is a comparative absence of mental exertion, and this may in some degree account for the rarity of apoplexy after the age of seventy.*

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* [Of 69 cases recorded by Rochoux, the distribution, in respect to age, was as follows: —

From 20 to 30 years,	. . . . .	2	cases.
„ 30 to 40	„	10	„
„ 40 to 50	„	7	„
„ 50 to 60	„	13	„
„ 60 to 70	„	24	„
„ 70 to 80	„	12	„
„ 80 to 90	„	1	„

69.—B.]

With respect to the different temperaments as bearing on this point, Rochoux shows that in Paris, at least, there was a nearly equal frequency of the disease in individuals of the sanguine, sanguineo-bilious, and sanguineo-lymphatic constitutions. The bilious temperaments, however, are much less liable. Such is the result of the observations in Paris; but it must be recollected, as Rochoux observes, that in that city the bilious temperament is the rarest. With respect to the sanguine or plethoric, it has been found that this temperament does not predispose to apoplexy so much as has been generally supposed. The disease has been observed to be most common in persons of ordinary development, next to those in persons of thin, spare habit, *and last of all in the plethoric and fat.* Rochoux's researches lead him to conclude that the number of persons of ordinary development, attacked by apoplexy, is three times that of the plethoric, and that that of the spare habits is little more than twice as great as that of the fat and plethoric. If these researches are correct, they afford great consolation to stout gentlemen.

The conclusion, which has been come to, with respect to temperaments as bearing on the liability to apoplexy, appears to be true, namely, that there is no sign appreciable by the senses which will unequivocally point out a predisposition to apoplexy. This is of great importance in a practical point of view. You may expect the disease in the fair or dark-haired, the thin or fat, alike. The frequent occurrence of this disease in persons who were never suspected to have any predisposition to it is another proof in favour of this opinion. With respect to the mere medical diagnosis of apoplectic effusion, it would be well if, in making it, you would always bear in mind the anatomical characters of the disease. Extravasation of blood into the substance of the brain generally takes place by a tearing or separating of the cerebral tissue. A quantity of blood is rapidly effused, the substance of the brain torn, and a cavity formed. There can be no doubt that the tissue of the brain is torn, for we can see the loose shreds hanging on each side of the cavity, and mixed up with the clot. Now, what are the principles which should guide us in making our diagnosis? They are exactly the same as those in other diseases *connected with a sudden solution of continuity in the substance of internal organs.* We have, with or without any preceding symptoms of a different kind, the *sudden* supervention of new and remarkable phenomena. The phenomena which are the result of disease proceeding in its ordinary course are gradual and progressive; but occurrences of this kind are almost always characterized by sudden and well-defined symptoms. Thus, we make the diagnosis of the rupture of an aneurism of the aorta from the sudden vomiting or expectoration of blood, followed by the death of the patient. Here, you perceive, the diagnosis is founded on the sudden supervention of new symptoms. In the same way we make the diagnosis of pneumothorax with a fistulous opening communicating with the bronchial tubes, and calculate, from the sudden occurrence of pain in the side and the other signs of pneumothorax, that there has been a solution of continuity in the pleura. Again; if a person labouring under hepatic abscess is seized with a fit of coughing, and suddenly expectorates a quantity of

pus, and that this is found to be accompanied by a subsidence of the tumour in the region of the liver, we make the diagnosis of perforation of the diaphragm and pleura, and the escape of the contents of the abscess into the substance of the lung. Or he may, under the same circumstances, be seized with sudden and rapid peritonitis, and here we make the diagnosis of an effusion into the peritoneum. It is on precisely the same principles that Louis has established the diagnosis of perforation of the small intestines in cases of gastro-enteritis. The patient is lying in bed, perhaps apparently improving; he is not exposed to any exciting cause, and every care may have been taken of him. *On a sudden* he exhibits symptoms of intense peritonitis, and rapidly dies. Any one conversant with such cases can easily make a correct diagnosis. On the same principles we found the diagnosis of apoplectic effusion. Almost all the instances of disease which I have given occur with a *sudden* violent invasion; and the same thing may be said of apoplexy with extravasation. It is true, that there are some cases which do not exhibit this character, but the general rule is suddenness of attack.*

We may divide apoplectic attacks accompanied by extravasation into three great classes; and, if you look to the great majority of cases of this disease, you will find that, although they appear to pass by insensible degrees into one another, still, when taken and examined singly, there will be found a difference between them. This classification is that of Rostan, and I have known his principles verified in many instances. In the first class of cases, which are the worst and generally prove fatal, the extravasation is enormous. A person, apparently in perfect health, will fall down in a fit of apoplexy, remain for a short time insensible and paralytic, and then die. In such a case as this, the ordinary pathological character is an enormous effusion of blood, or excessive congestion. In a case of the second class, we have an apoplectic seizure with coma, which disappears after some time, and the patient recovers his intelligence, *but with paralysis of one side*. The pathological character of this form is, that the effusion is more limited, and exists only on one side of the brain. Neither is the congestion so severe, and the patient recovers from the coma. In the third form, we have an attack of apoplexy of a milder description; there is scarcely any coma or loss of intelligence, and the paralysis is slight, generally affecting the muscles of one side of the face or of one of the extremities. Let us repeat these varieties. In the first, which constitutes the *apoplexie foudroyante* of the French, there is an enormous extravasation of blood in both sides of the brain; or, if it be only on one side, the amount of the effusion is frequently such as to burst hrough the walls of the ventricles and get into their cavities, and in

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* [As regards the predisposition to apoplexy dependent on sex, we find that more men than women are attacked with the disease. P. Frank shows that, out of 1241 cases of fatal apoplexy in the hospital at Vienna, during the period between 1787 and 1804, there were 637 men and 604 women. M. Fabret, in his statistics of apoplexy, indicates a greater difference. Thus, out of 2297 cases of the disease, there were 1670 men and 627 women. — B.]

this way we may have an effusion of one side getting into the other hemisphere, or exercising such pressure on it as may give rise to *general* symptoms. Such a case as this is, I believe, generally fatal; its progress, too, is very rapid, several persons under such circumstances having died in the space of an hour or less. In the second form, there is coma and loss of intelligence, and the patient recovers *with paralysis of one side.* Here the extravasation is never so great as in the foregoing case; the effused blood is confined to one side, and does not get into the ventricles. In the third form, the effusion is very much circumscribed, the signs of general congestion or extravasation are slight, the quantity of blood poured out is not, perhaps, larger than a nut, it is followed by partial paralysis, and there is little or no coma or loss of intelligence.

Let us take a brief review of the symptoms which attend each of these forms. In a case of the first description, we find a person, hitherto in the enjoyment of health, suddenly attacked with symptoms of intense apoplexy. You will recollect that in my last lecture, I told you that apoplexy consisted in various lesions of the phenomena of the life of relation. In the most violent form of apoplexy, many authors are of opinion that there is a total paralysis in the functions of animal life. The patient falls down and remains in a state of complete insensibility, the eye no longer obeys the stimulus of light, no sounds make any impression on the ear, of odour on the sense of smelling, the sense of taste is destroyed, the skin may now be seared with a red hot iron without the slightest indication of suffering; in fact, sensation, one of the great phenomena of animal life, appears to be annihilated. If we examine further, we find that there is a total suspension of the intellectual functions, and that the patient is unconscious of anything passing around him. If we go to the muscular system, we find that all that part of it which subserves to the purposes of animal life is completely paralysed. The neck, trunk and extremities have lost their power; and if you raise the head, trunk, or one of the limbs, they fall down like dead masses, as soon as the support is withdrawn. In some cases there is a certain degree of rigidity in the muscular system, in others not. We may observe also, that from the paralysis of the buccinators, the cheeks are alternately puffed out and sucked in during respiration. As far as my experience goes, I believe that this symptom is fatal. Here, then, we see that the great phenomena of the life of relation are suspended. The functions of organic life, however, still continue to be performed, the heart beats, respiration goes on, and the power of secretion remains; but, after some time, the functions of organic life are also suspended, and the patient dies. In some of these cases, we observe evident signs of determination of blood to the head, the face is swollen, and the lips livid; there is cosiderable turgescence of the vessels of the neck, with heat of the head, the skin hot, and the pulse full and strong. In other cases, however, we have a feeble pulse and a cold and collapsed state of the surface.

Let us now turn for a moment to the pathology of this form of the disease. I have already mentioned, that the extravasation sometimes occupies both hemispheres of the brain, or that it occurs on

one side, and, by tearing through the substance of the brain, gets into the ventricles, and produces symptoms referrible to a lesion of both sides. With respect to the simultaneous double effusion, the following is a short notice of some cases taken from the "*Clinique Médicale*" of M. Andral. A man, about thirty-seven years of age, fell down near La Charité in a fit of apoplexy. He was immediately brought into the hospital, had prompt and careful attention paid to him, but without any effect; he lay in a state of profound coma, with complete suspension of the phenomena of animal life, and died in an hour and a half. On examination there was a double effusion of blood found in the brain, but it had not got into the ventricles. In another case, marked by simple intensity, there was an enormous effusion discovered in the substance of one hemisphere, which burst into the ventricle, tore through the septum lucidum, and passed into the ventricle of the opposite side. In the next case, no distinct trace of optic thalamus or corpus striatum could be seen, their substance being completely broken up and destroyed by the effusion. I have told you that, after a rupture of the substance of the brain and the escape of the effused blood into the ventricles, persons have not recovered, but it is a fact, and a consolatory one indeed, that a person may recover from a *simultaneous double effusion*. A case in proof of this is given by Andral. A female who had been for some time a patient at La Charité, died of cancer of the stomach. The history of her case was, that nine years before she had an attack of apoplexy, she had fallen down in a state of insensibility, and remained comatose for a considerable time, and this was followed by *paralysis of both sides of the body*, which continued for two years, after which she gradually recovered the use of her limbs. In this case, two serous cysts, such as are met with in cases where patients have recovered from apoplectic attacks, were found, one in each hemisphere of the brain. In another case, the subject of which died of visceral disease, the patient had twenty-two years before an attack of apoplexy with double paralysis, and recovered with the loss of the use of one side; here there were two cysts also found. It appears, then, that though extravasation, with rupture of the walls of the ventricles, and escape of blood into their cavities, always proves fatal, a recovery may take place after a simultaneous double effusion.

Let us now inquire briefly, whether an apoplectic attack, followed by paralysis of both sides of the body, gives sufficient grounds to enable us to make the diagnosis of either of these accidents. Does it follow, if a person has an attack of apoplexy, succeeded by paralysis of both sides, that the effused blood has burst into the ventricles, or that a simultaneous double effusion has occurred? Andral inclines to this opinion as far as I can recollect. Dr. Abercrombie appears to differ from him, and gives cases in illustration of his opinions. The following is one: — A private of the 10th Hussars has been complaining for some time of a pain in the head, for which he was blistered, and the pain soon went off. On the 22d of July, 1819, he was seized with giddiness and fell down; on being raised, he vomited, and complained of violent headache and faintness, but was quite sensible. He was very pale, and his pulse slow and languid.

He was brought into the hospital, where he asked for some cold water, made a few inspirations, and expired. From the moment of his last seizure he had been paralytic of both extremities. Here we have an attack resembling the first form of apoplexy, so far as complete loss of power in the upper and lower extremities is concerned, but observe, the *patient was not comatose, and retained his faculties to the last.* On examination there was nothing found amiss with the brain, but, on removing the cerebellum, a coagulum to the amount of about two ounces was found under and surrounding the foramen magnum. Here the paralysis appears to have been produced by the pressure of the effused blood on the upper part of the spinal cord. This case is an interesting one. It appears that the injury done to the functions of the life of relation was partial, there was a lesion of the muscular function, but there was no coma, and the intellectual faculties were unimpaired. As far, then, as a single case goes, we may come to the conclusion, that we are not to make the diagnosis of the first form of apoplexy, unless, in addition to the double paralysis, there are coma and loss of intelligence and sensation. The great points of diagnosis are coma, suspension of the phenomena of the mind, and paralysis of both sides of the body, both of motion and sensation. We now come to consider the symptoms of the second or milder form of the disease. A person falls down in a state of insensibility, but when you come to examine him, you find that the coma is not so profound, nor is the paralysis and loss of sensation so complete. The eyes are to a certain degree susceptible of the impressions of light, signs of uneasiness are exhibited when strong pungent odours are applied to the nostrils, and indications of suffering are given if you pinch or burn the skin. All these circumstances prove that the paralysis of sensation is by no means so complete in this as in the former case. You observe here, too, that instead of the cheeks being pulled out in the manner before described, there is only a partial paralysis of the muscles of the face, *and the mouth is drawn towards the sound side.* The patient, too, instead of dying in a comatose state, gradually regains his intelligence, and is only paralysed on one side, or one extremity. All these circumstances point out that the injury done to the brain is not so extensive, and the occurrence of paralysis on one side shows that the effusion is limited to a single hemisphere of the brain. All this, too, is borne out by pathological anatomy, which shows us, in the first place, that the extent of the effusion is much less, that it exists only on one side of the brain, and never bursts into the ventricles. The general congestion of the head also is much less than in the former case. In the third form, the congestion and other symptoms are sometimes very slight. A person in health may feel a stunning sensation in the head followed by some thickness of speech and drawing of the mouth to one side, or slight paralysis of one arm or hand, but he has no coma or loss of intelligence, and the paralysis quickly disappears. Everything connected with the attack shows that it is very slight, the effusion is extremely limited, and this is confirmed by pathological anatomy.

I have now given you a brief sketch of the three varieties of apoplexy; between these you will meet many intermediate cases.

Let us inquire how far does the circumstance of paralysis point out the occurrence of an extravasation of blood into the substance, or on the surface of the brain; that is, how far we can say that this patient has effusion, because he has become suddenly paralytic. It would appear, that the mere suddenness of the attack will not alone lead to the formation of a certain and accurate diagnosis. You will find in various authors many instances of affections of the head, not of an apoplectic character, in which there was sudden paralysis. Thus, for instance, there are many cases of tumours and encysted abscesses on record in which there was sudden paralysis, and where, if you should pronounce the disease to be apoplexy, you would be certainly wrong. We had lately, at the Meath Hospital, a remarkable instance of this. A patient who had been for a considerable time labouring under aneurism of the innominata, in the course of the night became suddenly hemiplegic. On examining the brain, *post-mortem*, there was a circumscribed abscess found in one of the hemispheres, but no sanguineous effusion. If you look to the works of Abercrombie, Rostan, Lallemand, &c., you will find many cases detailed in which sudden paralysis occurred from other causes than apoplexy.

But are there no circumstances, which, combined with the suddenness of the attack, would lead us to form the diagnosis of apoplexy? Now, it would appear that, as a diagnostic of apoplectic effusion, *suddenness of paralysis* is only to be relied on where there have been no premonitory symptoms of a local disease of the brain. In the great majority of cases of cerebral abscess, you will find that pains and cramps in some of the limbs, and pain of the head in the situation of the abscess, have preceded for some time the paralytic attack. But if a person in health, without any of these cramps or pains, gets a *sudden* attack of apoplexy, and becomes hemiplegic, you may make the diagnosis of apoplectic effusion with tolerable certainty. The fact of the paralysis occurring with an apoplectic seizure, renders it highly probable that the case is really one of the hemorrhagic diseases of the brain. On the other hand, it is true that we may have apoplectic effusions ushered in by symptoms of irritation of the brain, as in the case of an apoplectic effusion occurring in the centre of a softening of the brain. The absence, therefore, of these premonitory symptoms appears to be necessary towards forming the diagnosis of simple apoplectic effusion.

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[As the phenomena of apoplexy, at least so far as regards the loss of consciousness and of motion and the stertorous breathing, may proceed from other causes than fulness and congestion of the cerebral vessels and general plethora, the *Observations on the Prevention and Treatment of Apoplexy and Hemiplegia*, read by Dr. Marshall Hall at a meeting of the Medical Society of London, April 4, 1842, come in opportunely in illustration of this subject. I have not room for the whole paper, but will give some passages. Dr. Hall says:—

The question of the causes, nature, prevention, and treatment of apoplexy and hemiplegia was a very complicated one. He thought the attention of physicians, in reference to the prevention and treat-

ment of apoplectic and hemiplegic attacks, had been far too much confined to the question of plethora as the disease, and of depletion as the remedy. It was to him certain that such attacks might and did occur quite irrespective of general plethora; nay, that they occurred in connection with the opposite condition of the system, that of inanition and anemia. Nor was a state of anemia the only other condition besides plethora which led to the apoplectic or hemiplegic attack. Morbid conditions of the stomach and morbid conditions of the intestines were other sources of these seizures. But he had also observed the occurrence of apoplectic affections under other circumstances: other indubitably predisposing causes of the apoplectic seizure were dyspepsia, cachexia, and gout. Nor was even this view of the subject sufficiently extended; the liver and the kidney must do their office. These sources of the apoplectic or hemiplegic seizure consisted in conditions of the general circulatory system, and of the blood itself. There were still others of a different kind.

The first of these was disease of the heart; and this consisted, first, in hypertrophy, with augmented impulse given to the arterial blood; or, second, in dilatation of the heart and disease of its valves, impeding the reflux of the blood along the veins.

The second was disease of the capillary vessels, of the minute arteries, or of the minute veins of the brain and its membranes.

Lastly, there were causes of apoplexy in the muscular efforts, by which the action of the heart itself was augmented, as in violent running, the ascent of a mountain, &c., and in other muscular efforts, by which the return of venous blood was impeded, as the efforts of vomiting, or for the expulsion of the feces; and still more of parturition.

This view of the causes of apoplexy would sufficiently denote the complexity of the problem of the prevention and treatment of the apoplectic and hemiplegic attack; for that prevention depended on restoring the system to a state of what may be termed equilibrium, in regard to plethora and inanition; to the removal of irritating or morbid matters from the primæ viæ; to the correction of the morbid diathesis in dyspepsia, gout, and cachexia. The prescription must include remedies and regimen to meet all these circumstances, and, as he had stated, the problem was by no means either an easy or a simple one. Yet another element in the problem was that which related to the local or topical remedies. On each of these sources of the apoplectic and hemiplegic attack, he proposed to make a few observations. These observations would be principally addressed to the medical practitioner; but as far as they might relate to regimen, they might, he thought, be profitably considered by the patient.

Of Inanition. — It was constantly his lot to see patients who were in jeopardy not from fulness but from inanition, and who had long been kept in a state of anemia by bloodletting, general or topical, when an opposite treatment was required to restore the equilibrium of the system, and to remove the vertigo and other symptoms threatening an attack of apoplexy. A state of pallor, a disposition to faintishness, palpitation, and nervous timidity, the occurrence of the symptoms when the stomach was empty, when the bowels had

been relieved, and on suddenly looking upwards, or resuming the upright position on rising from bed, or after stooping, or the recumbent position; such were the diagnostic *signs* of a state of inanition from a state of plethora. The *history* of the case also afforded a diagnosis; for, although depletion might have appeared to afford a momentary *relief* of the symptoms, it had issued in their *aggravation* in general. An opposite mode of treatment, very cautiously and prudently adopted and pursued, would confirm the diagnosis, by affording a more permanent, though possibly a less immediate and marked relief. It was to the important distinction between the immediate and permanent relief, indeed, that he would draw the attention of the profession. In the case of symptoms portending apoplexy or hemiplegia, although these might arise from inanition, yet they were invariably *relieved* by depletion, although they afterwards returned with augmented force. This effect was very puzzling to the inexperienced practitioner. It was explained by the fact, that the symptoms ceased under the influence of a condition allied to syncope, but returned with the reaction. This subject must be carefully studied, in order that the nature and treatment of the case might be understood. He had next particularly to notice that the state of anemia was not one of safety. In such circumstances apoplexy and hemiplegia, with the actual effusion of blood into the cerebrum, had occurred.

Of Dyspepsia and Cachexia.—There could be little doubt that in dyspepsia the blood itself became contaminated, and, as it were, *cachectic;* on this principle we accounted for the appearance of furunculus and paronychia; for the morbid condition of the tongue and interior of the mouth, the general cutaneous surface, the secretions, &c. He had so often observed symptoms threatening the apoplectic or hemiplegic attack, in conjunction with symptoms of dyspepsia and cachexia, that he had no doubt of the vast importance of a strict attention to this subject. That very day (Oct. 1, 1841) he had been consulted by a medical gentleman under these circumstances. One form of this affection was the following; vertigo occurred with faintishness, sickishness, and a cold clammy perspiration; sometimes there was actual sickness, sometimes much flatus. In these cases the feet and other extreme parts were apt to be cold. The secretion of the liver was frequently defective, and the urine was apt to deposit the lithic acid salts. Nothing could be so injurious as bloodletting. In no case was the loss of blood repaired with such difficulty. The application of a few leeches frequently left a state of debility and pallor which were felt and seen for weeks. The treatment consisted in the correction of the secretions, and in the infusion of tone and general health into the system. The compound decoction of aloes, the infusion of rhubarb, of gentian, of cinchona, singly, or, better, mixed together; sarsaparilla; the vinum ferri; the bicarbonate of potass, stomachics, tonics, and antacids, in a word, were the principal internal remedies. But with these a mild, nutritious diet, a system of gentle exercises, early hours, the tepid salt-water shower-bath, and a strict attention to the condition of the feet and general surface, by means of the flesh-brush, flannel, and a frequent change of shoes and stockings, should be conjoined. Those engaged in the harassing affairs of a

London life should sleep in the country, and cherish the utmost quiet of mind.

Of Gout.—But he had frequently traced a connexion between gout and its frequent attendant, the lithic acid diathesis, and the apoplectic and hemiplegic seizure. It was not merely plethora, or the opposite state of inanition, which led to the apoplectic attack. The morbid state of the blood in dyspepsia and cachexia also disposes, as he had already said, to this affection. The same remark applied to the condition of the system and of the blood, especially in gout; and, as he should have to observe immediately, the same disposition obtained in several morbid conditions of the liver and kidney. A nobleman, now no more, suffered in succession from gout and the herpes zoster, and the urine deposited the lithites copiously. He was relieved by the appropriate remedies, and became affected with an apoplectic (or epileptic) attack. A similar attack (without hemiplegia) occurred several months afterwards, and a third attack proved fatal. This gentleman was pallid, the prolabium being white. A steady perseverance in such remedies as the dococtium aloes compositum, the bicarbonate of potass, and the vinum ferri, had in other cases effectually averted the threatened evil. But he must make another remark. The vinum colchici should be given in very minute doses, as five drops thrice a-day, also steadily and persevering to overcome the specific gouty diathesis. The lithic acid diathesis was not the only urinary disorder which led to apoplexy and hemiplegia. This attack, it is well known, occurs in the case of diabetes, and in that of albuminous urine. Although he had designated the attack apoplectic and hemiplegic, it was sometimes more allied to epilepsy than apoplexy. The gentleman to whose case he had briefly adverted, was affected with minute ecchymosed spots on the forehead, which he had only observed under three circumstances, viz., after severe vomiting, the effects of parturition, and the epileptic attack; when he saw him soon after the second seizure, the insensibility had passed away, and there was no hemiplegia.

Of Muscular Efforts. — He might make the same remark in regard to muscular efforts, which he had done in regard to disease of the heart — those efforts, which opposed resistance to the reflux of the venous blood, were much more efficient causes of the apoplectic seizure than those efforts which augmented the momentum of the arterial blood. Thus we rarely heard of the occurrence of apoplexy during the violence of the race, during the ascent of mountains, &c., but such an occurrence at the water-closet was by no means uncommon; and we all know how apt the parturient efforts were to induce congestion of the brain, and the consequent apoplectic seizure. It would be most interesting to correct our ideas on these subjects by a cautious appeal to facts. — B.]

LECTURE CXV.

Apoplexy from *ramollissement* (softening) of the brain—Supervention of apoplexy on encephalitis—Inflammation round the clot—Variety of paralysis consequent on apoplexy—Paralysis croissée—Different forms of paralysis—Origin—Phenomena of face and tongue—Paralysis of the tongue—Treatment of apoplexy—Bloodletting—Purgatives—Lotions, beneficial effects of—Emetics, dangerous effects of—Use of revulsives and stimulants—Treatment of paralysis—Efficacy of strychnine—Its modus operandi—Brucine, its proposed employment.

I left off at my last lecture in considering how far the mere circumstance of suddenness of attack with paralysis could be considered as leading to the diagnosis of apoplectic effusion, and endeavoured to show that mere suddenness of attack with paralysis was insufficient to form a diagnosis, except where they occurred in a person who had no previous symptoms of irritation of the brain;—these symptoms being pain of the head, and pains, spasms, and rigidity of the limbs. I wish to impress upon you that you may have an attack of apoplexy with effusion ushered in by all these symptoms, particularly in cases where the apoplectic effusion is consequent on a localised inflammation of the brain. A portion of the brain, for instance, becomes inflamed and disorganized; local *ramollissement* (softening) takes place; and it may happen that this, acting as a point of attraction to the fluids, may lead to the occurrence of an apoplectic effusion in the originally affected portion; and in this way you will have apoplexy preceded by all the symptoms which characterise a partial encephalitis. You will perceive, then, that the absence of these premonitory symptoms is necessary towards forming a *certain* diagnosis of apoplexy with effusion. If these symptoms have preceded the attack, it is probably either circumscribed abscess of the brain, or it is local inflammation followed by effusion. Between these two forms of disease we have no means of distinguishing.

Before I speak of paralysis I wish to make some remarks on a condition of the brain which supervenes in certain cases of apoplexy. In cases where absorption of the clot takes place, we cannot suppose that any inflammatory condition of the brain exists; on the contrary, we have every reason to believe that a non-inflammatory condition of the brain is highly favourable to this process, for whenever anything of an opposite character happens, we find that it prevents absorption. But sometimes cases occur, in which, at an earlier or later period, inflammation is set up round the clot. Now, what happens in many of these cases? Here let me repeat, that there are many exceptions to the rules given for forming the diagnosis of disease of the brain; the variety in the symptoms of cerebral affections being so great, that it is sometimes difficult to deduce from them rules of general application. In most cases we have apoplexy followed by paralysis with resolution; but, in cases where inflammation takes place round the clot, it has been observed that the paralysed limb which had been previously in a state of resolution becomes contracted, and then we have paralysis with contraction. This contraction generally comes on in a gradual manner, but when

the case is severe, it is frequently ushered in by violent spasmodic action of the affected limbs. We have, then, the following order of phenomena; first, paralysis with resolution, and then paralysis with contraction. In circumscribed inflammation of the brain, the phenomena are the reverse of these; we have, first, rigidity and contraction of the limbs, and then symptoms of apoplexy followed by paralysis with resolution.

With respect to the paralysis which is consequent on an attack of apoplexy, there is the greatest possible variety. In some cases there seems to be paralysis of all, or almost all, of the muscles of animal life; in others, it affects only the muscles of one side of the body. A rare and extraordinary form of paralysis has been described by the French writers, who have given it the name of *paralysis croissée*. In this form of the disease there is an affection of both sides, but not of the symmetrical members; we find the left arm and the right leg paralysed, and *vice versâ*. This is an unusual form, in fact the rarest to be met with in practice. We may also have great varieties in the amount of the paralysis; in some cases both sides being affected, in others only one, while in others there is only a single extremity or one side of the face paralysed. We may also have complete paralysis of one side without any affection of the face. I remember a remarkable case of this kind, of which I shall give you an abstract. A gentleman, of stout muscular habit and a strong full pulse, had been suffering for a long time under an obstinate gouty affection. From a reputation of the gouty attacks he got a chronic swelled state of the lower extremities, which continued for some time, he being in other respects in the enjoyment of excellent health. The swelling, however, preventing him from taking his usual exercise, he applied for advice. Laced stockings were advised, the effect of which was, that the œdema subsided, and the motion of the lower extremities was restored. It is curious that, between the period of the removal of the œdema and the paralytic attack which I am about to describe, this gentleman enjoyed excellent health. At the end of that time, on attempting to go over a step that led into the yard, he found he could not accomplish his purpose, and struck his foot against the stone. He immediately became alarmed and sat down, and soon after found that he had lost the power of using his arm. I saw him in a short time after the accident, and found that there was complete paralysis of the arm and leg, but no distortion of the face or tongue, or the slightest lesion of intelligence. He continued in this state for some time, and then recovered, but it was necessary to take a large quantity of blood from him. In the first bleeding, as the pulse was full and bounding, I took sixty ounces of blood from the arm, and I think it was owing to the activity of the measures adopted that he recovered so speedily. I mention the case merely to show that we may have paralysis of the leg and arm, without any affection of the face, or loss of intelligence. In some cases we find the paralysis affecting the tongue, face, and muscles of the eyelids; in some we have paralysis of the sphincter ani, or of the muscles of deglutition, or of the bladder, but these are rare, and the most ordinary form is paralysis of the muscles of one side, and distortion of

the face. There is another circumstance, which seems to be so exceedingly frequent as to form a law, perhaps the most general of any in medicine, that paralysis occurs on the side of the body which is opposite to that on which the effusion occurs. If you have an effusion into the right hemisphere, you will have paralysis of the left side of the body, and, if the effusion be on the left side, the paralysis will be on the right. To this rule, however, it has been stated that there have been a few exceptions; how they have occurred it is totally impossible to explain; it is sufficient for us to know that such exceptions have been witnessed. Cases of this description have been very rarely seen since pathological anatomy has been studied with more diligence; it is, however, true, that a few have been detailed by men of great professional eminence. We want facts to throw light on this point, and, until this is accomplished, we must remain in ignorance of the cause of the anomaly. In the vast majority of instances, the paralysis is on the opposite side to that on which the effusion takes place, and this appears to be explained by the decussation of the fibres of the brain at the upper part of the spinal marrow, the fibres of the left side passing to the right, and *vice versâ*. It is an interesting fact connected with this subject, that the muscles of the face follow the same law as the muscles of the extremities, and yet it is a fact, as you are well aware, that the nerves which supply the muscles of the face come on before the decussation of the fibres of the brain takes place. The fifth nerve, which supplies the face with muscular branches, is given off at a considerable distance from the decussation of these fibres, and yet we perceive that the muscles to which it is distributed obey the same law as those which derive their nerves from the spinal cord. Now, if this decussation was the only cause of the paralytic symptoms being observed on the side opposite to that in which the effusion occurs, the muscles of the face should be an exception to this law; but we find that they correspond with other parts of the muscular system in this respect. Thus, if a man gets an attack of apoplexy, followed by paralysis of the left arm, we find the left side of the face affected, and *vice versâ*. We must conclude from this, that the mere decussation of the fibres is not the sole cause of this peculiarity, and must look for an explanation elsewhere, by referring it to the intimate communication which exists between both sides of the brain by means of its commissures. Many persons are not familiar with the phenomena of the face and tongue in paralysis; they are, however, simple and easily explained. Let this diagram represent the head — here we have the right hemisphere of the brain, here the left. Now, suppose you have an apoplectic effusion in the right hemisphere, the consequence is that you have paralysis of the left side of the body, according to the law already mentioned. What will then happen with respect to the face is, that the muscles of the left side being paralysed, and their antagonism destroyed, the mouth is drawn by the sound muscles of the opposite side from the paralysed side, and this is invariably the case. Recollect, then, that the mouth is always drawn from the paralysed side, and towards that side where the disease exists in the brain. But when you desire the patient to put out his tongue. do you find that the tongue follows the direction of the mouth? No; it goes towards

the opposite side. This appears somewhat paradoxical at first, but is easily explained. The protrusion of the tongue is effected by the action of the genio-hyoglossi muscles, which are, as you all know, a pair of fan-shaped muscles, attached to the inside of the chin, the middle line of the tongue, and the body of the os hyoides. This diagram will represent it. Here is the muscle of the left side, and here is the right. When the patient puts out his tongue, this left half being paralysed, and having lost its antagonism, the tongue obeys the action of this, the right half, and the fixed point of attachment of the muscle being to the right of the mesial line, the base of the tongue is brought forward, and to the right, and its point consequently deviates to the left or paralysed side. It has been remarked, also, that there is some variety with respect to the paralysis of the tongue; some patients can protrude it, others cannot. In some cases, too, the patient can put out his tongue well enough, but he cannot employ it in the articulation of sounds, and his speech is quite indistinct.

I might occupy your time for several lectures with these subjects; and, did my time permit, I could lay before you a vast quantity of interesting matter on the subject of paralysis from apoplexy; but, as the number of lectures is limited, all I can hope to accomplish is, to point out the great landmarks to you, and leave the rest to your own study and experience. With respect to paralysis of the extremities, the upper are paralysed more frequently than the lower; and, when both extremities are engaged, the upper are generally more completely affected than the lower. When a person recovers, also, we find that the lower extremities are the first to retain their lost power and sensibility. These circumstances have been attempted to be explained by considering the particular parts of the brain in which the effusion has occurred; but, as this has not as yet been sufficiently made out, I shall pass it over. I regret, also, that I have not time to enter into the subject of different varieties of lesion of intelligence in cases of apoplexy. I must, however, observe that the varieties are infinite, and your trouble will be amply repaid by reading what has been written on this point by Dr. Abercrombie, and Dr. Cooke in his Treatise on Nervous Diseases. You will find in the latter work an extraordinary collection of facts with respect to lesions of the intellectual functions.

I shall now endeavour to get through the treatment of apoplexy as briefly as the important nature of the subject will admit. I shall commence by saying, in the words of Dr. Abercrombie, that the remedies for apoplexy are few and simple. The great point is to relieve the head from the accumulation of blood, to prevent farther congestion, and to obviate inflammatory action; and for these purposes the only efficient means we possess is bleeding. There is no disease in which the efficacy of free and bold depletion by the lancet is more remarkable than in apoplexy. I agree completely with Dr. Abercrombie in thinking that the symptoms which denote serous apoplexy by no means contraindicate the use of the lancet; for I have already shown, that serous apoplexy was nothing but congestion, that the serous effusion was one of the consequences of this congestion, and by no means the cause of the apoplectic symptoms. Dr. Abercrombie thinks that, in the commencement of the disease, you

may bleed where the pulse is feeble as well as where it is strong and full, and give many important cases in which the disease yielded to a copious abstraction of blood, though the state of the patient's pulse and general system at the time were such as would deter many from bleeding. He gives three cases of persons about seventy years of age, on whom this mode of treatment was practised with success, and another of a person of spare habit, aged eighty years, whose life was saved by a bold and timely use of the lancet. There is also another case detailed of a patient who was worn down and dropsical at the time of the attack, and received considerable relief from bleeding. I do not wish you to conclude from this that you should bleed as boldly in the one case as in another; what I wish to impress is this, that in a vast majority of cases it is advisable to have recourse to the lancet. With respect to the first bleeding, I think that where the pulse is full and strong it should be large, and such as will produce some effect on the symptoms. This may be repeated afterwards to a smaller amount if necessary; but the subsequent bleedings should be rather local than general, except where there is any renewal of the cerebral and circulatory excitement, which must be always met with activity. I believe the cases in which you must make the largest bleedings are those in which there are symptoms of an hypertrophied heart. But where this is not present, one or two bold bleedings, followed by local depletion of the head, will be sufficient. In cases of apoplexy, you may either open a vein or the temporal artery, for the objections made to arteriotomy in phrenitis do not apply so much to cases of apoplexy. There is no violence on the part of the patient, nor is there the same chance of the vessel giving way. The head should be shaved and freely leeched, and the patient may be cupped on the temples or the back of the neck.

Next in efficacy to general and local bleeding seems to be the administration of strong purgatives. There are many cases on record in which the coma and other symptoms have resisted bleeding, both general and local, but have disappeared under the influence of active purgation. One of the great objects in the treatment of apoplexy should be to get rid of the coma as soon as possible; and for this purpose nothing appears to answer better than the early use of brisk purgatives. Dr. Abercrombie recommends croton oil as the best purgative that can be employed, and indeed it is an excellent one; but if the patient can swallow, you need not be very anxious about the kind of purgatives you prescribe; any active purgative followed by a strong enema will do. Where the patient cannot swallow, you may mix the dose of croton oil with some mucilage, and pass it into the œsophagus by means of a gum elastic tube.

After purgation, the next thing is to apply cold to the head by means of cold lotions, or iced water, or by pouring a stream of cold water on the head. This is a measure of great efficacy, and one which you may employ with safety and advantage.

In cases of apoplexy, where the coma has resisted free bleeding, both general and local, and where purgation and cold applications to the head have been employed without any decided effect, it seems advisable to apply a blister to the head or nape of the neck. You

will recollect that I told you that blisters were always dangerous in the early periods of all acute visceral inflammations. This, however, does not apply so much to cases of hemorrhagic effusion like apoplexy, in which blisters may be employed at an earlier period than in cases of active inflammation. I would advise you, therefore, to use blisters in cases of apoplexy attended by persistent coma, having first put into practice the means already mentioned.

Many persons advise the use of emetics in apoplexy, but the facts bearing on this point, to which I have drawn your attention when speaking of inflammation of the brain, will also apply here. You may take it as a general rule, that where congestion of the head exists vomiting will always increase it, and must be therefore exceedingly dangerous. As far as theory goes it is totally against this practice, and I believe experience also is opposed to it. In a number of cases of disease of the brain, where emetics were employed, it has been found that an unfavourable result ensued, and there are some cases of apoplexy on record in which the exciting cause was a fit of vomiting.

Suppose that, after having taken away blood, purged actively, used cold applications, and blistered the head, the coma still remains, accompanied by a feeble pulse and cold skin, what are you to do? I believe, under these circumstances, and these alone, you may venture on the use of internal stimulants. Though this is at best but a forlorn hope, still the practice appears rational; we have analogy to guide us in the use of stimulants in such cases, and there are cases on record of persons who have recovered from this state by their judicious employment. The remedies most generally prescribed for this purpose are camphor, musk, and carbonate of ammonia. In the cases of typhus, we know that these remedies have frequently succeeded in removing the coma; but I repeat, that you should never have recourse to stimulants until the period for depletion has passed by, and all the ordinary means have failed.

I shall now suppose that we have succeeded in removing the coma, that consciousness has returned, and that nothing remains but paralysis of one side. Our great object is to get rid of the paralysis as soon as possible. Here you will recollect that you have to deal with paralysis depending on extravasation, a paralysis which, as far as we know, will not disappear under any form of treatment until the extravasated blood has been absorbed. The first thing, then, you have to do, is to adopt measures to prevent a return of the attack. This is to be effected by carefully restricting the patient in his diet, by avoiding all causes of cerebral irritation, whether physical or moral, and by obviating everything capable of exciting the circulation. But you should not be content with this: you should from time to time employ local depletion, which in cases of this kind has a double utility. It tends to prevent a repetition of the attack, and, by lowering the circulation, keeps the brain in that non-inflammatory condition which is most favourable towards promoting the absorption of the coagulum. In many cases, also, you will find it of great advantage to establish a drain in the vicinity of the disease, and a great deal of good may be done by putting a seton, or an issue, in the neck. You must also pay constant attention to the state of the bowels and urinary system in

cases of paralysis; keeping up a steady but mild action of the bowels has an excellent effect, and I need not impress upon you the necessity of paying strict attention to the bladder.

The paralysis which supervenes on an attack of apoplexy, is to be treated always in the first place by means directed to the head, and the brain is to be put in such a state as will favour the removal of the clot by the means already recommended; in addition to which it will be necessary that the body and extremities should be kept in a warm temperature. But there is this very singular circumstance connected with some cases of paralysis, that a period will arrive when, although the original disease of the brain has been removed, and the clot absorbed, the paralysis still continues. It is not easy to explain the circumstance; but it has been observed in many persons who have been paralytic, that the clot was completely absorbed, and no existing trace of disease discoverable, such as would account for the continuance of the paralysis. In cases like this we must adopt a different mode of practice, and have recourse to measures capable of exciting the brain, and we have reason to believe that whatever will excite the brain and restore its energy (I must use this phrase for the want of a better) will cure the paralysis. We find that in some cases where the brain of a patient, under such circumstances, has been exposed to any sudden stimulus, whether physical or moral, the symptoms of paralysis have disappeared, sometimes gradually and slowly, at other times rapidly and at once. Now, this disappearance of the symptoms shows that the paralysis did not then depend on the presence of a clot, for if an unabsorbed coagulum remained in the situation of the original extravasation, the paralysis would not disappear. But it has been frequently observed, that a patient, labouring under paralysis, may get rid of his symptoms suddenly, or that, at a certain period, they begin to decline, and then go away altogether. From a consideration of these circumstances we are led to divide the treatment of paralysis of this description into two parts, and endeavour first to excite the brain itself, and next the nerves which supply the paralysed limbs. For this purpose several remedies, supposed to be capable of stimulating the brain, so far as its action on the muscular system is concerned, have been recommended, the most important of which is the nux vomica, or its active principle, strychnine. The researches and experiments of modern medicine have already established the efficacy of strychnine in such cases, but you will recollect, as I before stated, that this powerful remedy can be employed with safety only in cases where the paralysis continues after the disappearance of organic disease of the brain. Until that period arrives, and all symptoms of congestion and excitement are removed, it would be improper to prescribe the use of strychnine. One of the most recent publications on this subject is from the pen of Dr. Bardsley of Manchester, in which you will find an exceedingly interesting series of cases treated with strychnine, and many of them with the most decided success. In most of these cases you will find that Dr. Bardsley, even where the disease has been of some standing, *precedes the use of strychnine by measures calculated to deplete the head,* even though the cases were chronic.

Hence, whenever you are about to prescribe this remedy, you should be satisfied that depletion has been sufficiently performed. You may be called to treat a patient for paralysis after an apoplectic attack. Here you must consider how far you are to premise the use of strychnine by depleting measures, and you must also reflect that we here have shadowed out one of the most important principles in medicine, *that in almost all cases where a cure is to be attained by stimulation, it will be effected more readily, and with more certainty, when preceded by local depletion, no matter how long the disease may have lasted.* The efficacy of strychnine in paralysis seems to be dependent on the antecedence of local or general depletion.

Strychnine being an exceedingly active remedy, and having a most powerful effect in stimulating the brain, it being also one of the accumulative class of medicines, it will be proper to commence its exhibition with a very small dose, and watch its effects, with care. The following is the formula which I would recommend you to employ. You take a grain of strychnine, and your object being to divide it into a number of equal parts (say sixteen), to insure an accurate division, you dissolve it in a small quantity of alcohol, and, having mixed this solution with a quantity of bread-crumb or conserve of roses, you divide it carefully into sixteen equal pills. In this way you may be tolerably certain that each pill contains one-sixteenth of the grain. Begin at first with one pill a day, next day you may give two, and so on until you have brought it up to half a grain or a grain, watching carefully its effects. Now, what are these effects? They are very analogous to the phenomena produced by inflammation of the brain taking place in the vicinity of the clot, namely, spasms of the muscular system.

It is alse a curious fact, that these spasms are principally observed on the paralysed side ; in other words, that the portion of the brain which has been effected by this disease is more sensible to the stimulus of the strychnine, the consequences of which is spasmodic twitches in the paralysed limbs. The great nicety of practice in the treatment of paralysis in this way, is to keep up a certain degree of this irritation without letting it proceed to any degree of violence, and to omit it whenever the following symptoms become manifest — headache, giddiness, weakness and sickness of the stomach, and too violent spasmodic twitches of the limbs.

There is a great difference with respect to susceptibility of the effects of this remedy in different individuals; in some the effects speedily appear, and you are obliged to intermit its use; others will bear large doses for a considerable time, and you may push the strychnine until a grain or a grain and a half is taken in the day. I have myself given to one patient a grain every day for the space of a fortnight without any intermission. In all cases, however, it will be necessary to watch the symptoms. There is one effect of strychnine which appears to be unfavourable, and whenever it occurs you should either omit the medicine or diminish the dose. Along with or succeeding the spasms, *there is a tonic rigidity of the limbs ;* when this occurs you should be cautious in the administration of strychnine. The length of time which it should be continued will of course vary

according to circumstances, but you should be aware that it requires a considerable period of time to produce its effects. In all Dr. Bardsley's cases, and in all those treated at the Meath Hospital, it has been continued for a considerable time, certainly more than a month. It is also necessary for you to recollect that strychnine is one of those medicines which are termed accumulative, that is to say, remedies, the operation of which, after remaining latent for some time, suddenly explodes with great violence. When this occurs, the strychnine must be immediately given up, and steps taken to control its effects. One of the best things for this purpose is the carbonate of ammonia with some mild anodyne. I have seen very severe spasms from the use of this medicine. In one case these spasms were so violent as to roll the patient nearly out of bed.

It has been proposed to employ brucine as a substitute for strychnine. Of this remedy I can say but very little; I have given it but very seldom; I believe in only two cases, and in these without any sensible effect. It is much weaker than the former remedy, one-fourth of a grain of strychnine being equal to six grains of brucine. Other remedies have been proposed for the same purpose, among the rest, iodine, which has been recommended by Dr. Mansfield.

The next class of remedies are those which are employed for the purpose of exciting the nerves of the paralysed limb. As my time, however, has expired, I must postpone the consideration of these until our next meeting.

LECTURE CXVI.

Paralysis—Local treatment of—Flesh-brush, shower-bath, &c.—Application of moxa—Cases in which it is useful—Professor M'Namara's plan—Acupuncture with galvanism—Electro-puncturation—Method of applying—Powerful action of small battery—Mr. Hamilton's observations—Value of galvanism and electricity—Use of, in paralysis of the muscles of the face—Paralysis from disease of the arterial system—Case of, by Dr. Graves—Diagnosis of this affection—Pathology of Pott's gangrene—Dupuytren's mode of treatment.

Having spoken of the general treatment of paralysis after apoplexy, we come now to the local management of the disease, or that portion of its treatment which consists in the application of stimulants to the nerves and their organs. Local stimulation or paralytic limbs may be performed in a variety of ways; all the usual stimulant embrocations may be employed for this purpose with the best effects. I shall not take up your time in detailing the different kinds of liniments which are used on such occasions; they are universally known, and may be varied *ad infinitum*. The flesh-brush, shower-bath, either tepid or cold, occasional blisters to the spine, or along the course of the nerves, croton oil and terebinthinate frictions — all these are measures that may be employed with advantage. The use of the moxa has been also strongly recommended, and appears to be decidedly beneficial. The efficacy of all these remedies, however, seems to depend chiefly on the particular stage and nature of the disease, and hence their good effects are most apparent in those cases where the paralysis no

longer depends on organic disease of the brain, but seems to be connected with that peculiar state of the nervous system which arises from a long interruption of the power of transmitting volition. It is in cases like this that the application of the moxa has been found to produce the most favourable results. Where the lower extremities are affected, it may be applied over the sciatic nerve on the loins, or a little below and to the outer side of the popliteal space over the track of the peroneal nerve. In case of paralysis of the upper extremity, you may apply it to the back of the neck, or in the neighbourhood of the brachial plexus.

A gentleman who does me the honour of attending these lectures, has related to me the particulars of a remarkable case, which I shall mention *en passant*. A young female was subject to repeated violent attacks of spasms with contraction in one of the upper extremities. She had laboured under this affection for a long time, and tried various remedies without benefit. At the suggestion of this gentleman she tried cupping in the neighbourhood of the shoulder and brachial plexus, and found that it produced decided relief to the symptoms. In this case it is highly probable that the disease was seated in the brachial plexus, and had no connexion with the brain, for it had continued for a great length of time (more than three years, I believe) without any remarkable variation in its symptoms. If the spasms of the arm had been produced by irritation of the brain, she would in all probability have had paralysis long before this period ; this, however, did not occur, and the probability that the disease was seated in the brachial plexus is still further confirmed by the fact, that the spasms were relieved by local bleedings. Here we have the spasms relieved by antiphlogistic means, but in a case of atony of the same nerves most benefit would be derived from the use of stimulants. The more completely the paralysis is of this description, the more sure will be the effects of local stimulation. You will sometimes meet with cases of paralysis from pressure on the nerves without organic disease. Thus there is a case on record of a person who lost the use of one of his upper extremities, from having leaned too long over a bench at a public meeting. I recollect the case of a man, who during a fit of intoxication fell asleep with his arm thrown over the back of a chair, and awoke with perfect paralysis of the hand. Cases like these are seldom of long duration, and are much improved by the application of the moxa. I may state, however, that permanent paralysis has been induced in this way. The best way of using the moxa is, not to make a deep eschar, but to touch the parts slightly, and repeat the application frequently. In the case of paralysis of the hand, immediate relief followed the use of the moxa to the back of the wrist.

While on this subject I may advise you always to employ the moxa in the mode first, I believe, devised by my friend and colleague, Professor M'Namara. The top of the moxa is to be dipped in a strong solution of the oxymuriate of potass, which is to be allowed to dry upon it. The moxa being fixed to the part by a little gum, a drop of strong sulphuric acid will produce immediate ignition. In this way you prevent all the alarm which the patient feels at seeing a lighted

candle brought to the bed-side. The same rule is to be observed when you employ electricity, the best mode of using which is to place the patient on an insulated stool, and draw sparks from, or shocks through, the affected limbs. Electricity frequently does much good in such cases; but, in order to obtain decided benefit from it, you must persevere for some time in its employment. It has been lately proposed to employ the stimulus of electricity and galvanism in a different way, by transmitting it directly to the muscles of the affected limbs by means of needles, which are to be inserted into different parts of paralysed extremities, and which are intended to act as conductors for transmitting the galvanic influence. This has been termed *electro* or *galvanic puncturation*, and forms an excellent mode of applying the stimulus of galvanism. I have made many experiments as to its effects, to which I shall briefly direct your attention.

The first thing to be considered is the manner of its application. The following is that which I use at the Meath Hospital: — Having procured two fine sewing needles, your first step will be to take the temper out of them; for, if you employ them in the tempered state, you will run the risk of their breaking in the flesh, and this would be very disagreeable. You can easily take the temper out of them by holding them in a candle until they become red hot, and then letting them cool gradually. The next thing is to place a head which will remain firm on the needle, and for this purpose you pass a small portion of thread through the eye, and then cover it with a bit of melted sealing wax. Having thus formed a head for the needle, you sharpen its point, and polish it by the emery pin-cushion, and the sharper it is the better. There is nothing more simple than to introduce the needles. You make the part of the skin tense with your finger and thumb, where you intend to introduce them, and, placing the point of the needle perpendicularly on it, you press it downwards in a slanting direction, using, at the same time, a rotatory motion, and thus easily pass it in; when you have pierced the skin and fascia, there is no difficulty in introducing it into the muscular fibres. The distance between the needles must be regulated according to circumstances. You then proceed to send the galvanic fluid to the part, and, for this purpose, the best mode is to employ a small galvanic battery with a limited number of plates. If you have plates of from two to three square inches you will find that from fifteen to twenty of these, in a state of ordinary action, will be quite sufficient, particularly in the commencement of the treatment. It is a curious fact, that the intensity of the shock is increased to an extraordinary degree by means of the needles. A battery which in the usual manner would not communicate any shock, will, when used with the needles, give a violent one, and communicate such a stimulus to the nerves as will throw the whole limb into violent spasms, and cause a copious perspiration to break out over the body. I have seen very great effects from a feeble battery in this way, and it would appear that this is the result of the *direct* transmission of the galvanic influence to the muscular fibre. In most cases a perspiration is brought on, the limb convulsed, and sometimes the whole body is thrown into spasms. As an illustration of the power of the battery when used in this way, I shall mention the following

case: — A patient, who was under the care of Mr. Hamilton, laboured under amaurosis; he was anxious to try the effect of galvanism, and with this view inserted one needle in the upper part of the back of the neck, and another over the orbit, so as to direct the course of the fluid across the base of the brain. He intended at first to use a small battery of twenty-five plates, but it struck him that even twenty-five might be too much. He made the experiment with three pairs of plates, and, the shock being given, the patient, to his astonishment, fell back as if he had been stunned by a violent blow on the head, and remained for nearly a minute in a state of insensibility. In other cases, too, where the galvanism was applied in the vicinity of the head, I have found that severe headache, giddiness, and even a stiffness of the muscles of the face were produced; all showing its powerful action on the nervous centre.

Some singular circumstances connected with this subject were observed in the Meath Hospital. It was found that after a certain number of shocks had been communicated to the parts, when you come to withdraw the needles there was a very remarkable difference in the ease of removing them. The needle through which the positive galvanic influence had been transmitted, was found to be strongly fastened in its situation, while that to which the negative pole had been applied, slipped out with the greatest ease. This result was constant. In some cases, where half a dozen shocks or so have been given, the extraction of the positive needle has been only accomplished with considerable pain to the patient.

It has been suggested by a distinguished scientific friend of mine, that this results from the coagulation of albumen at the positive pole, Mr. Hamilton, however, who performed most of the operations for me, thinks that the true explanation is the paralysing effect of the negative pole on the muscular fibre, while the positive needle is firmly grasped by the increased contraction. Further researches are necessary on this point. Another fact connected with this subject is, that when the needles have been inserted into a large muscular mass, the positive needle is powerfully retracted, and carried, as it were, into the muscles. In one case, where the needle was inserted into the lumbar muscles, in a patient labouring under sciatica, more than one-twelfth of an inch of it was drawn in at each shock; so that, after a certain number of shocks, it passed up to the head. This is one reason for using the sealing-wax head, in order to prevent the complete passing in of the needle.

With respect to our experience of the value of this mode of employing electricity or galvanism, I have to remark that, if galvanism or electricity can be of any use to paralysed limbs, this is one of the best modes in which it can be supplied. The apparatus is simple, can be prepared in a moment, and does not depend on the state of the weather, like the ordinary electrical machines. There is another advantage, also; it is not so likely to excite alarm in the mind of the patient. We have employed it in several rheumatic and paralytic cases in the Meath Hospital, but have not as yet been able to say that decided benefit has accrued from it to the majority of the patients on whom it has been tried. This is more particularly true with

respect to paralytic patients; in the rheumatic cases we have found it more beneficial. In a remarkable case, where the deltoid muscle was paralysed and atrophied from some affection of its nerves, Mr. Hamilton tried it for a fortnight without any good effects. In a case of senile amaurosis, its effects was to produce flashes of light before the eyes, lachrymation, and contraction of the pupil, but after a fortnight's trial there was no improvement in the sight. We have had, however, distinct and unequivocal proofs of its value in one case of paralysis of the muscles of the face, which had all the characters of that described by Sir C. Bell, as resulting from an affection of the seventh pair of nerves. I have not the notes of this case at present, but shall bring them down and lay them before you on to-morrow. I may, however, observe at present, that this patient had been for a long time labouring, under an affection of one side of the face, and had used a variety of remedies. Those principally employed were stimulating liniments and the internal use of strychnine, from which he derived some slight benefit; but the application of the galvanic fluid, in the way I mentioned, was followed by decided and rapid improvement. Indeed, from the time it was first applied, the patient recovered rapidly, so that in a very short time all the deformity of face disappeared. Now the value of the application is to be estimated in this way. Here we have a case of paralysis of a local nature, and not depending upon any disease of the brain; in this case the galvano-puncturation was tried, and found to be most beneficial. The conclusions, then, as far as a single case goes, is, that this mode of treatment is best adapted to the form of paralysis just mentioned, in which we find an affection of some of the muscles remaining after the original disease of the brain has been removed. The same observation, I need not tell you, applies to all other remedies which are employed for the purpose of local stimulation.

Before I leave the subject of paralysis, there are two points to which I wish to call your attention. One of these involves the consideration of a remarkable form of paralysis in which the disease appears, as far as we can see, not to depend on any primary lesion of the *nervous system*. In this form we have a paralysis, not the result of any disease of the brain or nerves, but connected with an affection of the vessels of the part. This is a very singular disease, and I am anxious you should be acquainted with it, for I believe it is by no means so rare as many persons think. The other point to which I would direct your attention refers to the influence of magnetism on the human body; of this I shall speak on a future occasion, confining myself for the present to that form of paralysis which is connected with disease of the *vascular system*.

So as to give you some idea of this affection, I think I cannot do better than read for you the notes of a case of it, published by Dr. Graves and myself in the fifth volume of the Dublin Hospital Reports.

A man, aged 44 years, was attacked in December, 1828, with alternate sensations of cold and burning heat in the toes of the right foot. These extended to the leg, of which the power became diminished. Pains in the foot next occurred, and in a month the part became cold and wholly deprived of sensation.

On the day of his admission the pain suddenly extended to the calf of the leg; and from this time he lost all power of motion in the leg. On admission, the temperature of the body, with the exception of the affected limb, was natural. The pain had extended to the thigh during the night. The temperature of the limb was but 58° of Fahrenheit. Slight œdema existed about the ankle. There was complete loss of sensation from the middle of the thigh to the toes; the patient could rotate the thigh slightly, but there was no other voluntary motion possible. The femoral artery appeared like a hard cord, painful on pressure, and without pulsation. By the stethoscope we found that pulsation was also wanting in the common iliac on this side, while that of the left iliac was plainly perceptible. The patient died on the fourth day after admission, the limb having become purple, tender, and covered with vesications.

On dissection, the right common iliac appeared distended and livid, and was completely plugged up by a dark clot, extending to the external and internal iliacs, and engaging the gluteal and obturator arteries. The same occurred in the femoral and profunda, and extended, as far as they could be traced, to the tibial arteries, and to the peroneal. The lining membrane of these vessels was soft, villous, and red; the clot in some places being separated from it by a layer of puriform matter. No disease in the veins. A large portion of the vasti and rectus muscles was *white* and hardened. Here you perceive a train of symptoms, some of which might be referred to disease of the brain, if the man had any cerebral symptoms, which was not the case, for his intellect was sound, and he had no evidence of cerebral disease except the paralysis.

His constitutional symptoms were emaciation, prostration of strength, and loss of appetite. The temperature of the body was natural, but, on examining the limb, we found (and this is a point of great importance) that it was as low as 58° of Fahrenheit; in fact it was quite cold. There was also complete loss of sensation from the middle of the thigh to the toes, and though he could rotate the limb slightly, it was, in all other respects, powerless. Here we have paralysis of motion and sensation in one of the extremities, *with remarkable coldness of the limb.* On making an examination along the track of the femoral artery, we found that it was painful on pressure, *without any pulsation*, and conveying to the finger the feel of a piece of hard cord. From a consideration of those circumstances, we came to the conclusion that it was not pervious, and that this would account for the state of the limb. In this case, also, we made another remark, and this, I believe, is the only instance on record in which such a diagnosis was made. Up as high as the groin the pulsation of the femoral artery could not be felt, and we were anxious to ascertain how far farther the disease extended. The state of the femoral artery in the left groin was natural. On making an examination with the stethoscope, we found that the pulsations of the aorta were perceptible down to its bifurcation, but when the stethoscope was applied below this on either side, we observed that there was no pulsation in the right common iliac artery, but on the left side it could be traced distinctly down to the groin. Here, then,

we had a train of phenomena, such as ordinarily occur in paralysis affecting the right lower extremity, and along with this an obstruction to the circulation in the thigh and leg. From these circumstances we made the diagnosis of obstruction of the right iliac and femoral arteries. On dissection, we found that the aorta was healthy to within about six inches of its bifurcation; below this point it was partly filled by a red clot. The left common iliac was healthy, but the right was plugged up with a dark red clot, which extended into the external iliac and obturator arteries, filling up also the femoral and its branches. The case, in fact, was nothing more or less than one of chronic arteritis.

This remarkable form of disease has been also observed by other authors. You will find it well described in Rostan's work on Diseases of the Brain, where he mentions that this loss of sensation and motion in a limb is sometimes produced by obstruction of its vessels. In persons advanced in life, the arteries are also frequently obstructed by the formation of ossific deposits within them, producing loss of power, coldness, and diminution of sensation, as in the foregoing case. A similar effect may occur from the pressure of an adjoining tumour on the trunk of a principal artery.

Paralysis resulting from disease of the arterial system is distinguished from paralysis caused by cerebral disease, by the following marks; first, by the colour of the integuments of the affected limb, which, in a case of the former description, are generally of a violet hue, or of a much deeper tinge than in the latter case, or in a state of health. It is very rare to find the two limbs of the same colour, as we do in cases of cerebral paralysis. Another mark is, that the temperature of the limb is always lower than that of the healthy one; but the distinctive sign of this form of paralysis *is the absence of pulsation in the arteries in parts where it should be naturally observed.* If to this description you join the absence of cerebral symptoms, you will seldom fail in making a correct diagnosis. I have had two cases of this disease under my care; one of them occurred in the upper, the other in the lower extremity, and, from observing the characteristic marks already detailed, I had no difficulty in making the diagnosis. It is to that peculiar form of this disease, which is considered by some authors to depend on ossification of the arteries, that the name of "Pott's gangrene" has been applied. A great deal of light has been thrown on this disease by the researches of modern pathology. It is now pretty well established that we may have this gangrene, not only in old persons from ossification of the arteries, but also in the young from arteritis. In truth, the pathology of Pott's gangrene appears to be one of two changes — either an arteritis or ossification of the arteries themselves; and of these two causes the first is by far the most frequent. You will see at once the importance of this view of the question, for if the gangrene occurs in a young person, and is connected with inflammation of the arteries, it is a disease more or less under the control of medical treatment; but if it be produced by ossification of the arteries, the results of treatment are far less likely to be successful.

We have, then, in a case of paralysis of this description, more or

less loss of sensation and motion, coldness of the limb, and absence of arterial pulsation. With respect to coldness, it may be said that it is of little value as a sign, being frequently observed in cases of cerebral paralysis. To this it may be replied, that though coldness is sometimes present in cases of ordinary paralysis, still it is never so remarkable as in this form of the disease, and the temperature of the limb is but a few degrees below the standard of health. Dr. Abercrombie makes a very interesting conjecture on this subject. He says the temperature of paralysed limbs is generally considered to be lower than that of the healthy ones, and, indeed, such is the case; but the true explanation of this occurrence is, that in this condition the limb loses its power of preserving a medium temperature, and hence it is, that, according to the temperature to which it has been exposed, it becomes hotter or colder than the healthy limb. A case is mentioned, of a medical man who laboured under paralysis of one of the upper extremities. This gentleman, on one occasion, after having applied some warm bran to the paralysed limb, was astonished to find, on touching it with the sound hand, that he could not bear the heat, though he was at the same time unconscious of any increase in the paralytic extremity.

The symptoms, then, of this form of paralysis are, diminution or abolition of sensation and the power of motion, a dark or violet hue of the skin, a remarkable coldness, and absence of pulsation in the arterial trunks which supply the affected limb. These, with a tendency to the formation of gangrene, are the characteristic marks of the disease, and by bearing them in mind you will seldom err in making a diagnosis. In the great majority of cases the disease is confined to one extremity; but Rostan gives some cases in which it was more general. We might also add to the diagnosis, that paralysis connected with disease of the brain often comes on suddenly, while in this case its invasion is slow and gradual. It is, however, true, that some cases of paralysis, depending on this cause, have come on so suddenly as to render this circumstance of less value as a diagnostic.

With respect to the treatment of this form of paralysis, if the patient be young and the disease recognised at an early stage, it is possible that you may be able to arrest it by free local depletion and other antiphlogistic means. In the case which was under treatment in the Meath Hospital, the symptoms had lasted for a considerable time before the disease exhibited any remarkable violence. The man was admitted on the 7th of February, and at this time the disease had been five weeks in existence, having begun at the lower part of the limb, and extended gradually upwards until it involved the whole leg and thigh. Yet it is very probable that this patient might have been saved, if proper means had been taken to arrest the inflammation of the vessels at an early period. Baron Dupuytren has published a case, in which it appeared that this disease was setting in, but was checked at once by bold antiphlogistic treatment directed to the affected limb.

LECTURE CXVII.

PARALYSIS FROM ARTERIAL DISEASE—Singular cases of, by Rostan—Diagnosis of paralysis from arterial obstruction—Magnetism, use and action of—Effect of magnetism in disease—Result of trials in the Meath Hospital—Paraplegia—Mechanical hyperæmia—Occurrence without disease of the cord or vertebræ—Cases by Mr. Stanley—Effects on urine by division of the spinal cord—Ammoniacal urine—Caries of the vertebræ—Diagnosis of paralysis with disease of the kidney—Prognosis in paraplegia—[Dr. Graves's views and cases of paraplegia—A sequence of fever—Means of prevention and cure—Local injury to a nerve causing partial paralysis.]

AT my last lecture I spoke of that form of paralysis which depends on arterial obstruction, and mentioned, as one of the principal diagnostics, a remarkable coldness of the diseased limb. I quoted for you a passage from Dr. Abercrombie's work, in which he suggests that it is probable that the actual condition of paralytic limbs, in the usual acceptation, so far as temperature is concerned, depends upon their having lost that power which animal bodies possess of preserving a medium temperature; so that their temperature becomes elevated or lowered, according to that of the surrounding matter. The general rule in cases of this description is, that the temperature of a paralysed member is a little lower (say two or three degrees) than the rest of the body; but when we find a limb reduced to the temperature of 58°, as in the case I mentioned, it is quite a different thing, and, under such circumstances, the great probability is, that the paralysis is connected with arterial obstruction.

You will see, in Rostan's work on the Softening of the Brain, the reports of two cases of this disease, occurring in patients of extremely advanced age. In one, there was complete paralysis of the right arm, which was cold and livid. The fingers were threatened with gangrene, and no pulsation could be felt in the radial artery. By stimulating frictions, a certain degree of warmth and motion was restored, and it was even thought that pulsation could be perceived. By degrees, the power of the left arm, and of the lower extremities, began to fail, with diminution of the force of the pulsation. On dissection, extensive disease of the arteries was found; the right brachial, at the insertion of the deltoid, was obliterated by a mass of fibrin, below which the vessel was contracted and closed: the left brachial artery was also narrowed, but without any clot; and this condition was farther met with in the crural vessels. The cerebral arteries and the aorta were diseased. In the second case, the patient, aged 80, was attacked with violent pains in the left leg, which became cold and bluish. There was no lesion of intelligence, and the corresponding arm was unaffected. In fifteen days, the pains having augmented, a certain degree of paralysis supervened, which, however, was never complete. On dissection (the disease having lasted a month), the crural artery was found extensively obliterated by a fibrinous clot. Here you observe that notwithstanding the great age of both patients, the disease was not *ossification*, but, in all probability, *arteritis*.

At our last meeting, I forgot to mention the particulars of a case, bearing on this part of the subject, and which goes to prove that even complete coldness of the affected limb is not, in itself, sufficient to establish the diagnosis of paralysis from arterial obstruction. I have had lately under my care a gentleman who has been for the last four or five years labouring under paralysis of the lower extremities, unaccompanied by any symptoms indicating disease of the brain. His intellect remains not only unimpaired, but in a state of high activity; and, what is equally singular, he has had none of the usual symptoms of disease of the vertebræ or spinal cord. His limbs, however, are quite powerless, and are of an *icy coldness;* and yet you will hardly believe me, when I tell you that I have repeatedly felt the femoral, popliteal, and even the anterior tibial arteries, pulsating distinctly. This is a singular fact, but I have verified it by a number of observations. You will perceive, then, that in taking a remarkably diminished temperature as a diagnostic of paralysis from arterial obstruction, we must admit that, as a sign, it is only valuable *when combined with absence of arterial pulsation.* In this case, the fact of such extreme coldness of the lower extremities, at the same time that their circulation continues with undiminished activity, becomes of great importance, as tending to prove that the temperature of the body depends more upon the state of innervation that on arterial action. There are, indeed, many facts which go to prove that animal heat is more closely connected with the nervous system than with the circulating.

I spoke of the employment of electricity and galvanism in the local treatment of paralysis. While on this subject, I shall take an opportunity of briefly drawing your attention to the use of magnetism in certain cases of nervous disease. Here let me be understood, I am not going to lecture on *animal magnetism;* it is, at present, a theme unsuited for the practical physician; no one more firmly disbelieves, no one more thoroughly despises, than I do, the countless absurdities which have emanated from the imaginative disciples of animal magnetism. But, as in almost every human hypothesis there is a fraction of truth, so in the doctrines of animal magnetism there is, perhaps, something which may not be entirely visionary; and it is possible that there may be some modification of the nervous influence, communicable from one person to another: this is one of the doctrines of animal magnetism. Another leading doctrine is, that organs, which are adapted by nature for the discharge of some peculiar function, appear in their magnetised state to take on a new function. Now, without saying that we are to believe in this, or in the extraordinary romances which are given in illustration of it, still it is right to admit the possibility of its occurrence, to a certain degree; because we frequently observe, in pathology, many instances of organs taking on functions, not merely new, but even totally repugnant to our ideas of their structural arrangements. We may, then, I think, without going too far, admit the possibility of a communication of some modification of the nervous influence from one person to another, and that organs under this influence may take on new functions; but, in the present state of this subject, this is as far as we can go.

But we have to deal, at present, with a more tangible and important subject — namely, the action of magnetism, in its proper acceptation, on the human body. You are aware that the term *animal magnetism* was first applied to the results of certain effects on the human system, which were supposed to be brought about by the aid of metallic contact; and you are all acquainted with the history of the metallic tractors. The term *magnetism*, however, is totally inapplicable to the communication of nervous influence from one individual to another; nor have we any grounds for connecting such phenomena with magnetism, in its proper acceptation.

That a magnet should act on the human body, is neither extraordinary nor incredible. You know that electricity, and its modification galvanism, have a powerful influence on the system; and modern researches have shown that there is a close connection, if not an absolute identity, between electricity and magnetism. Now, on this subject of magnetism, the researches of some eminent men have been, latterly, employed, and the results of their labours have been received by some with an undistinguishing credulity, and by others with unphilosophical skepticism. One of the principal things which has prevented medical men from entering on this subject, is that many persons have confounded the results of magnetic action on the human body with the absurdities of animal magnetism and metallic tractors. There is, however, I need not repeat to you, an essential difference between them. In the Meath Hospital I have lately made a number of experiments, with a view to ascertain the effects of a powerful magnet on the human body. The magnet which I used was one of considerable power, being, in its highest state of action, capable of supporting a weight of more than twenty pounds. Now, in almost every instance where this instrument was used, we found that, when brought near to sensible surfaces, phenomena were produced which were very similar, indeed, to those of electricity. These phenomena also appeared in so many cases, and with such a remarkable constancy, that they could not be accounted for by any supposition of accident. We have applied it in cases of rheumatism, sometimes to a healthy part of the body, sometimes to the part affected. In one of these cases, the application of the magnet was followed by a very rapid subsidence of the morbid symptoms, and the patient got well in a few days. Here let me remark that there is no one more opposed than I am to the publication of the result of a single case as a proof of the success of any particular remedy; and in putting forward this case, I do not wish it to be received as an instance of a decided cure of rheumatism by magnetism. The only reason why I quote it, is, because in other cases of rheumatism we had distinct evidence of the influence of the magnet to a greater or less extent. The patient, a stout man, of good constitution and in the prime of life, was brought into the hospital for an attack of rheumatism in the back and left shoulder, which had come on after exposure to wet. The first seizure was three days before admission. When brought in, he had severe pain in the back and shoulder, increased on pressure; he could neither elevate his arm to his head, nor could he bend the head

towards the shoulder, without great difficulty and suffering. The value of this case consists chiefly in this, that except using the magnet there was no other remedy employed; if any other medicinal agency had been used, it would have been difficult to attribute the merit of the cure to magnetism. I applied, in this case, the large magnet to the shoulder, within a short distance from the skin. In about half a minute the patient remarked that he felt a kind of pricking sensation immediately under the magnet; this was succeeded by a feeling of heat in the part, which became increased by continuing the application, while at the same time the pain was sensibly relieved. The sensation of warmth continued in the shoulder for about ten minutes after the magnet had been removed, and the patient declared that he received great benefit from the application. On the following day, the magnet was applied again with precisely the same results; the same thing was done on the third day, when the pain was very much reduced, and the arm became more moveable. On the fourth day, the mobility of the limb was increased, and he could bend his head in the direction of the shoulder with very little inconvenience. On the eighth day, the power of motion was restored, the pain gone, and the patient left the hospital quite well. I have heard nothing of him since; but if he had not experienced permanent relief, it is very probable he would have returned again, for he seemed quite pleased with his treatment. If this was the only case in which the magnet had been employed, it would prove nothing neither for or against its use. It might be said, that the cure, in this instance, was the result of keeping the patient in a warm bed, and that any good supposed to be effected by the magnet, might be attributed to the influence of imagination. But to this it may be answered, that the sensations observed by this patient were *exactly the same as in others*, each having noticed the peculiar pricking sensation in the part to which the magnet was applied, and the subsequent feeling of warmth. Again, it is to be remarked, that although the symptoms in this case were severe, the cure was extremely rapid; and when you recollect the obstinacy of most affections of this kind, you must allow that a week was a very short space of time for its accomplishment.

The following is another equally interesting case. A woman was admitted into Meath Hospital labouring under paralysis of the right side of three weeks' standing. The history of her case was, that she had fallen into a state of mental despondency, after the death of her husband, who was her only support; she then got symptoms of derangement of the stomach, and hypochondriasis, followed by an attack of paralysis, which deprived her of the power of using one side. On examination, we found that, as far as motion was concerned, the paralysis was not complete, but that there was a total loss of sensation in the side affected. It was curious to observe what the effect of the magnet would be, and accordingly applied it to the spine, moving it upwards and downwards along the cervical and dorsal regions, at about half an inch from the surface. After it had been applied for a few seconds, she remarked that she felt a sensation "of wind" passing over the left shoulder, but not over the right. Observe, it

was on the right side of the body that the paralysis existed in this case; and you will also recollect that it was chiefly a paralysis of sensation. Now, it is quite contrary to chances that she should have described it in this way, if she had not really felt it in this situation. The action of the magnet was naturally felt on the left, which was the sensible side, for, on applying it to the opposite or paralysed side, she said she no longer felt the sensation of "the wind." During the operation, she saw the instrument; and if disposed to draw upon her imagination for a description of her sensations, she might say that she felt the aura on the paralysed side; but this was not the case, for she stated that it was no longer perceptible, when the magnet was moved from the sound to the paralysed side. In this case, I must tell you that magnetism was not the sole remedial agent employed, for she had been also leeched and blistered. She was admitted on the 12th of August, and on the 17th of the same month the power of motion in the upper extremity was so much increased, that she could grasp objects with force, and place her hand on the top of her head with facility. On this day, after having applied the magnet, she immediately exclaimed that she felt the wind for the first time over the right shoulder, and, on examination, it was found that sensation, to a certain degree, had returned to the right side; and here you will perceive that the first manifestation of the return of sensibility was denoted by her feeling the magnetic influence in the paralysed side.

I shall not take up your time any longer by detailing cases; it will be sufficient to state, that it was used in many other instances of a similar kind, and in all with the same result. Each patient described the same sensation, with very little variety; in some, it consisted in a feeling of pricking or tingling; in others, of an aura passing over the part. Some stated that they felt a sensation of warmth in the part, some time after the magnet had been applied; and some a kind of suction as if the skin was drawn towards the magnet. When it was applied over a very sensible or a blistered surface, the patient felt the pricking sensation to amount to pain, and the feeling of warmth and suction was proportionally increased. I have also to observe, that it was employed on a set of patients, the majority of whom were totally ignorant of its nature and effects; and yet it is very remarkable that there was an almost universal accordance in their descriptions of the sensation produced. It has been stated by some writers on the subject, that the sensations differ according to the pole of the magnet employed. This statement does not accord with our experience: for in every one of our cases the sensation was the same, whether we made use of one pole or the other. As far as our experience goes, it is, I think, fair to conclude that a very perceptible influence may be produced on the human body by the application of the magnet; it is another matter to ascertain how far it may be rendered available as a therapeutic agent. The cases in which I think it might be employed with advantage, are cases of nervous and spasmodic affections, and muscular rheumatism. That the sensations described by our patients had an actual existence, and were not the result of imagination, I am firmly convinced.

Before I leave the subject of paralysis, I wish to draw your attention to one more form of the disease, by no means uncommon; I allude to that in which *both* the lower extremities are exclusively engaged. This is a disease, or symptom, which may arise from a great number of causes, and be observed under a variety of circumstances. Generally speaking, however, it will, in almost every instance, be found to depend oa some cause which engages the spinal marrow, either primarily or secondarily. I believe that this paraplegia, as the result of disease of the brain, is never met with except in combination with paralysis of the upper extremities. General paralysis may be produced by cerebral disease; and in describing the various forms of paralysis which depend on disease of the brain, this form has been particularly noticed; but when paralysis of the lower extremities *alone* occurs, it is generally the result of some lesion of the spinal marrow, either organic or functional, below the situation in which the brachial nerves are given off. Among the causes by which this paraplegia is produced, the following are the principal; inflammations of the membranous coverings of the spinal cord, with effusion of lymph or serum; spinal apoplexy, ramollissement from inflammation of its substance; pressure on the cord, by solid tumours from a variety of causes; the bursting of abscesses or aneurismal swellings into the vertebral canal, as occurs in some cases of aneurism of the abdominal aorta. Thus, during the progress of a case of this description, it has been observed that the patient suddenly became paraplegic, and, on examination after death, a quantity of blood which escaped from the aneurismal tumour, has been found compressing the spinal marow. Lastly, recent investigations have established the fact, that we may have paralysis of the lower extremities, and yet, on dissection, *we cannot detect any traces of disease of the bones of the vertebral canal, or in the membranes or substance of the spinal cord.* Hence you see how cautious you should be in making the diagnosis, so common among surgeons, of caries of the vertebræ, in cases of paralysis of the lower extremities. The truth is, that in the present state of medicine on this subject, we labour under very great difficulties; the diagnosis of these affections is exceedingly obscure: it is a subject still open to investigation, and I need not remark, that it is one of paramount importance.

Parapalegia is one of the most miserable diseases to which the human body is liable. It is almost always obstinate and unmanageable, and in the majority of cases incurable. How far the fatality of the disease depends upon the want of an accurate diagnosis, and a correct plan of treatment, must be determined by future observations; but it is a fact, that a vast proportion of paraplegic patients die, and under the most melancholy circumstances. In many cases, the formation of gangrenous sores on the back and loins is a common occurrence. For this there are two reasons: first, the vessels of those parts exposed to pressure from position fall into that state which Andral terms *mechanical hyperæmia*, the result of which is that they are unable to unload themselves, a stasis of blood follows; and this leads to mortification of the part; secondly, there is a lesion of innervation. Hence it is, that the great majority of patients of this kind

die with gangrenous sores on the back and loins. They have also most constantly paralysis of the bladder, or its sphincter, or both, producing retention of urine, or retention with incontinence, or stillicidium urinæ. The sphincter ani, too, is generally paralysed, and we have a most melancholy and disgusting source of annoyance. The frequent passing of urine and feces keeps the unfortunate sufferer in a state at once pitiable and loathsome, and when, in addition to his other calamities, the gangrenous sores form, the supervention of low diffused erysipelatous inflammation may prove fatal; or he may be carried off with symptoms of typhous fever, from the absorption of putrid matter.

While on the subject of paraplegia, I am anxious to lay before you a sketch of some important opinions lately put forward by Mr. Stanley, of London. In the last number of the Medico-Chirurgical Transactions, this gentleman has written a most interesting paper, in which he gives the history of several cases of paraplegia, the majority of which were supposed to be examples of caries of the vertebræ, but in which, on dissection, no disease could be discovered, either in the bones of the vertebral canal, or in the membranes or substance of the spinal cord. You will ask, were there no pathological phenomena in these cases? There were; but they belonged not to the spine or its contents, but to an organ in its immediate vicinity — the kidney. From a candid review of Mr. Stanley's cases, there appears to be reason to believe that disease of the kidneys may produce all those symptoms which have been attributed to lesions of the spinal marrow, or caries of the vertebræ. In the four first cases, the symptoms given as of caries of the vertebræ were present, and the cases treated as such. On dissection, no caries, or disease of the cord, could be discovered in any of them, but the kidneys were found to be the seat of extensive disease. The fifth case was a remarkable one; the patient had been admitted for retention of urine, the consequence of severe gonorrhœa, which had been checked by injections. The bladder and sphincter ani became paralytic, and he lost the power of the lower extremities to a certain degree. He also complained of severe pain at the fifth lumbar vertebræ. He distinctly traced the pain from the bladder to the left kidney, and then to the right. Paralysis of motion, and, nearly, completely of sensation of the lower limbs, next supervened, and in about a fortnight he died. On dissection the kidneys were found in a state of inflammatory softening, and with numerous minute depositions of pus. The bladder was inflamed, but the brain and spinal cord were perfectly healthy. In the sixth case, a patient, while in progress of cure of a gonorrhœa with phymosis, was suddenly seized with paraplegia. The functions of the brain were unaffected. He had suffered for a day or two from pain in the loins. Sixteen hours after this attack he suddenly died.

From considering the former cases, Mr. Stanley predicted that inflammation would be found in the kidneys. A slight turgescence of the vessels of the cord, with a little transparent effusion in the theca, were found, but the kidneys were in a state of the most intense engorgement. In this case, it was remarkable that, from the period of the paraplegia, there was an inordinate secretion of urine. The

seventh case was that of a patient who, for two years, had been labouring under pain of the back, increased by pressure, and incontinence of urine. On dissection, there was some vascularity and effusion of the cord, but both the kidneys were almost entirely destroyed by disease. In addition to these, Mr. Stanley mentions four more cases, which were seen by a friend of his, Mr. Hunt, of Dartmouth, which corroborate his opinions.

Here, then, we may have well-marked paraplegia, without any perceptible organic change in the spinal cord, or its investments, but presenting distinct traces of disease of the kidneys. This leads us to observe the very close connection which exists between the kidneys and spinal cord, a connection which has been long recognised by medical practitioners, but only in a limited point of view; for though they were of opinion that disease of the kidneys, and a discharge of ammoniacal urine, were the results of spinal disease, they never seem to have reflected that the reverse of this might happen. It seems now, however, to be almost completely established, that disease of the kidneys may produce symptoms which are referrible to disease of the spine; and Mr. Stanley has the credit of having been the first who directed the attention of the profession to this circumstance, and his paper must be considered as one of the most important, and practically useful, which has appeared for a length of time. You should all peruse it carefully. The fact that disease of the spine will give rise to affections of the kidney, is long known, and has been proved by numerous experiments. Thus, Olliviet details the experiments of a German physiologist, M. Kreimer, who, by dividing the lower part of the spinal cord in animals, made the urine almost immediately ammoniacal. You will also find, in Dr. Prout's work, that an ammoniacal state of the urine may be rapidly brought on by injuries of the back, from falls or bruises on the spine. It is, indeed, singular how quickly those profound functional lesions of the kidneys supervene on injuries of the spine, sometimes appearing in four or five days, sometimes sooner. Medical men have hitherto been in the habit of looking at this matter only in one point of view; they know that disease of the spine will produce disease of the kidneys, and here they stop; but it has been shown that the reverse of this may happen, and that renal disease may produce very remarkable lesions in the functions of the spine. Of this very curious occurrence we have many analogies in pathology. Thus, for instance, in several cases of cerebral disease, but chiefly in hydrocephalus, we have vomiting; here we have functional disease of the stomach depending on an affection of the brain. Take the reverse of this — observe the delirium which attends a case of gastro-enteritis — here you have the functions of the brain deranged in a most remarkable manner, and this produced by sympathy with an inflamed mucous membrane. The truth is, that in the spine and kidney, as well as in various other parts of the system, we have two organs which are so closely connected by sympathy, that disease of one will bring on serous functional lesion of the other.

Observe, then, the great importance of these inquiries. When you meet with a case of paraplegia, you are not at once to conclude

that it depends on disease of the spine, or caries of the vertebræ. You must carefully investigate its history, and ascertain whether it may be referred to either of these causes, or whether it may not rather depend on disease of the kidneys. That it may depend on the latter cause is now established, for the cases are too numerous for us to suppose the complication accidental. You will observe the importance of making an accurate diagnosis, when you consider that this point will most materially influence your treatment. In the one case, your treatment will be directed to the bones and cartilages of the spine; in the next, to the spinal cord itself; and, lastly, to the kidney, a parenchymatous organ, to which there is a great determination of blood. No one will venture to assert that the principles of treatment in each of these cases are the same; and the chances are, that, if you do not make a correct diagnosis, you will practice improperly and without success. I have now seen a number of these cases, but there were only two of this description in which I was fortunate enough to obtain a *post-mortem* examination. I cannot say that my dissection exhibited remarkable disease of the kidneys (they were large and very vascular), but from the many points of resemblance they bore to Mr. Stanley's cases, I was led to conclude, that if they were not examples of actual chronic disease of the kidney, they were cases of lesions of function in the spine, unaccompanied by any organic change to account for the symptoms. I shall briefly detail these cases: the first was that of an unfortunate man from the country, who was discovered by two friends of mine, under peculiar circumstances. While on an excursion, they were requested to visit a poor man who was lying ill at a remote farm-house. They heard he had been labouring under a dropsical affection for a long time, and had been treated for ascites. On arriving at the cottage, they found the man lying in bed, with his abdomen very much enlarged; and, on further investigation, discovered that he was quite paralytic of the lower extremities. On examining the belly more particularly, they found that the swelling was produced, not by ascites, but by *an enormously distended bladder.* He had also, stillicidium urinæ, with paralysis of the bladder; and this having been mistaken, by the medical practitioner who attended him, for suppression of urine, he had prescribed diuretics, and continued this plan of treatment for some weeks, totally overlooking the paralysis of the bladder. As little or nothing could be done for him in the remote situation in which he lived, it was determined to send him up by easy stages to Dublin, and procure him admission at one of the public hospitals. On his arrival, he was received at the Meath Hospital; and, when I visited the wards next day, I found that he was quite paralytic of both lower extremities, that the bladder was in the state above described, and that his health had suffered considerably, and that bed-sores had formed on his back, and were increased by his journey. I prescribed cupping and blistering, which were productive of some slight relief; but in the space of a few days he began to exhibit symptoms of low typhus, as if from the absorption of pus, and sank rapidly. On examining his body, we could not detect any traces of disease in the bones or cartilages of the spine;

neither did the cord, or its membranes, present any marks of organic lesion, except that towards its lower portion, where it begins to spread out into the cauda equina, it was perhaps a little softer than natural. I regret very much that I did not note the circumstances of this case more fully; but, as far as my recollection of it goes, the general features were as I have just mentioned. I had another case, some time since in the Meath Hospital, in which the following circumstances were observed: — The patient, a labouring man, generally employed about the quays, was brought into the hospital with paraplegia of some standing. The first symptom in his case belonged not to the spine, but to the urinary system; he had had an attack of gonorrhœa, for which he had used stimulants and balsams; and, in some weeks after, without any injury to the spine, he lost the use of his lower extremities. During his stay in the hospital, the urine was intensely ammoniacal. On examining his body after death, we could not discover any disease of the bones or spinal marrow. A layer of substance, resembling fat, or organized lymph, was found lying on the theca of the spinal marrow, but it was so very small as to be scarcely sufficient to account for the symptoms. The kidneys were pale, flabby, and without any vascularity, but did not present any marked traces of organic lesion.

Here, then, were two cases which, before the publication of Mr. Stanley's paper, would be considered as examples of organic disease of the spinal cord, or its investments; and yet, on dissection, we can find nothing to establish this opinion; and, in the last one, the first affection was of the urinary system.

Is it possible that a *functional* disease of the urinary system may produce also a *functional* disease of the spinal cord?

With respect to the diagnosis of caries of the spine, I wish to make a few observations. The diagnosis where there is distortion of the spine is extremely easy, but this does not hold where the caries is accompanied by distortion. Let us inquire. Are there any circumstances which would enable us to arrive at the diagnosis of caries without distortion? One symptom, not observed as far as I can see, in paralysis, *connected with disease of the kidney*, is that the patient feels exquisite pain on motion. This is an exceedingly common symptom in caries of the vertebræ, but I am not aware that it occurs in cases where the disease is situated in the kidney, or the spinal cord itself. There is another remarkable circumstance: — When the patient attempts to move, he often feels a cracking sensation in the affected portion of the spine; and this has not only been observed by the patient himself, but is also perceptible to his medical attendants. When this occurs, it may, I think, be looked upon as a diagnostic symptom. The exquisite pain on motion, the tenderness of the spine on pressure, and the crackling sensation, these might be sufficient to make the diagnosis of caries of the vertebræ, even in cases where there was no distortion. But if you had a case of paralysis of motion and sensation of the lower extremities, and if these symptoms came on without any injury of the spine — if there was little or no tenderness on pressure — if the patient felt scarcely any pain in turning or moving, and if he had at the

same time symptoms of disease of the kidney or bladder, and ammoniacal urine — under these circumstances the great probability would be, that it was not a case of caries of the vertebræ, or original disease of the spinal cord, or its investments, but a lesion of function of the spine, connected with organic or functional derangement of the kidneys. It must be acknowledged, however, that the diagnosis of this affection is rather obscure. The circumstances which I have just mentioned, might enable you to get rid of the opinion that it was caries of the vertebræ or organic disease of the spinal cord, and that it was probably such a case as Mr. Stanley has described; and if you could arrive at this diagnosis at an early period of the case, it would be a matter of great importance. By doing this, you would then be aware that you had to deal with an inflammatory affection of a highly vascular organ; you would not be led away from the real state of the case, or waste time in treatment calculated to stimulate the spine, or remove disease of the vertebræ. Your plan would be simple, and your treatment defined, and all your efforts would be directed towards removing the disease of the kidneys. You will easily perceive that diagnosis is here of vast importance; unfortunately it is still involved in obscurity.

The prognosis of cases of paraplegia, when once complete paralysis is established, should be always unfavourable. The fact of paralysis occurring, is sufficient in itself to prove the existence of extensive disease in most cases. There may be, however, some cases susceptible of cure, and this particularly occurs in young females, in whom a perfect cure has been frequently accomplished by the use of stimulant embrocations to the loins. I have seen one case of this kind, in which the patient was paraplegic for a year and a half, cured by the application of hot oil of turpentine over the lower part of the spine. Simple as the treatment may appear in this case, its success was rapid and complete. Mr. Crampton has mentioned to me the particulars of another case, in which the patient's limbs were quite rigid, and could not be moved without great difficulty; in this case, complete relief was obtained by applying Pearson's liniment over the lower part of the spine. This liniment produced powerful counter-irritation, and an eruption of bullæ over the body, which were speedily followed by relief. The patient is now in the enjoyment of perfect health; and since the period of her cure, which is now better than six years ago, has had no return of the disease.

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[In confirmation of the occasional origin of paraplegia from visceral disease, as stated in the preceding lecture, the following facts are added: Dr. Graves (*Clinical Lectures*) relates the case of a man who had, consequent on exposure to cold, wet and fatigue, become affected with pain and weakness of the lower extremities. During the time his legs and back were getting weak, he was obliged to pass water about three times in an hour, which he did with pain and tenesmus. At the time of his admission into the hospital, he appeared somewhat broken down in his general health; he was pale, emaciated, and laboured under derangement of his digestive organs. He suffered from occasional chills, succeeded by heats and sweating, which oc-

curred at irregular periods; he, also, laboured under micturition, dysuria, and the stream of urine was much diminished. The pain in his back was very severe, and he lost the use of his limbs, but not completely, for he could support himself, and even walk a little, with the aid of two sticks.

His treatment was as follows: — First, cupping over the loins, then moxæ in the same situation; attention to his digestive organs, diluents and opiates for the urethral symptoms. On the tenth day after his admission, a very close stricture was found to exist in the membranous portion of the urethra. A small cat-gut bougie of double length was introduced, so that one-half of it projected from the meatus; over this was slided a small gum-elastic catheter of ordinary length, and open at each end, until it traversed the stricture, and reached the bladder; the cat-gut bougie was then withdrawn, and the gum-elastic catheter secured. A little constitutional disturbance followed, but soon subsided, and in a few days gum-elastic catheters of a much increased size were introduced with facility.

"*A very remarkable amendment took place in his back and lower extremities, in a very few days after the first introduction of the instrument: in fact it was almost sudden.* Warm baths, friction to his limbs, &c., completed his cure." He was discharged on the 25th February (admission on the 16th January), at which time the power of his lower limbs was perfectly restored, and the symptoms affecting the urinary system had disappeared. This case was reported to Dr. Graves by Dr. Hutton, under whose care the patient was placed. It proves, as Dr. G. remarks, "that urethral irritation may, as well as inflammation of the kidneys, give rise to paraplegia." This man had gonorrhœa, followed by gleet, from which he recovered five years before his attack of paraplegia.

Several examples have been witnessed by Dr. Graves of more or less complete loss of power of the lower extremities, supervening on inflammation of the gastro-intestinal mucous surface.

Paraplegia sometimes occurs during the course of a fever. Here, as Dr. Graves remarks, the other sufferings of the patient, and his general debility, attract our notice so exclusively, that the paralysis entirely escapes notice until convalescence is established — until, in fact, the patient wishes to support himself on his legs. He then finds, much to his surprise, that his limbs yields under him. This appears to him the more extraordinary on account of his having recovered a good deal of strength in his upper extremities. Mr. Carmichael has seen several cases of paraplegia following the remittent gastric fever of children, totally unconnected with spinal disease. Such an occurrence is most usual in children of a scrofulous temperament, and s seldom, Dr. Graves thinks, remedied either by time or medicine. A remarkable exception to this unfavourable prognosis has recently occurred in a young patient of mine, aged nine years. This boy, who is of a scrofulous habit, has had bad health from infancy; at first bowel complaints, long and exhausting, then bronchial disease, also protracted and harassing, and enlarged tonsils. To these succeeded a posterior curvature of the first dorsal vertebræ; and about ten months ago an inability to walk well and a leaning to one side. He

was subjected at this time to regular treatment — a horizontal posture, counter-irritation along the spine, and took the iodide of iron and laxatives internally. Ere long he lost the use of his lower limbs entirely, and continued thus helpless throughout the winter — with, at times, a partial stoppage of urine, and alternately involuntary discharges of feces and constipation. During this period a scrofulous tumour appeared on the left side of his neck, which eventually suppurated, and has continued to discharge up to the present date (June). Another but smaller tumour on the opposite side soon reached the suppurative stage, some time after the other was emptied, and has left a small opening, from which oozes out a fluid. In the early part of the spring this boy recovered the use of his limbs so as to be able to perform the movements of flexion and extension in bed or on a sofa; and since then, and for about two months past, is able to stand with the aid of some support. That of which he chiefly makes use is the spine-cart, in which he now walks with tolerable ease. In addition to the other symptoms the patient had, during much of the winter, a troublesome cough and hectic with night sweats. His chief and almost sole medicine, which he has taken for some months past, is the sulphate of quinia, and occasionally an alkaline mixture with a little laudanum for his cough, which is now much better, and the hectic has in a great measure disappeared. After the cessation of the use of irritating ointments, and of blisters applied to the spine, the external treatment for a long time past, and anterior to the restoration of muscular power of the lower limbs, has been friction with a flannel, and sometimes the hand, and rubbing in of the common volatile or soap liniment on the spine and lower limbs.

The preceding account was written in 1842; at the present time (1844), this boy is in tolerable health — goes to school, and enjoys the sports of his age. But he is deformed by spinal curvature — projecting sternum, &c.

Without adopting, in all their entireness, the opinions of Dr. Graves, we ought to imitate his practice more frequently than we do, by employing appropriate measures for the relief of the pain in the back, which is so common in the beginning of fever. "When headache is the prominent feature of the first stage of fever, how few will omit bleeding, leeching, cupping, cold or hot applications, &c. When, on the contrary, the lumbar spinal marrow is the seat of the congestion, how generally do practitioners neglect the application of topical bleeding and other appropriate remedies. Were such neglect of less frequent occurrence, it is probable that paraplegia after fever would not probably be met with."

Partial paralysis, as that of a limb, sometimes ensues on irritation transmitted from some part of the surface. Thus, in a case of erysipelas of the calf and inside of the right leg, described by Dr. Graves, which yielded to appropriate treatment, there was for some time a loss of power of motion in the affected limb. Sometimes the reverse happens, and pressure, as of the head on the arm in sleeping, has been followed by a palsy of the limb of several years' duration; and in another case a fall on the hip and trochanter produced a permanently paralytic state of the left lower extremity. No

injury of the spine could be detected, and there was no numbness, pain, or formication, in the affected limb.

In the views of treatment of paraplegia supervening on visceral disease laid down by Dr. Graves, I fully coincide. He says that he has never seen any benefit derived from applications to the spine, and that the application of blisters or issues over the back or loins does not appear to be productive of the least good effect. He is in the habit of applying his local remedies to the legs and thighs, selecting those parts in which the greatest sensibility exists. Confirmatory of the propriety of this course is a circumstance which occurred in the case of my little patient whose case I have already described. At a time when he was completely paraplegic and unable to move either of his lower limbs except by grasping one or other of them with his hands, and dragging it up a little from the bed, moderate friction of the skin of the lower part of the leg would often be followed by a regular but involuntary contraction of the muscles both of the leg and thigh, so that the knee was partially bent, and the thigh partially flexed on the pelvis. This fact encouraged me to urge a continuance of the frictions, which had been before regularly practised, of the feet and legs.

Dr. Graves generally keeps up a succession of blisters along the inside of the legs, and over the anterior and inner part of the thighs, aided by the use of liniments of a stimulating kind, applied to the cutaneous surface of these parts. The two internal remedies on which he relies most, are strychnia and sulphur; the former of these he continues until some sensible effect on the system is produced; when he omits its farther use and has recourse to the exhibition of sulphur in the form of an electuary. Much, also, will be accomplished by the external use of sulphur, and of course sulphur water, and hence cases of paraplegia have been materially benefited by the external use, combined with drinking them, of the waters of Harrogate, Baréges, &c., and of our own White Sulphur in Virginia. — B.]

LECTURE CXVIII.

Paralysis, sudden, from abscess of the brain—Curious case of paralysis without effusion—Previous symptoms of—Demonstration of the cellular tissue of the brain—Compressibility of the brain—Inaccuracy of the opinions of Drs. Abercrombie and Clutterbuck—Pathological states—Arachnitis without delirium—Traumatic apoplexy—Case of paralysis of the portio dura—Peculiar appearance of the affected side of the face—Use of the electro-puncturation—Bad effects from—Mechanical support of the paralysed parts—Neuroses, active and passive—General pathology of—Principles of diagnosis—Case of neuralgic liver—Neurosis from moral causes.

Before I leave the subject of organic affections of the brain, I wish to exhibit a few preparations illustrative of some of the principal diseases dwelt on in the preceding lectures. You will recollect that, in a former lecture, I alluded particularly to the question, how far, we are able to judge of the existence of apoplectic effusion, by the *sudden* occurrence of an attack of paralysis. I endeavoured then

to impress upon you that we may have sudden paralysis from other causes, as well as apoplectic effusion, and stated that there were numerous cases of sudden paralysis, with disorganization of the brain, on record, depending, not on apoplectic effusion, but on circumscribed abscess of the brain; and that, consequently, the diagnosis of apoplectic effusion from *suddenness* of attack was only valuable when it came on unpreceded by symptoms of local disease of the brain. I alluded to a remarkable case of aneurism of the arteria innominata, in which the patient, soon after the date of his admission into the hospital, had become suddenly hemiplegic. This was a case in which one would be led to expect an effusion of blood into the brain, as the circulation of the head was evidently impeded by the pressure of the aneurismal tumour on the great veins, and as there was a remarkable distension of the jugular and other superficial veins. Of the existence of the aneurism there was not the slightest doubt; the tumour could be felt pulsating below and above the clavicle on the right side, compressing the trachea, so as to cause stridulous breathing, and producing a varicose state of the veins of the neck by its pressure. We accordingly made the diagnosis of aneurism of the arch of the aorta, or of the arteria innominata. In this case two circumstances — the sudden paralysis of one side, and the obstruction to the circulation of the neck and head — would, as I have said before, lead to the supposition of an apoplectic effusion. On dissection, however, the paralysis was found to depend, not on this circumstance, but on the existence of a circumscribed abscess in the anterior part of the opposite hemisphere of the brain. I have the pleasure of exhibiting to you to-day this interesting and important preparation. It is too large to send round, but you can all inspect it after lecture. Here is the aorta from its commencement at the left ventricle — here is the enormous aneurism of the arteria innominata compressing the trachea — so that it has not only pushed it far to the left side, but it has flattened it in such a manner as to produce a curious alteration in the appearance of its musculo-membranous structure. The terminations of the rings of the trachea are brought close together, and the muscular parts are folded in between them. There is another circumstance here deserving of your notice: the right carotid, you see, is obliterated; it is interesting to connect this fact with the absence of true apoplectic effusion. The case altogether is a curious one, and presents two remarkable circumstances — great mechanical obstruction to the venous circulation of the head, and sudden paralysis *without effusion*. It is, however, to be remarked, that in this case, though the paralysis was sudden and unexpected, it was preceded by some symptoms of local disease of the brain. The patient had pain in the head and limbs of one side, accompanied by a sense of formication. These symptoms were remarked some days before the attack of paralysis, but their importance was not at that time thoroughly estimated, in consequence of a greater share of attention being directed to the aneurismal disease.

In this bottle, you have a specimen of that species of ramollissement which supervenes on local inflammation of the brain. We

have every reason, I think, to believe that when this disease occurs in the young, or in the adult, it is the result of an active inflammatory process; and that softening of the brain has in it nothing more specific or peculiar than softening of the liver or lungs from acute inflammation. Here, you see, is the disease — an irregular cavity filled with broken up cerebral matter, somewhat resembling cream in appearance and consistence. I may remark here, that it is in cases of this description that we are able to demonstrate the existence of the cellular membrane of the brain. This cellular membrane is extremely fine and delicate — so much so, indeed, that some anatomists of high authority have asserted that the brain possessed no interstitial cellular tissue. This preparation, however, gives a proof of the great light which pathology frequently throws on obscure points of anatomy and physiology; for, though the interstitial cellular tissue cannot be seen in the sound brain, we are able, in the preparation before us, to demonstrate its existence with certainty. It is, however, to be observed, that it is only in recent cases of ramollissement that this phenomenon can be examined with advantage; for, in those of long standing, the cellular membrane shares in the general destruction, more or less, and gives way. But if you get a case where the softening is recent, and then take the softened portion of the brain and expose it to the dropping of a filter, you will find that the soft cerebral matter will be gradually washed away, leaving behind it a delicate tissue; and in this way you can prove the existence of cellular membrane in the substance of the brain, like that of other parenchymatous organs.

Here is a specimen of apoplectic effusion: see how extensively the substance of the brain has been torn; the cavity formed in this way is, you will perceive, filled up with a large clot. Now, there is one consideration which strikes us at once, in looking at an effusion of this kind into the substance of the brain, whatever may be its situation or extent — and this is, *that the brain must be a very compressible organ.* Here we see the brain torn, a cavity of large size formed, and this completely filled with blood. Now, it is obvious that the rest of the brain must give way, in order to give room for the formation of this cavity. If, then, it be true that the brain is compressible, so far as to admit of the formation of a large cavity, it necessarily follows that, contrary to the opinion of Drs. Abercrombie and Clutterbuck, the quantity of blood in the brain may vary, and be greater at one time than another. These authors think that the quantity of blood circulating in the brain never varies, but here you will perceive, we have a remarkable cavity; and it is plain that the rest of the brain must have yielded before it could be formed; and it follows, as a natural inference, that the brain must be compressible, and that, consequently, the quantity of blood contained may vary at different times. It may be argued against this, that the illustrative proof in this case is derived from a pathological condition, and that, under such circumstances, the brain has room for the formation of a cavity, by the emptying of some of its vessels. Here, it is urged, is a cavity, but the emptying of the vessels of the brain compensate for it; thus room is found, and there is no in-

crease in the quantity of blood circulating in the brain. This, however, I look upon as a mere *petitio principii;* nor have we any reason to think, that in a case of apoplectic effusion, there is any corresponding emptying of the vessels, for dissection almost always shows a surcharged state of all the vessels. The result, then, in my opinion is, that the brain is compressible, and may admit a larger quantity of blood at one time than it does at another. On this subject I advise you to consult Dr. Mackintosh's work on the *Practice of Physic*, and also the review of Dr. Clutterbuck's *Essay on Apoplexy*, in the London Cyclopædia of Practical Medicine, as given in the Dublin Medical Journal, vol. ii.

Here is another specimen. You see the brain, with a small clot in its substance about the size of a hazlenut. The patient in this case did not die suddenly; the clot has nearly lost the appearance of blood, and the processes of absorption were going on. I have got here another preparation illustrative of this effect on one of those effusions. I told you, in a former lecture, that in these cases one of two things occurred; either the clot was wholly absorbed, and a serous cyst left in its place, or it was not absorbed, and became to a certain extent organized; and that this might be the history of many of the anomalous tumours we meet with in the brain. Here is a clot fully as large as a walnut, in which no absorption has taken place, and you perceive it has been converted into a mass of a dense solid texture. You can easily conceive that the brain, having a clot of such a texture in its substance, could not easily recover its functions, and that the paralysis would be persistent. Here is another large apoplectic effusion, in which a certain degree of change has been produced; the clot, you see, has lost a good deal of its colour, and is not so red as in its recent state. Here is an excellent specimen of circumscribed abscess of the brain in the centre of one of the hemispheres. In this you can, to a certain degree, demonstrate the cellular membrane of the substance of the brain; but, if the preparation had been manipulated in the way I have mentioned, I have no doubt that it would exhibit it much better — that is, provided the abscess was of recent occurrence. If it should happen to be of long standing, the cellular membrane generally gives way, and you have nothing but a cavity filled with softened matter. This large preparation exhibits an enormous effusion on the surface of one of the hemispheres of the brain; it was the result of an injury of the head, and was accompanied by paralysis of the opposite side. It furnishes an example of what has been termed traumatic apoplexy. The other preparations on the table do not apply so immediately to the illustration of apoplectic effusions, and I shall pass them over.

Here is a preparation which I would draw your attention to, as it belongs to a very remarkable case. I mentioned before, that, in certain cases of arachnitis, where the disease was chiefly situated at the base of the brain, it had been observed that there was seldom delirium. In this case the patient complained of pain along the base of the skull, which occasionally remitted and then returned with violence, and it was at first supposed to be neuralgic. He continued in this state for some time, having a recurrence of violent pain in

the ear, temporal and mastoid regions, which lasted for several days; when, all of a sudden, without any preceding delirium, he became comatose, and died shortly afterwards. On dissection, the arachnoid covering of the brain was found to be in a state of extensive disease over the inferior surface of the anterior lobe, and towards the posterior part of the base of the brain. Here we had a case of extensive and fatal arachnitis, with total absence of delirium.

When speaking of the employment of galvano-puncturation in the local treatment of paralytic affections, I stated that the case in which the most decided benefit was observed occurred in paralysis of one side of the face, apparently unconnected with actual disease of the brain, and of a local nature. This is in accordance with what has been observed with respect to the efficacy of all local measures employed in the treatment of paralysis; and, accordingly, the more the affection is purely of the nerves of the part, the more satisfactory should be the results of galvanism. I shall read for you the notes of this case, and I am happy to have it in my power to lay before you two excellent drawings of the patient's appearance before and after the use of the galvanic battery, from the pencil of my friend, Mr. Berthon.

"A bricklayer, named T. Hogan, got an attack of erysipelas of one side of the face, accompanied by a feeling of pain and stiffness between the angle of the jaw and mastoid process of the right side. This was followed by an attack of paralysis of the right side of the face, and he presented himself for admission at the Meath Hospital in the following state: — The features at the right side of the face are blank, unmeaning, and motionless, while those of the left side retain their natural cast, except that their lines are more strongly marked, and the angle of the mouth is drawn upwards and towards the left side to a considerable extent. The skin of the right side of the forehead is smooth, that of the left furrowed and puckered. The lids of the right eye are half closed, and he has not the power of moving the upper one. When desired to close his eyelids, the eyeball rolls upwards, and the transparent cornea is carried behind the curtain of the upper lid. By this movement the patient excluded all objects, and was under the impression that he had shut his eye. The lower lid hangs down, and is partly everted, exposing the conjunctiva, and allowing the tears to trickle down the cheek. When he breathes, the right cheek is puffed out; it becomes still more distended by an attempt at blowing; and, when attempting to drink, a quantity of the fluid escapes at the right angle of the mouth. On being requested to draw the right angle of the mouth towards the corresponding ear, not the slightest movement was made, except by the muscles of the opposite side. In masticating his food, the morsel gets between the cheek and gum of the right side, and he is obliged to put in his finger to dislodge it. Sensation on the paralysed side is unimpaired, and there is no deafness, alteration of taste, or loss of vision. With respect to the muscular functions of the tongue, they appear to have suffered no injury, and he can direct it with facility to either side. Here was a fact to show that the paralysis of the face in this instance had no connexion

with cerebral disease. In the majority of cases of paralysis of one side of the face, from diseases of the brain, there is lesion of motion of the tongue, but here it was in its natural condition. There is a slight degree of thickness of speech, which can be remedied by supporting the paralysed cheek with the palm of his hand. He complains of a feeling of stiffness in the jaws, and cannot open his mouth more than what would be capable of admitting a teaspoon. He has had some tenderness over the mastoid process. He can press hard substances with his teeth; and the temporal, pterygoid, and masseter muscles seem to be as strong on the paralysed as they are on the sound side. He can move the lower jaw so as to incline the symphysis to either side, but more to the left than to the right. His general health is good, and his bowels regular." I shall hand round the drawings of this case for your inspection. You will observe the peculiar appearance of the left side of the face, with the mouth drawn upwards, and the skin of the nose and forehead thrown into deep wrinkles. There can be no doubt that the exciting cause of the paralysis in this instance was connected with the erysipelas of the face. He had no symptoms of any cerebral affection, and the paralysis was limited to those muscles which are supplied by the seventh pair of nerves. The tongue was quite unimpaired in its motions, and there was no lesion of taste, hearing, or smell. It was, in fact, a case of purely local paralysis, and bore a decided analogy to those cases which have been so accurately described by Sir Charles Bell as depending on an affection of the seventh pair of nerves.

The treatment of this case was in accordance with the views already detailed; the diagnosis was paralysis of the seventh nerve, and the treatment founded on this diagnosis proved eminently successful. The first thing done was to apply a few leeches to the ramus of the jaw; we then used stimulating applications, and he used for some time the liniment, camphoræ compos. with extract of belladonna. After this he was put on strychnine, which did him some good; but there was so great a susceptibility of its action that we were ultimately obliged to give it up. The last remedy employed was electro-puncturation, under the use of which he improved rapidly. On the 5th of March, the galvanic battery was first applied; the needles at that time were inserted — one in front of the ear, and the other near the symphysis of the chin; subsequently they were inserted in various parts of the right side of the face, following the different branches of the portio dura. On the first application of the galvanic influence, he had spasmodic twitches of the paralysed muscles, and soon afterwards he began to complain of a burning sensation in the cheek and pain in the head. Here, it would appear that headache was the result of the proximity of the stimulus to the brain. On the 11th, the symptoms were nearly the same, and his general health continued to improve. On the 15th, the application of the galvanic influence was followed by severe headache, which lasted for half an hour. On the 19th, his appearance was much improved, and the galvanic battery was not used. On the 20th, it was again applied, and in an hour afterwards he had rigors and slight headache. On the 21st, after using the battery, he had

rigors again, followed by headache and a pricking sensation in the cheek. On the 24th, he left the hospital in a remarkably improved state. Expression had returned to the side of the face which had been previously unmeaning and blank; the furrows which had deformed the opposite side were removed, the thickness of speech diminished, and the paralysis of the buccinator had been so far relieved that he was able to manage soft articles of food without being under the necessity of removing them from between the cheek and gum with his finger. In this case we employed an adjuvant which should be mentioned; we supported the paralysed parts for some days with strips of adhesive plaster, to restore the position of the mouth. This was done on the principle recommended by Dr. Pemberton, in the treatment of paralysis of the forearm and hand from painters' colic. By applying strips of plaster near the angle of the mouth, and drawing them back and fixing them behind the ear, we endeavoured to counteract the preponderating antagonism of the muscles of the opposite side. For the report of this case, I am indebted to Mr. K. Ellison, of Liverpool, who had the charge of the patient in the Meath Hospital, a gentleman whose talents are only equalled by his untiring zeal in the study of pathological medicine.

The foregoing case is interesting in two points of view; first, as to its peculiar phenomena, and, in the next place, as to the success of local treatment. It also shows that we may go too far with electro-puncturation, particularly when it is applied to parts which are situated close to the brain. You recollect that, in Mr. Hamilton's case of amaurosis, three pairs of plates were capable of producing a degree of stunning and insensibility which lasted for some time. In this case the rigors and headache showed that the galvanic fluid had a powerful effect, and would lead us to be cautious in using it too freely, where the parts to which it is to be applied are situated in the vicinity of the brain.

We have now taken a very brief sketch of some of the most important organic affections of the brain; but, in the study of disease, we constantly meet with a vast number of cases presenting the most exraordinary nervous phenomena, and yet we are unable to discover, by the closest pathological investigation, any appreciable lesion of the nerves, spinal cord, or brain. These are the class of diseases which have received the name of *neuroses*. We find, in most of these affections, a remarkable alteration in the nervous functions without any perceptible or constant organic change; we find, too, that this alteration may be connected with an exaltation or a depression of the nervous power; and from this circumstance results the division of neurotic affections into active and passive — active where the nervous power is elevated, and passive where it is depressed. The spasms which accompany an attack of flatulent colic, the exquisite pain of tic douloureux, and the wild intellectual exaltation of mania, are examples of active neuroses. A patient in the second stage of painters' colic will have paralysis of motion and sensation of the forearm; there is here an obliteration, or at least a diminution, of the nervous function, and the disease furnishes us with an example of passive neurosis.

Of these two classes the active are certainly the most interesting in many points of view. We find, under the class of active neuroses, some of the most extraordinary diseases to which the human body is subject; all the different varieties of spasmodic affections — chorea, epilepsy, tetanus, hydrophobia, tic douloureux, hysteria, and a host of others, come under this denomination. It is a melancholy reflection, then, that, in the present state of medical science, we are not only ignorant of the ultimate cause of most of these diseases, but even of the causes of the variation in their phenomena.

You will recollect that, in a former lecture, I threw out a conjecture on this point, and stated that there might be changes of an organic nature connected with these affections, not appreciable by any mode of investigation at present known: and that it was possible that there might be a change in the nervous substance, quite independent of any addition or subtraction from the component sum of their organic molecules, but in all probability connected with a new and different arrangement of these molecules. The analogy in this instance, is drawn from chemistry, and, I think, may obtain here, as well as in the phenomena of Isomerism in inorganic bodies. You are aware that many bodies, which seem to present exactly the same component elements, are found to be extremely different in their properties, and that this difference has been accounted for by supposing that it depends, not on any addition or subtraction of the component molecules, but on *some difference in their mode of arrangement.* Now, if this happens in the case of inorganic bodies, there is no reason why it might not also occur in organic substances; and, if so, we may understand why a state of the brain and nerves, which appears to us to be normal and healthy, may still be essentially different, and give rise to the most extraordinary phenomena.

I shall not detain you with any further remarks on this subject — it is too obscure to be treated of in a course of lectures on the practice of medicine; let us turn to the consideration of the actual state of our knowledge on the subject of nervous affections. In the first place, we know that in the neuroses there is no change discoverable which could account for the symptoms; and that, if we examine the nervous centres to explain the phenomena of paralysis in one instance, of epilepsy in another, of mania in a third, of hydrophobia in a fourth, and so on, the minute investigations will not, in the majority of cases, point out any deviation from the healthy condition sufficient to account for the phenomena. We find, too, not only that the state of the brain does not present any constant difference in the foregoing diseases, but also that there is often not the sligetest trace of anything like inflammatory action — a fact borne out by the most extensive experience — and showing that treatment which would relieve ordinary cases of inflammation of the brain will here prove useless. There is one curious circumstance connected with these neuroses which you should be aware of, and this is — where the patient, after suffering from a nervous affection for a long time, dies, you may find organic disease on dissection; but here there appears reason to believe that organic changes of the cerebro-spinal centres, taken in the proper

acceptation of the term, *are, in reality, the result of some state of these centres which existed previous to the attack, and was the cause of all the nervous phenomena.* We arrive at this conclusion, for two reasons: first, because such changes are by no means constant; and secondly, because they are only found where disease has been for a long time in existence.

Nervous phenomena, independent of organic lesion, have been divided into two classes — namely, neuroses of the nerves of animal, and neuroses of the nerves of organic, life. With respect to animal life, or the life of relation, we may have its neurotic affections of an active or passive kind; we may have pains, spasms, and exaltation of intellect, under the active form: under the passive, we may have extinction of muscular motion, sense, and the intellectual functions — the life of the individual being still preserved. With respect to the system of organic life, it would appear that, if we are to speak in general terms, we must admit that there is no passive paralysis of the nerves of organic life, they being liable to the active neuroses alone — for a passive neurosis of the ganglionic system implies death; yet, to a *certain degree*, as I have formerly stated, such a passive neurosis might exist in the visceral nerves. But we may have the phenomena of the active neuroses in all parts of the body, whether muscular or visceral. It is a singular fact, that in some visceral diseases we have signs of high exaltation of the nervous functions of the parts, in others not. Why is this the case? I think it must chiefly depend on the mode or degree of excitability of the brain, which is very different in different persons. There is no known organic difference between the gastritis with delirium, and the gastritis of a man in his senses: nor is there any difference between the hepatitis of a man of bilious, and the hepatitis of a man of nervous temperament: and we have, in order to explain the variety of the symptoms, to refer to some original conformation or mode of excitability of the sentient centre. Whether this difference depends on an original organization, or on excess or deficiency of parts, or on phenomena similar to those of Isomerism, we know not. As the result of experience, we are forced to admit that these phenomena have no necessary connection with the inflammation of the suffering part, or of the brain; and this proposition applies to the great majority of cases which are called nervous. Experience has also proved the truth of this from the results of treatment — for it has proved that the most successful treatment is that which is by no means calculated to remove inflammation (in its ordinary acceptation), either from the brain or from the suffering parts. The progress and duration of these cases, also, tend to prove the same thing; for, if we were to measure the degree of inflammation by the amount of pain suffered, it would be of an intense character and rapid fatality; and yet we find that, notwithstanding the violence of the symptoms, these diseases may go on for a number of years.

It is quite plain, then, that the pathological condition of a neurosis is not inflammation. Now, one of the most common mistakes in the practice of medicine is the taking these neuroses for cases of local inflammation; and this, I need not tell you, is frequently productive of most distressing consequences. There is one point connected

with those violent nervous attacks which leads to a persistence in this error; and this is, that local antiphlogistic treatment gives temporary relief, although, in the majority of instances, this is of very brief duration, and the pain and other symptoms return, leaving the patient worse than he was before. From the fact of temporary alleviation following depleting means, however, the idea of inflammation gets into the practitioner's mind, and the patient himself is favourably disposed to that plan of treatment from which he has obtained a momentary relief. The consequence is, that a system of general and local depletion is continued, until a period arrives when the nervous excitability gets to an alarming height. Now, is there any circumstance, or class of circumstances, which would lead to the diagnosis of these affections? I feel certain that in many instances this must be a matter of some difficulty. By a careful study of the symptoms, however, you will, in most cases, be able to arrive at the truth. The first thing to which I would direct your attention, in studying the diagnosis of such cases, is *the extreme violence of the pain.* Now, this intensity of suffering seldom occurs in cases of inflammation; and it is a curious fact, that the most painful diseases are the non-inflammatory. The agonies of a patient labouring under neuralgia of the liver, or of the left side, or under tic douloureux, are dreadful; the pain is far more intense than in any case of inflammation: and yet, notwithstanding all this excess and persistence of suffering, we do not see that the duration of life is necessarily curtailed. In the next place, you will observe that these attacks frequently recur, and that, though long-continued and violent, they do not affect the patient's life, which would not be the case if they were connected with inflammatory action. If you add to all these circumstances a knowledge of the constitution, temperament, and habits of the patient, you will have still clearer notions. But there are other circumstances besides these to guide you. In the majority of cases, you will find that all the local and general signs of inflammation, with the exception of pain, are absent. A female labouring under neuralgia of the liver, will have frightful pains in the right hypochondrium, and yet, if you examine her, you find that she has little or no hepatic derangement, no tumour in the region of the liver, no derangement of the digestive system, and (though the disease has lasted for years) no dropsy, and in many cases no appearance of jaundice. She has no fever, thirst, or loss of appetite; her tongue is clean, her complexion clear, her stools natural, and her pulse soft. All these circumstances tend to show that, however violent the pain may be, it has no connection with inflammation. You will be assisted further in your diagnosis, by finding that the access and cessation of these attacks are equally sudden and unexpected — two characters which do not belong to organic diseases. The quick supervention and sudden cessation of these diseases should lead you to suspect that they were not inflammatory. It may happen, in cases of inflammation, that pain may come on suddenly, and as rapidly cease; but, though it may come and go in a brief space of time, still you will find that lesion of function or structure remains. Thus, in a case of pleuro-pneumonia, the pain

of the side may cease suddenly under treatment; but the stethoscope informs you that the layers of the pleura do not as yet glide freely on each other, and that there is some obstruction still to the free passage of air into the air vesicles. There is also another point. When we come to inquire into the exciting causes of these neuroses, we observe that they are most generally found to depend upon various circumstances connected with improper nutrition and with moral influences. Of these two classes of causes, the latter, though perhaps not the most numerous, are by far the most remarkable. A violent neurosis may be brought on in a single instant by moral causes. A nervous female, in apparent good health, may, from a sudden fright or fit of passion, get an instantaneous attack of neuralgia of the liver, and be thrown into a state of intolerable agony. Lastly, you will be greatly assisted in these cases by a knowledge of their history and *previous treatment*. What you will generally find is, that the patient has gone through a long and harassing course of general antiphlogistic treatment. The failure of this treatment will be of great value in guiding you to a correct diagnosis; and you will be further confirmed in this view of the case, by finding that the treatment which has the power of relieving or curing consists in improving the state of the whole system by the use of tonic, and, in many cases, of stimulant remedies. These observations will apply to almost all cases of purely nervous affections.

LECTURE CXIX.

NEURALGIC AFFECTIONS—Principles of treatment of—Connection with organic disease—Neuralgia of the liver—Treatment—Hemicrania—Treatment—Use of iron, quinine, and opium—Endermic method of using opium—Tic douloureux—Opinions of Sir C. Bell—Remarkable case related by—Inflammation of frontal sinuses—Violent symptoms—Mr. Crampton's treatment—Affections of the fifth and seventh nerves in cases of cerebral disease—Neuralgia of the side—Researches of Lombard and Brande on the effect of nitrate of silver—Injury to the skin.

TO-DAY I purpose to speak of some of the general principles connected with the treatment of neuralgic affections; and here I beg leave to remind you, that we mean by neuralgic affections an exaltation of the nervous sensibility independent, *quoad* its production, of any organic disease *which we can detect* in the nerves, brain, or spinal cord. There is no proposition better proved than this, that the phenomena of nervous affections are not the same as those of inflammatory diseases; everything tends to prove it, whether we look to the history and symptoms of the case, the results of treatment, or the appearances seen on dissection.

As the nervous system is diffused all over the body, and as there is no part of the system which does not, under certain circumstances, exhibit indications of sensibility, it follows that we may have neuralgic pains in any of the component tissues. Still it is remarkable, that neuralgic affections are much more frequent in some parts than in others; and we find that, of all parts of the nervous system, the superficial nerves are those which are most commonly affected. With

respect to the nervous affections of the viscera, we know very little as to their exact seat, but it has been generally observed that the pain is situated in the situations of the plexuses of the great sympathetic.

In entering upon the principles which should regulate the treatment of neuralgic diseases, I have to remark that they are but slightly modified by their situation; in fact it may be stated generally that the same principles of treatment apply, no matter where the disease may be situated. But are we to consider this subject as totally apart and having no connection with the occurrence of inflammatory or organic disease? If we did so, we should get but a limited and erroneous view of the matter. I have told you before, that in long-continued cases of functional disease organic alterations were very apt to take place. The reverse of this proposition also is true, that organic affections may precede an attack of nervous symptoms; in other words, you may have cases presenting, at first, phenomena, amenable to antiphlogistic treatment, and yet a period will arrive when new symptoms occur, and this mode of treatment will be no longer applicable. This is of importance in the practice of medicine, for if, in such a case, you persevere in the use of depleting measures, you will effect nothing towards the removal of distressing symptoms, and may do your patient's constitution much injury. A common example of this is, where a person receives some local injury, as, for instance, a blow on the cheek. This is followed by all the symptoms of inflammation, as pain, swelling, heat, redness, &c. Well, then, you have a case of local inflammation to deal with, and you must treat it as such. But a period may arrive, when, the heat, swelling and other symptoms of an inflammatory affection subsiding, the pain alone continues. Here the pain may be purely nervous; and if you were to go on leeching, purging, and depleting your patient, you would not only lose your time, but in all probability do mischief. Here, as in many other cases, we have local inflammation followed by an active neurosis. You remember, when speaking of hepatitis, I remarked that many persons were subject to pains in the regions of the liver, *independent of any known organic disease.* I also drew your attention to the fact, that after the symptoms of hepatitis are removed, the pain sometimes continues, having no longer any connection with organic disease, and taking on the character of a neurosis. You will see of what importance this is when you reflect on the mischief done to such patients by persevering in bleeding, blistering, and the use of mercury, when the disease is amenable, not to this, but to a plan of treatment calculated to remove the neuralgia of the liver. It is the same thing with regard to the mammæ, injuries of which are frequently followed by severe neuralgic affections. In the case of the heart, it sometimes happens that, after an attack of pericarditis, the patient will be subject to pain in that region, which may continue for years. Dr. Bright gives a very remarkable case of neuralgia which supervened on the disappearance of a cutaneous affection. All these facts tend to show, *that the mere pre-existence of local inflammation in any individual case does not prove that the pain is not neuralgic*, and hence it is plain that in such a case it might be improper to persevere in the treatment used for local inflam-

mation. This persisting in the taking of a neuralgic pain for the continuance of inflammatory or organic disease is a common error, and often productive of the most frightful consequences. Without a careful consideration of such cases, you will fall constantly into error. Never forget that, although neuralgia may be the first and sole affection, yet that it is often combined with organic disease, which it may precede, accompany, or follow.

One of the most common forms of neuralgia which you will meet with in private practice, is what has been termed *hemicrania*, the chief symptom of which is violent pain on one side of the head and face. The symptoms are exceedingly violent; there is a high degree of exaltation in the sensibility of the surface of the face; the eye is exquisitely sensible to light, and the ear to sound. The patient is very much prostrated, and his spirits depressed, and the slightest cause is sufficient to bring on an attack of pain. In some cases the pain is constant, in some remittent, in others intermittent. The sensibility is deranged only at one side of the head and face; and the pain seldom extends beyond the median line. As far as we know of this affection, it seems to depend on some morbid state, either of the sentient extremities of the fifth nerve, or of that portion of the brain which receives its impressions.

In cases of hemicrania we may have symptoms existing elsewhere, and this leads us to the consideration of the exciting causes. These will be often found to depend on deranged digestion. Here the irritation is reflected through the sympathetic system to the brain and sentient branches of the fifth pair, for there exists between these two nerves a very close and remarkable sympathy. Thus we frequently observe, that tic douloureux, as well as hemicrania, are the result of some injury or irritation of those parts to which the ganglionic nerves are distributed. In treating a case of hemicrania, then, you must inquire whether there be any visceral irritation present, and remove it as soon as possible. You must also carefully inspect the teeth and gums, for a carious tooth or a diseased gum will prove the exciting cause of an attack. I have seen many cases of hemicrania where the patient was subjected to a variety of treatment without success, and where complete relief was obtained by the simple process of extracting a carious tooth. It is a very curious fact, that in those instances the pain was referred, not to the diseased tooth, but to the whole surface of the face. Cases of this kind are given in which the pain lasted for many years, resisting every form of treatment, and were afterwards cured by the extraction of a decayed tooth. There is one circumstance in these cases which is very apt to mislead, and this is, that the pain is often not referred to the tooth; and relief, to a certain extent, is obtained by the use of narcotics and carbonate of iron. This, however, should not lead you to think that the disease has no connection with the state of the tooth and gum; and this fact is illustrative of a most important principle, viz., *that temporary relief by a purely anti-neuralgic treatment does not prove that no organic origin exists.* How often has hysteria depended on local disease, and the practitioner been misled by the temporary relief afforded by antispasmodics. I have seen the

most melancholy examples of this, and I have more than once been misled myself.

With respect to the remedies most generally employed in the treatment of hemicrania, they are chiefly preparations of arsenic, iron, sulphate of quinine, and opium. Of these, the recently precipitated carbonate of iron appears to be the best; indeed its success is frequently heroic. In proof of this you will find several very interesting cases detailed by Mr. Hutchinson in his excellent work. The best way of giving it is to combine it with an aromatic and a laxative; a small quantity of the pulv. cinnamomi comp., a few grains of rhubarb, and fifteen grains or a scruple of the carbonate of iron, will form a powder which may be given two or three times a day with advantage. It has been asserted, that the carbonate of iron is suited for fixed, and not for intermittent, cases of neuralgia; I have found the contrary to be the fact. I had lately a lady under my care, who, in attempting to remove some furniture, received an injury by striking her cheek against a chest. She was treated for six weeks with purgatives, local bleeding, and mercury; the swelling, heat, and redness of the part went off, but the pain remained, being regularly intermittent, and occasionally very severe. This lady was perfectly cured by a tonic regimen, and the carbonate of iron, in scruple doses, three times a day. The sulphate of quinine has been proposed as being peculiarly adapted for intermittent cases; it will sometimes succeed, but I have known several cases where it completely failed. I grant that the character of intermission would naturally induce a practitioner to have recourse to it, but I have known so many instances of its failure, in purely intermittent neuralgia, that I gave a decided preference to the carbonate of iron; I recollect the case of a gentleman who for six weeks had daily attacks of terrible hemicrania. When the attack came on he was obliged to remain perfectly motionless, the tears streaming from the eye of the affected side, the ear was exquisitely sensible to the slightest sounds, and he remained in a state of intolerable suffering for some hours. For the space of six weeks he took quinine *in enormous doses* without any improvement, and was ultimately obliged to give it up as useless. I have seen the same result in a great many cases, and as far as my experience goes, I would not place much reliance on quinine, even where the attack was of a purely intermittent character. I have seen some cases, indeed, where it has done good, and you may try it; but if, after three or four full doses, you find there is no improvement; you may be almost sure that it will prove useless. When it succeeds, one of the first effects produced by it is to put back the paroxysm for an hour or two, just as occurs when it is successfully given in a case of ague. But I feel certain, that if it is likely to succeed, its beneficial effects will be seen in the course of a few days, and to persist for weeks in using it is not only unnecessary but improper. In the very remarkable case to which I have just alluded, the gentleman, after having tried quinine without the slightest improvement for six weeks, was suddenly and completely relieved by a full dose of opium. At night, on retiring to rest, he took a strong opiate, awoke in the morning refreshed and free from pain, and has continued from that time to the

present (a period of ten years) without any symptoms of hemicrania. Dr. Mackintosh says that the sedative solution of opium, or the acetate of morphia, are the best remedies for this disease he is acquainted with, and that he has seen many cases where they succeeded, after everything else had failed. You may also employ in such cases the external use of narcotics with great advantage, of which one of the best is the extract of belladonna. If you prescribe a liniment composed of a drachm of the extract of belladonna with an ounce of the compound camphor liniment, you will have a powerful remedy, and one which, when applied to the surface of the affected parts, will often produce a great relief. I have sometimes used the acetate of morphia in the endermic mode, by putting on a small blister, and leaving it on until vesication was produced, when the raised cuticle was cut away with a pair of fine scissors, and the surface dressed with an ointment composed of a drachm of lard, and from a grain to a grain and a half of the acetate of morphia. I remember two cases of intermittent hemicrania which yielded to this treatment. You will also frequently derive benefit from the internal use of stramonium and belladonna. There are many other remedies used for this purpose, but I shall not detain you any longer on this part of the subject; it will be sufficient to remark that the carbonate of iron, sulphate of quinine, and opium, externally and internally, are the remedies on which the most reliance is to be placed.

We have now to consider one of the most painful affections to which man is subject. This affection has been generally considered under two points of view, either as functional or organic. The functional, as far as we can judge of it, appears to be a pure neurosis; in the organ it is supposed that the disease is connected with an organic affection of some part of the brain; of these the first kind is that most commonly met with in practice.

Tic douloureux is one of the most melancholy and harassing affections to which the human frame is liable; in some instances the poor sufferer, after having lived for years in a state of exquisite misery, is at last worn out by the intensity and persistence of his agonies. Such was the fate of the late celebrated but unfortunate Dr. Pemberton. A great deal of light has been thrown on the nature of this affection by the researches of Sir Charles Bell. He seems to have succeeded in establishing several points connected with the nature and seat of this affection, one of the most important of which is, that the seat of this disease is in the sentient branches of the fifth pair of nerves, and not, as it has been supposed, in the portio dura. He has shown pretty clearly that the portio dura is the nerve which regulates the muscular motions of the face, producing all those modifications of features which we call expression, and also peculiar motions or changes connected with certain states of respiration; in a word, that it is the expressive and respiratory nerve of the face. It is, according to him, never the seat of tic douloureux, and the practice of dividing it for this complaint is as unscientific as unsuccessful. The division of the portio dura in such cases, not only fails to give relief, but also entails disgrace on the practitioner, and disfigurement and misery on the patient. *Its effect*

is paralysis of the muscles of one side of the face, and great distortion, without the slightest relief. Yet it is a melancholy fact that such operations have been performed. Sir C. Bell's researches, however, have put an end to this malpractice, for he has shown that the fifth nerve is that which supplies the face with sensation, and that it is in its branches the disease is situated. We are then, I think, to look upon this disease as a neurosis situated in the expansions of the facial branches of the fifth pair of nerves. Sir C. Bell relates a very remarkable case, in which the patient had suffered from a series of dreadful attacks, the pain coming on in violent paroxysms. From the accounts given by this patient, and from personal observation, he says that one could trace with anatomical precision the course and direction of the branches of the fifth nerve, for, on the recurrence of an attack of pain, he applied his fingers to his face, and made pressure on the foramina, where the different branches of the fifth nerve issue. Having done this, he would press the nerves with all his force, and remain in a fixed posture while the paroxysm continued.

Sir Charles Bell's idea with respect to the cause of this disease, is, that it generally depends on some visceral irritation reflected through the sentient branches of the fifth pair of nerves.

I have told you that this disease is one of the most melancholy affections to which man is subject, it is also one of the most obstinate. A vast number of remedies have been employed or proposed for its treatment, and this affords an illustration of the fact, that the more incurable a disease is, the more extensive is the list of its remedies. A few only are deserving of attention, and these I have already mentioned when speaking of hemicrania, namely, the preparations of arsenic, iron and quinine, and opium. Where these fail after a full trial, Dr. Bright looks upon the case as hopeless. Narcotics in every form and of every description have been employed, both externally, and internally, but to all these the same remark applies; many of these remedies will give temporary relief, and the physician will flatter himself on the prospect of a favourable termination, but in a short time he is annoyed at finding that the disease has returned and left the patient as bad as ever. Many a time have I seen a poor sufferer excited by hope on receiving temporary alleviation from the use of arsenic or iron, and sinking into despair when he found that his torturing malady returned, and that the remedies which on the first trial gave relief, on the second proved useless. The general principles which should guide you in your treatment are, first, to investigate carefully whether any visceral irritation exists, and remove it as far as possible, taking care at the same time to improve the general state of the patient's health; and the next thing is to allay the sensibility of the nerves of the part, and avoid all exciting causes. In certain cases this disease appears to be connected with an affection of the brain, and this seems to be an explanation of the fact before mentioned, that, in some cases, where all specific treatment had completely failed, relief had been obtained by shaving the head and applying ice to the scalp during the paroxysms. I have already mentioned to you a case in which this

mode of treatment proved eminently successful. This is a curious fact, and one which, being of practical importance, you should hold in memory.

We have a form of disease consisting of violent paroxysms of pain, apparently nervous, and in which no doubt the branches of the fifth pair of nerves are engaged; it is generally found to depend on a local cause, being connected with some disease of the bones of the face or skull, and bears a close analogy to tic douloureux. I have now witnessed several instances of this disease; in some cases it is produced by a carious tooth, in others by disease of the maxillary bones, and I have observed it to occur in one case of abscess of the antrum. The same thing has been observed by Dr. Bright, who gives a case in which the extraction of one of the bicuspids was followed by a gush of matter from the antrum and complete relief of the violent pain. I have also seen cases in which this affection appeared to be the result of disease of the lining membrane of the frontal sinus; of this also Dr. Bright gives an example. The case I witnessed was that of a lady who got a dreadful attack resembling hemicrania, in consequence of being exposed to cold shortly after leaving a warm climate. She suffered the most violent agonies for some time, until one day she had a discharge of purulent matter from the nostrils, which was almost immediately followed by relief. This has recurred at intervals since that period, the pain ceasing when the discharge comes on, and returning when the discharge goes away. The pain is most intense, and situated in the direction of the frontal sinus, and running down along the side of the face; it is constant, and without any intermissions, returns upon the occurrence of any cause which checks the discharge, and is sometimes so excessive as to render her quite frantic. Whenever an attack comes on she applies a number of leeches over the frontal sinus, then warm fomentations, and this has the effect of bringing on the discharge and giving relief. In a conversation which I had with Mr. Crampton on this case, he stated to me that he had met with two similar ones, and that he had succeeded in accomplishing a perfect cure by inserting a large caustic issue over the top of the head. I accordingly advised my patient to have the same thing done. She has since that time left the country; but previous to her departure I certainly observed an improvement in her symptoms, and the principle of treatment appears to be perfectly rational.

This leads us to consider some affections of the sentient and motor branches of the fifth pair of nerves, in which the disease is connected with an affection of the brain. A very interesting and important case bearing on this point is given by Sir Charles Bell, which I shall briefly relate. The patient, a lady, had remarked, that for twelve months before the case began to assume a serious character, she felt an unusual sensation on the tip of the tongue, towards the left side, as if it had been burned. This sensation gradually extended over the whole of the left half of the tongue, the left half of the palate, gums, and face, accompanied by an almost total loss of proper sensation in the parts affected. The sensation of heat and uneasiness was increased by the least motion of the face, the application of her hand,

and other trifling causes. This case was communicated to Sir Charles Bell by Dr. Whiting, under whose care it was. She had paralysis of the buccinator of the affected side, and the morsels of food had to be removed on that side with the finger, so that she was obliged to perform mastication with the opposite jaw alone. The motions of the face, however, were properly performed, showing that the functions of the superficial branches of the portio dura were unimpaired, and the temporal and masseter muscles continued in their natural state. Her general health also was pretty good, and she complained of nothing but the affection of the side of the face, tongue, and palate, and the impossibility of masticating her food with comfort on the left side, in consequence of the state of the buccinator. Some time afterwards, while engaged in eating, she found that a new train of symptoms were in progress; her face became distorted by the retraction of the mouth to one side, the masseter and temporal muscles of the left side ceased to act, the tongue became protruded, with its tip directed to the left side, hearing ceased on the same side, she had some difficulty in performing the motions of the eye, and the eyeball began to waste and diminish. About a month before her death she became quite stupid, and spoke very distinctly. She died after the disease had continued for two years.

Here was a case, presenting in the first instance symptoms of a nervous affection of the left side of the face, tongue, and palate, unaccompanied at that time by any paralysis of the muscles of the face. About a year afterwards, however, she began to exhibit symptoms of paralysis of that side affecting those muscles which are supplied by the branches of the portio dura and fifth nerve. Expression was now lost, the temporal and masseter muscles ceased to act, the mouth was drawn to one side, and the tongue protruded. In addition to this the sense of hearing on one side was lost, and the globe of the eye began to waste. On dissection, it was found that a tumour, appearing to be a morbid growth from the left crus cerebri, about the size of a pigeon's-egg, and containing some fluid, was situated over the left temporal bone. This production was partly cellular and partly membranous. But the most interesting part of the case was the examination of the state of the nerves. The first and second nerves were undisturbed, and so was the fourth. The third was slightly displaced; but it was on the fifth that the principal impression seemed to have been made, for it was flattened, thin, and wasted, as if from the direct pressure of the tumour. The sixth nerve was uninjured. The seventh was involved and lost in the tumour, from within a quarter of an inch of its origin as far as the meatus auditorius internus. Here is a drawing of the case; here is the fifth nerve flattened and wasted, and here is the seventh involved in the tumour.

Mr. Stanley gives a case very similar to the foregoing, of which I shall give you an abstract. The patient had hemiplegia of the left side, without loss of sensation in the affected arm or leg, but in the left side of the face there was a complete loss of sensation and motion. The loss of sensation and motion in this case would argue that there was an injury of the seventh nerve as well as the fifth.

The mucous membrane of the left nostril was red, and there was opacity and disorganization of the cornea of the left eye, with total loss of hearing on the same side. The patient died some time after the paralytic symptoms were established. On dissection, a tumour was found lying close to the *tuber annulare*, and compressing the fifth and seventh nerve.

Here was a case in which there was hemiplegia of one side, and complete loss of motion and sensation in the corresponding half of the face, with an erysipelatous redness of the nostril, inflammation of the conjunctiva, and disorganization of the cornea. It is a curious fact, that in cases where the sentient branches of the fifth nerve, which are distributed to the face, become affected, the eye is frequently disorganised. The cause of this appears to be that the eye, under such circumstances, loses the sensibility of its external surface, which is supplied by the branches of the fifth pair, and is consequently left in a state in which it can no longer protect itself from external injuries. In a case of this description which came under the notice of Mr. Crampton, the finger could be rubbed over the eyeball without giving the patient any pain, and there was chronic inflammation of the conjunctiva.

The principles which should guide us in the treatment of neuralgic affections of other parts of the body are the same as those which have been laid down in speaking of the neuralgic affections of the face. You will often meet with affections of this nature in females: they are situated generally in the right or left side, and are frequently, I regret to say, mistaken for cases of local inflammation. I have already dwelt on the disastrous consequences of mistaking a neuralgia of the liver for hepatitis, and showed the mischievous consequences of treating it with purgatives, leeching, blistering, and mercury. There is an analogous affection of the left side, which has frequently been mistaken for disease of the heart, and treated accordingly. It is most commonly observed in females of a nervous habit. To this affection the same principles will apply as to hepatic neuralgia; by regulating the patient's general health, prescribing a mild nutritious diet, giving up all antiphlogistic measures, and the judicious employment of tonics and narcotics, you will be able to effect a cure.

It has been lately proposed to use the nitrate of silver in the treatment of cases of this description, from its success in epilepsy. A very interesting memoir on this subject has been recently transmitted to me from Paris by Dr. Lombard, in which he dwells on the utility of the nitrate of silver in several nervous affections. Some persons, but in particular the disciples of the physiological school, think that nitrate of silver relieves cerebro-spinal irritation by creating a new irritation elsewhere; that its efficacy consists in its causing a revulsion of the gastro-intestinal mucous membrane; and that thus we cure an epilepsy by substituting a gastritis. In proof of this they bring forward cases where a chronic gastritis was found to supervene on the removal of an epilepsy by this remedy. This, however, is by no means a fair or logical deduction. The epilepsy might have been preceded and produced by the chronic gastritis, though

the symptoms of the latter were not recognised, owing to the existence of other symptoms of a more prominent and striking character. The gastritis might have had a priority of existence, and might have been the cause of the epilepsy; the epilepsy might be cured, and the patient die afterwards with symptoms of chronic gastritis. This shows you how cautious you should be in receiving, on medical subjects, the *post hoc ergo propter hoc* argument. This mode of explanation of the cure of one irritation by the substitution of another, sprung from the denial of all specificism, in disease and its remedies, by the school of Broussais, one of the greatest errors of the "*physiological doctrine.*" The use of mercury in syphilis, of bark in ague, and many other instances, have been quoted against it. If in these diseases there be nothing but local irritation, why does not ordinary antiphlogistic treatment always suffice for their removal? Why is it that mercury is the best revulsive in syphilis? The specific character appears under this view, as well as under any other. The term specific may be objectionable as not being precise, but we use it for want of a better, and it rather expresses what the disease is not than what it is.

There is another and a more rational objection to the employment of nitrate of silver; namely, that it has produced a blackening or discoloration of the skin. This, in my opinion, is an objection which will always weigh against the use of the remedy, for there are few who would like to encounter the risk and consequent blame of such an event. It has not been proved that nitrate of silver has cured epilepsy by superinducing gastritis, but it has been proved that it may blacken the skin. Dr. Lombard admits that this may and does occur, but he thinks the frequency of its occurrence much overrated, and states that in the majority of his cases it did not happen at all. He mentions a very interesting fact connected with this subject. It has been supposed that exposure of the skin to the influence of sunlight during the use of the nitrate of silver is the cause of the blackening. Now Dr. Lombard says that this cannot be the case, for one-half of his patients were peasants who worked in the open air, and never took the slightest precaution against exposure to the sun's rays; and yet, among them all, there was no instance of discoloration. He is of opinion, therefore, that the influence of the sun's rays should not be taken into account in a case of blackening of the skin; and this appears to be confirmed by the fact, that in all cases where the nitrate of silver produced discoloration, the patients were inhabitants of towns, and consequently less liable to exposure. This blackening of the skin, though a rare circumstance, will, as long as we are ignorant of the causes which produce it, and the means of controlling them, be a great obstacle to the internal use of nitrate of silver. I have used this remedy in cases of epilepsy and other diseases, and cannot say much for it; in the hands of some of my friends, however, it has been much more successful. Dr. Lombard thinks very highly of its value. In some cases in which he prescribed it a perfect cure followed, in others more or less relief. He give some cases of facial neuralgia, in which it appears to have produced a cure. He has also prescribed it with success in epilepsy and chorea.

There is one fact, which appears to show that the cause of the blackening of the skin is connected with something else besides the influence of the solar rays, which I had almost forgotten. In a late number of the *Quarterly Journal of the Medical Sciences*, Mr. Brande gives an account of some experiments he made on the bodies of persons who were tinged by the nitrate of silver. He found on examination *that the deep-seated parts were tinged as well as the superficial*, and was able to detect the oxide of silver in the bones, and even in the substance of the viscera, as well as in the skin. If this be the case, we cannot attribute the discoloration to the solar rays, though it generally happens that the face appears to be darker than other parts of the body in persons who have undergone this change of colour. The fact, however, that in Dr. Lombard's cases the peasant escaped while the citizen became tinged, and Mr. Brande's discovery that the deep-seated parts are equally liable to discoloration, furnish a weighty objection to the opinion that the blackening of the cuticle is produced by the decomposing power of the sun's rays.

LECTURE CXX.

DR. BELL.

NEURALGIA—Appropriateness of the term—This disease may be caused by inflammation of the sheath—Origin of neuralgia sometimes in the nervous centres—Change in the state of the nerves themselves and in their extremities—*Diagnosis* of neuralgia—Nerves and regions chiefly affected with neuralgia—the fifth pair and the dorsal and sacral nerves—Varieties of neuralgia specified—Dorso-intercostal neuralgia mistaken for irritation of the spinal cord—Its seat, symptoms, and diagnosis—Lumbar neuralgia—Crural neuralgia—Femoro-popliteal neuralgia, or sciatica—Membranous, ganglionic, and visceral neuralgia—*Treatment* of neuralgia.

NEURALGIA is a term of modern origin, for which we are indebted to Chaussier; and a better one could not be framed, since it simply expresses a fact (pain of, or in a nerve), the chief feature in the case, without its being connected with or derived from any hypothesis. The occasional changes by injection, thickening, and effusions of the neurilema of a nerve affected with neuralgia, show that the disease may be of an inflammatory nature; but in many, and perhaps a majority of cases, there is no structural lesion evident. The chief seats of neuralgia are in the first and second branches of the fifth, in the sensitive portions of the dorsal nerves, and of the par vagum, and in the sciatic nerve. A distinction has been drawn between neuralgia of the nerves of animal and that of the nerves of organic life, in the paroxysmal returns of the former coming on in the latter part of the day or in the evening, and those of the latter early in the morning. But an exception to this rule is presented in the history of twenty-two cases of frontal neuralgia reported by Dr. Rennes, in which the attacks for the most part were in the morning, and in sixteen of dorsal neuralgia by Dr. Valleix, which came on in the day as well as in the night.

In attempting to ascertain the seat of neuralgia we are not to regard

the part pained as that in which the primary nervous lesion exists. This latter may be at the sentient and percipient centre, in the medulla oblongata and brain, as in the instance of pain still referred to a limb which had been long before removed by amputation, or strongly felt in a particular nerve during a dream, or induced during the waking state by strong mental emotion. All the causes which influence powerfully the nervous centres, such as great atmospherical mutations, moral affections, intellectual labour, prolonged watching, a habit of body peculiarly sensitive and nervous, may give rise to neuralgia. Bearing this fact in mind we are the less surprised at the occurrence of intense pain along the course of a nerve whose structure is perfect, whilst, at other times, a manifest and great laceration of a nerve is productive of slight and scarcely painful sensation. Connected with this general condition of the nervous system, not measured by anatomical change or lesion, is the greater predisposition to neuralgia at particular periods of life more than others; the two extremes of life, infancy and old age, being in a measure exempt. Although the general proposition be admitted, that neuralgia may depend on certain unappreciable modifications of the nervous centres, — we must not stop here in our inquiries, but proceed to note the vital and organic changes in the nerves themselves. Organic and hygienic causes may act directly on a nervous cord, increase its sensitive property, or continuedly work on its sensibility, and give rise to neuralgia. We generally find that the superficial or subcutaneous nerves are most subject to this disease. Persons who by their calling are habitually exposed to the effects of cold and humidity, such as fishermen, sailors, inhabitants of marshy countries, the workers in certain manufactories, are very liable to neuralgia: — half, that is fashionably, dressed females often suffer in the same way from the same cause. Physical and mechanical causes, by which nerves are compressed, stretched, or pricked; organic changes by tubercles or neuromæ developed in their tissue, inflammations of the neurilema or in the substance of a nerve, making part of or situated in the neighbourhood of an inflamed organ, may also all, severally, give rise to neuralgia. Of this last nature are the facial neuralgiæ which so often accompany extensive inflammation of the pituitary membrane, and the sympathetic pains resulting from a phlegmasia of the kidneys, uterus, and testicle.

The extremities of nerves may be so impressed as to give rise to neuralgia—continued pressure of a boot or shoe, which is too short, on the end of the great toe, will cause this disease. Of a similar nature is the neuralgia depending on a carious tooth and inflamed gum; although this is a case which ought, perhaps, to be regarded as neurotis, or inflammation of a nerve, rather than neuralgia. There are other cases in which inflammation of the gum, as well as organic changes of the tooth, had long ceased, and yet the pain still continues, and constitute often one of the most troublesome facial neuralgias, or tic douloureux. Even here the influence of the nervous centre is every now and then powerfully and instantaneously manifested, as when the protracted and racking pain of toothache disappears with the arrival, or announcement of the arrival, of a dentist, who comes to extract the decayed tooth.

The *diagnosis* of neuralgia, although laid down by some writers with great precision, is not quite so easy as would appear from their showing. Periodicity or paroxysmal recurrence at irregular intervals, relief by pressure and friction, absence of heat, redness, and tumefaction, and occasionally even a sensation of coldness in the part affected, are the common symptoms of neuralgia, whether this disease attacks the organs of animal or of organic life. Thus, one almost instinctively presses the abdomen in neuralgia of the stomach and intestines, or in *gastralgia* and *enteralgia*—whereas, if neurotis, or other phlegmasia be present, the least degree of pressure cannot be borne. The same difference is often observable in facial neuralgia. But, on the other hand, we see at times cases in which the slightest touch, or even the jar communicated by shaking the bed or sofa on which the patient lies, gives the most violent pain. Writers are not careful enough to separate neurotis from neuralgia, nor in fact is it easy to do so, combined as these two states are in certain cases of recognised neuralgia. Thus, Dr. Elliotson says, neuralgia is very inflammatory, so that the surface is tender, hot, swollen, and even red. If the absence of pain on pressure were to be received as diagnostic of neuralgia, we should have to exclude from this class that large variety depending on or connected with spinal irritation, in which augmented sensibility of the parts supplied by the affected nerve is one of the most constant symptoms.

Mention has been made already of the nerves chiefly affected with neuralgia. I will just add a rapid sketch of the chief varieties of the disease, in reference to the regions affected and the organs which are the greatest sufferers. The nervous centres themselves, at least the sentient part of them, may be the seat of neuralgia, the pains of which are felt at the surface and envelopes of the brain and spinal marrow, rather than in the substance of the organs themselves. In this respect there is an analogy to what takes place in the neuralgia of a nervous cord, the symptoms of which are felt at the extremity or expansion of the nerve on the surface of the organ. Cephalalgia, therefore, which we use instead of *cerebralgia*, may, like neuralgia of the cords and their extremities of the nerves, be dependent on or associated either with simple irritation or phlogosis—an important consideration which it behoves us to bear in mind in practice. In *delirium tremens* and certain other varieties of cerebral disease, there is more *cerebralgia* than cerebritis, and we ought not to be misled by pain, and exaltation and disturbance of function under such circumstances, so far as to take them for unequivocal symptoms of inflammation. Opium and narcotics, if our diagnosis be a correct one, would take precedence over, and be substituted for the lancet, leeches, and purging. I might, did space permit, illustrate this proposition by describing the phenomena of *myelalgia*, and show that these were manifested at a distance from the medulla spinalis, sometimes by exquisite tenderness of the skin of one or more limbs, and of the muscles of particular regions, sometimes by subsequent irregularity of movement consequent on morbid sensation, as in certain changes of the voice, spasms of the œsophagus, convulsive cough, dyspnœa, vomiting, colics, and cramps. Most of the neuralgic affections, however, which have been attributed

to a morbid state of a part of the spinal cord, proceed, as I shall have occasion soon to show, from the spinal nerves, and particularly the intercostal. In all these affections of the cord or its nerves, the neuralgia so far predominates over neurotis, that we shall often find counter-irritation and anodynes suffice for entire relief without having had recourse to sanguineous depletion.

The *neuralgiæ of the encephalo-spinal nerves* are mainly the *facial*, *intercostal*, *lumbar*, and *sacral*. The first or facial includes a great variety of pains in different parts of the face, in the course of the branches and sometimes twigs of the trigeminal or fifth pair. I shall notice the chief of these, but must premise that, more frequently, the pain is met with in the three branches of the nerve on one side, than in any one or two of its branches. Pain on pressure corresponds, in the majority of cases, with the pain complained of by the patient in the course of the nerve—1, the *frontal* or *supra-orbitar*, the pains of which, beginning at the supra-orbitar foramen, extend to the upper eyelid and eyebrow, and the corresponding side of the forehead and face, following all the nervous ramifications and anastomoses of the orbito-frontal nerve. Sometimes the pain is fixed on the nasal arch and frontal sinus, or on the ramifications of the nerve over the globe of the eye, constituting in the first place a *coryza*, and in the second *ophthalmodynia*, or an eye painful, watery, and intolerant of light, with commonly some tenderness of the conjunctiva. Frontal neuralgia is usually intermittent, and sometimes merely remittent,—the paroxysm coming on daily in the evening, lasting a part of the night, and disappearing towards morning and during the day. At other times, and particularly where the neuralgia is either associated with disease of the chylopoietic viscera, or is brought on by the common causes of intermittent fevers, the paroxysm is in the morning. Dr. Rennes (*Eclectic Journal of Medicine*, 1836-'7, from the *Archives Générales*, June, 1836) describes thirty-two cases of the disease depending on atmospherical vicissitudes, and occurring in a rural district, and at the same time with influenza, which were of this nature.

2. *Sub-orbitar Neuralgia.*—This kind is described by writers under the names of *prosapalgia* and *odontalgia*. As its title indicates, it affects the sub-orbitar branch or superior maxillary of the fifth or trifacial nerve. The pain radiating from the sub-orbitar foramen, is sometimes continued in the line of the muscular branches of the face, sometimes in that of the deeper seated or dental branch, and extends in the first instance to the lower eyelid, the internal angle of the eye, the cheek, the *ala nasi;* and in the second, to the maxillary sinus, the palate, uvula, base of the tongue, and often to the whole side of the face, following the anastomoses of the fifth with the ramifications of the portio dura of the same side. In this case the pain is apt to be accompanied by convulsive twitchings of the lower eylid, cheeks, and upper lip:—the arteries of the affected side beat with more force, but not, as has been commonly asserted, with more frequency: the veins are more dilated, and sometimes we see all the symptoms of a true fluxion, such as redness of the eyes and face, tumefaction of the eyelids, and an abundant excretion of tears and nasal mucus.

This variety of neuralgia exhibits the intermittent type; sometimes it is remittent; but in either case its paroxysmal returns are in the evening. At times the neuralgia is confined to a single twig of the superior maxillary branch, and hence the names given to each of these sub-varieties of *sub-orbito-nasal*, *labial*, *palpebral*, and *dental*.

3. *Maxillary Neuralgia.* — In this variety the pain follows the course of the inferior maxillary branch of the trifacial or fifth nerve, and consequently extends not only from the superior mental foramen to the alveoli, lower teeth, sides of the tongue and to the chin, but also may be irradiated over the cheeks, temples, and the external and anterior portion of the ear, by following the anastomoses of the nerve with the ramifications of the portio dura in this region. The right side is somewhat more frequently affected than the left. This neuralgia is less evidently periodical than those already described, but like them may be sometimes accompanied by partial convulsions and deformity of the mouth and eyelids. Facial neuralgia, complicated with muscular contractions, though less painful, is generally more obstinate than simple neuralgia. To these sudden and jerking movements, as it were, of the muscles, the term *tic* has been applied, and the sensations accompanying it caused it to be qualified with the epithet *douloureux*, or painful. These twitchings are met with in a small proportion of facial neuralgiæ. When the neuralgia affects chiefly the alveoli and roots of the teeth, it simulates closely toothache — the more readily, because a carious tooth will give rise to both diseases, which may also, notwithstanding the persistence of the cause, be periodical, and yield to remedies directed against periodicity.

Facial neuralgia rarely makes its attack suddenly; it is often intermittent, and I have seen it alternate occasionally with lumbar neuralgia. Commonly it is most apt to occur when the weather is cool and damp, but I know of two cases in which the worst paroxysms used to come up in the hottest days of summer.

4. *Neuralgia of the Cord of the Tympanum.* — This variety, described by Itard under the name of *otalgia*, more particularly attacks children and sometimes adults, in connexion with facial neuralgia. The intermission of pain, its darting and divergent character, the absence of fever, and other symptoms of phlogosis, distinguish it from internal *otitis*. The introduction of a little soothing balsam, or even sweet oil and two or three drops of laudanum, or an injection of warm water, will often suffice for its cure.

5. *Cervical Neuralgia.* — This is of rare occurrence. Sometimes it has been caused by bleeding the jugular vein, and by the bites of leeches to the neck.

6. *Thoracic and Intercostal Neuralgia.* — Under this head are properly included those neuralgic pains affecting the mammæ, shoulders, thorax, and the hypochondriac and epigastric regions, and which are connected with, or as it has of late years been generally thought, originate from spinal irritation itself, manifested by tenderness of one or more vertebræ on pressure. Omitting, as either generally known or not germain to our present purpose, a notice of the essays which have appeared within the last fifteen years, on

both sides of the Atlantic, on the subject of spinal irritation, neuralgia, functional affections of the spinal cord, &c., I am fortunately able to indicate, with more precision than has hitherto been attempted, the seat and character of the kind of neuralgia now under consideration, by borrowing from the very clear and detailed essay by Dr. Valleix, in the *Archives Générales de Medicine* for January, February, and March, 1840, the facts in which he has subsequently extended and published in a volume entitled *Traité des Nevralgies, où Affections Douloureuses des Nerfs*, 1841.

The title of the chief variety of the disease examined by Dr. Valleix is *dorsal* or *intercostal*, and in his book called *dorso-intercostal neuralgia*. When pointing out the fact of the roots of the dorsal nerves being much higher than the point of their exit from the vertebral canal, he takes occasion, from this anatomical fact, to expose the inaccuracy of the English writers, who attribute the disease in question to irritation or any other lesion of the spinal cord. The pain caused by pressure on the spine, according to their own description, exists always at the posterior end of the intercostal space, in which last is found the painful point in front. It is then at the very exit of the nerve, and in a line with the intervertebral foramen, that we discover the pain. Were the irritation really of the spine, we ought to detect the pain at the origin of the nerve, and consequently at the spot higher up than the foramen. Each dorsal nerve at its departure from the intervertebral foramen is divided into two branches; one, *posterior*, goes directly backwards, and gives off filaments variously distributed, some of which, and they the ones most interesting in the present question, pass between the transverse processes and the muscles which cover them, and are distributed to the skin of the back. The *anterior* branch is, properly speaking, the continuation of the nerve. That of the first dorsal nerve comes out below the first rib, and that of the twelfth below the last or twelfth rib. It is important for us to know that this branch is not subdivided in any notable manner until towards the middle of the intercostal space: at first it is situated beneath the intercostal muscles, and is only covered internally by the pleura; then it is engaged in the muscles, and passes between them until it has reached the middle of the intercostal space, where it divides in the manner just indicated. The ramifications are not distributed in a uniform fashion. Thus, in the first three dorsal nerves there is an intercostal branch which continues in the original direction, or rather towards the inferior part of the intercostal space, and another branch which goes to the shoulder. The eight following dorsal nerves furnish, also, an intercostal branch, which is continued in the original course, and only penetrates the muscles which cover it at a short distance from the sternum, or from the outer border of the external part of the great abdominal oblique muscle, whence it distributes its filaments to the integuments of the anterior part of the chest and superior of the abdomen. In place of a brachial branch, such as was given out by the first three nerves, these eight furnish, each of them, an *external* pectoral branch which penetrates the external intercostal muscle, and distributes filaments to the in-

teguments. The last or twelfth dorsal nerve is appropriated to the muscles and integuments of the abdomen, and is divided into a superficial and a deep-seated abdominal branch; a division this analogous to that of the preceding nerves.

In summing up these anatomical details, the application of which will soon be obvious, we find that the dorsal nerves have three principal divisions, — the first immediately after their exit from the intervertebral foramen, — the second about the middle of the intercostal space, measuring from the spine to the sternum; — and the third a little external to the sternum or to the upper part of the rectus muscle. Thus at each of the points of division there is a branch which is superficial and gives twigs to the integuments. There are three of these perforating branches, — one *anterior*, near the sternum; a second, or *middle*, the name of which indicates its situation; and a third, or *posterior*.

Under anatomical guidance we can now speak more understandingly of the seat of dorso-intercostal neuralgia. As to the side which is chiefly affected we find notable differences. In twenty-five cases noted by M. Valleix, the neuralgia was on the left side in seventeen; the right in seven; and in both sides in one. M. Nicod, the only writer who has examined this subject in a methodical manner before M. Valleix, makes the proportion in which the two sides were affected as 15 of the left to 1 of the right. M. Bassereau designates the proportions as follows, in thirty-seven cases: on the left side, twelve; on the right side, six; and in both sides, nineteen. It requires after all a good stock of *numerals* to enable us to reach a positive conclusion.

The number of the intercostal spaces occupied by the neuralgia varies from 2 to 8. This last number was only met with in two cases. Frequently (six times) there were but two of the spaces affected; and if we were to take a mean term expressive of the whole, it would be three and a fraction. But even when a considerable number of intercostal spaces was the seat of neuralgia, more commonly two or three of them, and generally the sixth and seventh, were much more sensitive than the others, and appeared to be the centre of the pain. To extend the proposition a little more, we might say, the result of a table given by M. Valleix, that dorsal neuralgia would seem to display itself in preference, on the fifth, sixth, seventh, eighth, and ninth intercostal spaces, and that, in an especial manner, it is met with most frequently from the sixth to the ninth — a result very nearly the same with that announced by M. Nicod. M. Bassereau makes the fourth, fifth, and sixth, the preferred spots.

The spaces which were the seat of pain were in no instance affected through their whole extent, at least during the entire course of the disease. In speaking of neuralgic pains, we ought, however, to state separately the pain caused by pressure, that caused by various movements, and that felt spontaneously in certain dragging, pricking, and darting sensations. The latter sometimes extended over the whole space. Three principal parts were the seat of pain on pressure, — the vertebral or posterior point was always sensitive, viz., in 25 cases; the anterior point in 19 of these; the middle or lateral in

17. The posterior or vertebral point is on one of the sides of the spinal column, between two vertebræ, and precisely at the spot corresponding with the intervertebral foramen. This painful spot was of circumscribed extent, varying from half an inch to an inch and a half. Hence it happens, that at a very short distance from a point at which pressure gave great pain, considerable force might be used without exciting any unpleasant sensation. This fact will be referred to when we speak of the diagnosis. The direction of the line of pain from the posterior point was always forwards, and neither backwards on the vertebræ, nor upwards or downwards on the spinous processes.

The *median* point at which pain on pressure was felt, is, as the latter indicates, the middle of the antero-posterior direction of the intercostal space, or rather in the prolongation of a vertical line drawn from the axilla to the crest of the ilium, for the first five or six intercostal spaces, and an inch or an inch and a half farther back for the lower ones. The median space was also circumscribed like the posterior was found to be; its limits being from half an inch to an inch and a half. In the cases in which the pain extended more than half an inch it was in the longitudinal or antero-posterior line, and consequently in the course of the nerve, as in the case of the posterior point.

As to the *anterior point*, the pains were more variable and multiple even than the preceding ones. In the fourteen cases in which it was met with, pressure gave rise to it at a point not far from the sternum, and always between this point and the beginning of the cartilaginous portion of the ribs. But the extent of the space affected was hardly greater than that of the posterior and median spaces. A variety in the point affected in this last or anterior division is worthy of being recorded: it is in the *epigastric* location, or rather termination of the pain. Thus, when pressure on the spaces between the cartilages was productive of pain, if it was continued forwards under the angular curvature, and on the epigastrium for an equal breadth, the pain was equally felt. This line of direction of pressure of course passed over some of the cartilages of the ribs, and there was an interruption accordingly, in the course of the pain between the inter-cartilaginous point and the epigastric point, for a space equal to the breadth of the cartilages. The limitation of the region of epigastric pain, and its line of direction from the anterior and inner point, externally and outwardly in the track of the intercostal nerve to the spine, will serve to distinguish this neuralgia from gastritis.

The painful spots above indicated are so not by pressure alone, but even in consequence of strong inspirations, cough, movements of the arms and sometimes of the trunk; and the darting pains themselves had commonly their point of departure from these spots, which we may regard as so many centres of pain from which it radiated in the course of the nerve.

An explanation of the occurrence of pain at these spots is furnished by the anatomical details already premised. Thus, backwards at the exit of the nerve from the intervertebral foramen, a

branch is detached which traverses the muscle, and is distributed to the skin; here is the first painful spot or point. Towards the middle of the intercostal space the nerve becomes also superficial, and detaches another branch which passes on to the teguments, giving a second spot for painful sensation. Finally, at the anterior spot, near the sternum and towards the epigastrium, the nerve again comes nearer to the surface than before, and distributes its filaments to the integuments of the anterior part of the thorax, making the third painful point. I have had cases under treatment in which the symptoms correspond precisely with those here detailed. The seventh, eighth, and ninth intercostal spaces were the ones affected, and the epigastric pain terminated exactly at the median line. The right was the side affected; pressure on the spine itself was not productive of pain. More than two years elapsed before recovery took place in one case. For the greater part of this period, the patient, a female, was unable to walk without great difficulty, owing to loss of power of the lower limbs. Pain alternated between the intercostal spaces and back of the sacro-iliac junction and hip of the right side.

A complaint of pain in any part of the chest, without cough, or even at the epigastrium, should induce the physician to run his finger down with a moderate pressure on each side of the spinal column, at the spino-costal junction and in the direction of the intervertebral foramina. If there be an intercostal neuralgia, the patient shrinks from pressure at the affected point, and cries out at the pain which he experiences. By continuing the pressure downwards, the physician arrives at a line beyond which no positive sensation is felt, and he thus has the limits, upper and lower, of the spine affected with neuralgia. By next passing his finger in a line from the posterior point of pain in the first intercostal space affected to the sternum, he learns the direction and limits anteriorly of the disease.

M. Valleix was not led to any positive inference respecting the causes, either predisposing or occasional, varying, from the received opinions on the subject. It was found that the most frequent complaints of pain were in snowy weather, even by patients in their rooms; and returns of the disease most common in winter. The duration of the neuralgia was from one to six months; and where it assumed an intermittent character the disease recurred at intervals from one year to four years, whether remedial means were had recourse to, or whether at each return the pain was left to disappear of itself. Women are affected in much larger proportion than men. The association of dorso-intercostal neuralgia with uterine disease has been often noticed.

The differential *diagnosis* of intercostal neuralgia has been already stated incidentally. We distinguish the disease from affections of the respiratory organs by means of auscultation and percussion, and by taking cognizance of the seat, direction, and limits of the pain; and from rheumatism of the muscles of the thorax, by remembering that the pain in this latter is more diffused, less acute under pressure, and more so by motion. *Angina pectoris* has been thought to depend on intercostal neuralgia, but it is distinguishable from this latter, by its paroxysm, and the feeling of constriction and agonising

distress which accompanies it. The diseases of the spinal cord cause sometimes a local pain, which is situated on the spinal processes and not on the sides. In caries of the vertebræ, pressure on the ribs, by these latter acting on the diseased bone, causes pain at the spine, which is not the case in neuralgia.

I resume the enumeration of the different varieties of neuralgia, by mentioning *lumbar neuralgia*, *lumbo-abdominal* of M. Valleix, which has been called by Chaussier and others, *ilio-scrotal and spermatic*, and, by some, lumbago. It may occupy one or several of the different lumbar branches, and be felt, according to the extent of these nerves, in the loins, at the crest of the ilium and over the great trochanter, or along the spermatic cord, in the scrotum, vulva, bladder, urethra, &c., giving rise to a crowd of symptoms calculated to render the diagnosis obscure. I have had under care a young person with this kind of neuralgia, in whom the symptoms of disease of the bladder were such as to induce fears of gravel associated with those of *prolapsus uteri* — all of which disappeared by the removal of the lumbar neuralgia. In another case there were so many of the symptoms of *prolapsus uteri* present, that I deemed it my duty to recommend an examination *per vaginam*. Somewhat to my surprise the uterus was high up, perfectly *in sitû*, but the *os tincæ* painful to the touch. A persistence, however, in the remedies which had been already prescribed for the lumbar neuralgia, which also was present in this case, was followed by entire relief of all pain and abnormal sensation whatever. The patient has since then become pregnant, for the first time, after a marriage of some years' duration.

It will be sufficient to mention some other varieties of neuralgia, without making any additional remarks on them. These are the *scapular* or *deltoidean*; the *cubito-digital*, which extends from the olecranon to the index and middle fingers; the *femoro-pretibial* or *anterior crural*. The *femoro-popliteal*, or sciatic neuralgia, demands more attention by its frequency of occurrence, its obstinacy, and the agonizing pain with which it is every now and then accompanied. Under the name of sciatic it is usually spoken of as one of the varieties of rheumatism. General experience does not correspond with the opinion advanced by M. Jolly (from whose article *Nevralgia* in the *Dictionnaire de Méd. et de Chirurgie Pratiques*, I have taken so largely), that sciatica is more common in women that in men, owing to the cause of pregnancy and labour of child-birth operating on the former. The nerve is, no doubt, in different states in different persons, and at different times in the same person — its neurilema being sometimes inflamed and thickened, and sometimes containing gelatinous effusions, by all which the nerve proper must suffer. At other times again, this latter is intact in its structure, and the affection is then one of simple neuralgia. In the first case, cups or leeches on the hips and behind the great trochanter, or on the outer side of the thigh, with other parts of an antiphlogistic treatment, will benefit, if not cure. In the second, the customary modifiers of sensibility, especially narcotics and tonics, must be the chief curative agents.

The principal seats of pain in femoro-popliteal neuralgia are, ac-

cording to M. Valleix (*Traité, &c.*), 1, in the haunch and hip; 2, the thigh; 3, the knee, to the head of the fibula; 4, the leg; 5, the foot. Pain in the lumbar region is not unusual, it being in the proportion of cases as of ten to thirty-six; and on both sides in eight out of the ten. Pain was uniformly complained of at the posterior and superior spine of the ileum, in a line from the upper portion of the coccyx to near the border of the sacrum. Out of the thirty-six cases, the knee was the seat of pain in seventeen. In fifteen cases of the thirty-six, pain was felt in the calf of the leg at the part where the gastrocnemii and soleus are separated by a fibrous sheath. The foot was painful in twenty-four out of thirty-six cases. Motion of any kind, as by turning in bed, coughing or laughing, exasperates the pain of sciatica. Darting or shooting pains were felt in nearly all the cases. In some, pains were experienced in other parts, such as the head, chest, loins, and abdomen, but especially the head and chest. Semi-paralysis and shrinking or atrophy of the limb, are unusual occurrences in sciatic neuralgia. The function of respiration, digestion, and circulation, are not affected with any uniformity. Obstinate coldness and damp skin of the extremities, both upper and lower, I have seen in this disease. The sensible states of the atmosphere make little difference in the frequency of pain. Periodicity, but without uniformity, is met with. As regards sex, the proportion of males affected out of the entire number counted (124), was three-fifths.

Plantar neuralgia is occasionally met with, and is not a little annoying to the patient, who complains of a pain in the sole of his foot to which the plantar portion of the popliteal nerve is distributed.

Neuralgia of the nervous extremities where they are lost in, or blended with the tissues, are common enough, as in neuralgia of the muscular tissue, which is not at all connected with inflammation, but is met with in the onset of certain typhoid fevers, acute gastro-enteritis, and in the chill of an intermittent fever, or from suppressed perspiration, atmospherical changes, &c., and which are commonly designated as rheumatic: akin to this variety is that attacking the fibrous and osseous tissues, and which are attributed to, and, in fact, are occasionally caused by syphilis, mercury in excess, scurvy, &c.

Neuralgia of the serous tissues shows itself sometimes in violent pain of an intermittent character, attacking the meninges of the brain, the pleura, and the peritoneum, but which yield readily to sulphate of quinia and opium.

Neuralgia of the mucous tissues comes, for the most part, within the list of ganglionic neuralgia; but we have examples of it on surfaces which belong to the cerebro-spinal system, as in the pituitary membrane, the conjunctiva, the bronchia, and the large intestine, &c. The skin is occasionally the seat of violent pain without inflammation, just as the parenchymatous tissues are.

Although their course and extent be indicated with less precision than already specified, the neuralgiæ of the organs supplied by the sympathetic nerve or ganglionic system, cannot well be doubted. Bichat had early, in this path of inquiry, expressed an opinion that there are colics essentially nervous, independently of any local affection of the serous, mucous, and muscular coats of the intestines

These colics have obviously, he continues, their seat in the nerves of the semilunar ganglion which are distributed along the whole course of the abdominal arteries; they are true neuralgiæ of the nervous system of organic life, although they have nothing (little) in common with tic douloureux, sciatica, &c. Ganglionic neuralgiæ, like those of the other order, are intermittent, but less distinctly so than these. They are accompanied often with a great fluxion and discharge of fluids, as of urine, bronchial mucus in asthma, hooping-cough, and suffocative catarrh; hence also, probably, the deluge of fluid in cholera morbus, dysentery, &c.

In the nervous system of a mixed nature, that which connects the two lives, organic and animal, although it belongs more particularly to the latter, and which is sometimes called the *nervous apparatus of association*, we meet with marked examples of neuralgic diseases. *Pneumogastric neuralgia* may result from direct irritation of the nerve itself,as in the phlegmasiæ of the pulmonary and gastric mucous membranes: it is manifested by a convulsive cough, spasms of the air-passages, and of the diaphragm and stomach. Or it may be the effect of a sympathetic irritation transmitted from some remote organ by the medium of the ganglionic plexus, as in inflammation of the kidneys, testicle, and uterus, or even simple pregnancy, which will give rise to dyspnœa, or to obstinate vomiting, with acute and tearing pains of the epigastrium. Finally, pneumogastric neuralgia may, like all the neuralgiæ, depend on some lesion of the nervous centres. Of this nature are intermittent asthma, periodical coughs, nervous dyspnœa, and vomiting. *Gastralgia* is a variety of this kind of neuralgia, and either appears alone or is recurrent, and constitutes the chief symptom of some pernicious intermittent fevers.

Diaphragmatic Neuralgia is manifested by pains, more or less acute, with a constriction at the epigastrium and back, accompanied with hiccup, eructations, and vomiting. This may readily be confounded with rheumatism and inflammation of the diaphragm, of which I shall speak in a subsequent part of this volume.

I have not much to say on the treatment of neuralgia in addition to the judicious remarks of Dr. Stokes. This should be based on a knowledge of all the circumstances, physical, hygienic, and physiological, which have any influence in the production of the disease; and should include, of course, a just appreciation of its seat and its idiopathic or symptomatic nature. I have dwelt the more on the various seats of neuralgia, and the symptoms by which its varieties are recognised, because, in so doing, I believed that I was conveying most valuable instruction to the younger portion of my medical brethren, by teaching them to shun the common, I might say barbarous empiricism which confounds pain and derangement of function with inflammation, and prompts to bloodletting, purging, and the heroical generally in place of the narcotic and soothing treatment.

Every resident in marshy and low situations is aware of the commonness of intermittent pains, hemicrania, frontal and facial neuralgia, ophthalmia, sciatica, &c., which sometimes accompany intermittent fever, and sometimes succeed to or are substitutes for it. The

successful employment of the bark in former times and quinia now, is also pretty well known to the practitioner in such cases. I have found, on occasions, the local detraction of blood by means of a few cups or leeches beneficial under these circumstances, both by the relief which they gave, and the speedier and more complete effect subsequently of sulphate of quinia. Arsenic has, I know, been administered often in these intermittent as well as some of the more untractable remittent fevers of neuralgiæ. Without intending to prohibit its use, I still think that a physician who administers it to his patient ought to give approved security that he will not injure the stomach of the latter, by bringing on chronic gastritis and its accompaniments.

In cases of feeble action of the organs generally, or of a sensation of coldness at the part affected, stimulants are indicated, and of these ammonia, camphor, and guaiacum are entitled to confidence:—The ammoniated tincture of guaiacum is a favourite prescription with some, —exhibited in such quantities as to keep the patient comfortably warm. With this view, a dose of half a drachm, or even four times the quantity, has been given and repeated three times daily, and sometimes every two hours. Where there is debility, with paleness, iron is, in Dr. Elliotson's opinion, preferable to quinia. Mercury carried to ptyalism has cured; but unless the subject have some strength, and a certain degree of excitement, he will only be more depressed and positively injured by such a course. Of the narcotics, the extract of stramonium, which we can so readily procure fresh in the United States, is entitled to fuller and more frequent trials than it receives; externally, also, in the form of tincture, or ointment spread as a plaster, it will be a good topical application to the affected part. When given, the stramonium should be continued in such a dose and at such intervals until its peculiar and marked effects on the brain and nervous system are produced. The most opposite means have been used with occasional success, as in one instance steam, in another ice. Dr. La Roche, of this city, succeeded in allaying and completely removing the pain of acute and protracted sciatica, which had resisted various remedies directed with no common skill and experience, by the application of ice over the affected part. The patient went to sleep shortly after it was put on. I have procured for my patient similar relief in facial neuralgia by this means. Ether used with the same intention is inferior to ice. Oil of turpentine in divided doses, so that a drachm or two be used daily, has been found to be very successful in a number of cases of sciatica, and in some other varieties of neuralgia by M. Martinet; and the same medicine in a full dose of half an ounce to an ounce by enema has been used with advantage. M. Valleix estimates the number of cases of sciatica cured by this remedy to be thirty-five out of fifty-seven, or the proportion of five-eighths.

Veratria and its salts and aconitine are certainly entitled to consideration, notwithstanding the unmeasured praise lavished on them by Dr. Turnbull; for assuredly the practice has been retarded by the indiscreet zeal of its advocate. In one case of tic douloureux in a lady, in which I had employed sulphate of quinia, and iron and opium, after purgatives and alteratives, with only partial relief, an ointment, composed of twenty grains of veratria and an ounce of lard, was directed

to be rubbed on the affected cheek, and in a short time with a most satisfactory result. The common proportion is ten to twenty grains to the ounce of lard or cerate. The cure was complete; and there has been no relapse up to the present time, which is upwards of three years from the date of the treatment. The sensation of heat and tingling was expressed by my patient shortly after rubbing in the ointment. Dr. Turnbull gives these symptoms as an evidence of the desired operation of the veratria, and indeed of its genuineness. Sometimes it gives speedy relief after its first application, but a renewal of subsequent trials, even though the tingling be felt, fails to benefit at all. A neater preparation is the alcoholic tincture, which is to be applied to the skin over the affected part. Of the internal use of veratria and its salts, and of delphinia and aconitine, which have been also recommended in neuralgic and rheumatic affections, I am not prepared to speak from personal experience. The dose of veratria, or of tartrate of veratria, the salt preferred by Dr. Turnbull, is a sixth of a grain in pill with half a grain of extract of hyosciamus, and some convenient vehicle, such as liquorice powder, — repeated three times a day. For the last two ingredients rhubarb should be substituted, when there is costiveness. The dose may be gradually increased to a grain and a half or two grains in the course of the day. (See Dr. Turnbull's Essay on the *Medical Properties of the Natural Order Ranunculaceæ.*) Extract of belladonna, in grain doses, gradually increased, is a remedy of power.

That variety of neuralgia which is most common, and, in reference to its extensive symptoms, the most important in the eyes of a practitioner, is the dorso-intercostal. Under the name of spinal irritation it has been commonly, and I cannot but think successfully, treated by counter-irritation, by means of a small blister over the most painful spot and kept discharging, or by tartar emetic ointment or croton oil, and tonics, notably quinia, preceded by and alternating with laxatives. In many instances, the first step has been to detract some blood by means of cups or leeches applied near the affected part. Of the advantages of this latter prescription I can speak with ∈uch confidence, based upon repeated experience. I must add, however, that although the relief was in most cases in which I directed it immediate, yet this remedy was far from removing the disease, and I am sure that it materially abbreviated its duration. Dr. Valleix found small blisters applied in the course of the affected nerve, and renewed at short distances, or on the painful points, to be the most successful remedy. Muriate of morphia applied endermically only served in his experience to allay temporarily the pain. He did not find cupping or leeches to cure the neuralgia; but, on the contrary, they seemed to aggravate it. Narcotics, quinia and iron, were not, in his observation, productive of any notable result.

I would refer you to a paper on Tic Douloureux, drawn up in detail and with great fulness by Dr. Chapman, in vol. xiv. of the *American Journal of Medical Science.* In the same volume there is an account, by Dr. Thomas Harris, of several cases of facial neuralgia, some cured, others greatly mitigated by galvanism, applied through the apparatus directed by Mansford, the mode of using which will be decribed in the next lecture.

LECTURE CXXI.

DR. BELL.

EPILEPSY—The true basis for treatment of this disease—Different causes and conditions require different treatment—Divisions of epilepsy—Women more subject to it than men—Hereditary predisposition; sometimes dependent on cerebral conformation—Epilepsy may exist with great mental endowments—Occasional exciting causes.—*Symptoms*—No uniform structural lesions.—*Treatment*; ought to be rational not empirical—Remedies for the plethoric state; the anemic—Paramount importance of hygienic means of treatment, especially as regards food, and exercise of mind and body—Bathing and frictions—The chief indications, to abate morbid susceptibility and to withhold all irritants to the nervous system—Vegetable diet preferable—Intoxicating drinks and tobacco to be abstained from—Probable morbid irritants—Chief remedies relied on in epilepsy; chalybeates; nitrate of silver; sulphate and oxide of zinc; sulphate of copper; oil of turpentine; digitalis—Galvanism.

IN the few remarks which I shall make on epilepsy I do not propose more than merely to fix your attention on the prominent traits of the disease and the philosophy of its treatment. I know that it may seem to argue no small presumption to speak of giving a philosophical character to the treatment of a disease which is for the most part deemed to be incurable. But let me at once explain my meaning in order to avoid imputation and criticism, which I hope not to merit. Epilepsy, although a cerebral disease, inasmuch as its distinctive phenomena consist in disorder of the cerebral functions, is, often, only so in a secondary manner, by the brain's becoming the recipient of irritative impressions from other and remote organs. The orgasm into which the brain is thrown, by its distended and congested vessels, is rather an effect than a cause of the epileptic paroxysm. The brain is forced by some other organ into that state of excitement which ends in violent muscular movements or convulsions and the abolition of intellect. Ignorant as we so generally are of any fixed organic cause, certainly of any structural lesion in the brain productive of epilepsy, we must inquire into all the preceding and concomitant circumstances by which the disease is brought on; and having done so, adapt our remedies and general treatment to the various and varying exigencies of the case. At one time the complaints of the patient are referable entirely to the brain, at another to the heart; sometimes to the digestive system; and again to some part of the spinal cord and its nerves, or of the periphery, on the skin. In some cases the patient is plethoric, in others he is thin and emaciated. Some manifest in the intervals between the paroxysms extreme mobility,—a sensibility open to all impressions,—an irritability which borders continually on passion. Others are sad, melancholy, and torpid—hard to be roused, and sinking immediately after being excited into their former apathy. With these differences in the accompanying features, and functional disorders of other organs besides the brain, in epilepsy, would it accord with the common principles of reason, and the more direct rules of therapeutics, to pretend to seek for a specific, a unit remedy, against all these multifarious and variable disorders, merely because the brain is affected. As well might

we ask for a single or specific remedy, and complain that it is not found, against all convulsions, in all ages and under most opposite states of the body and lesions of particular organs — merely because the brain is necessarily implicated in causing the convulsions.

Epilepsy, if not strictly a hereditary disease, is readily developed in those persons one or other of whose parents was either epileptic or had suffered from cerebral disease in some form, or had been distinguished for some eccentricity or startling peculiarity of mental feature. In this point of view the treatment of such persons from early infancy ought to be carefully attended to, both in a hygienic and moral view, if indeed hygiene can ever be regarded apart from morals, or that there can be acceptable morality to the Creator when health is made to suffer. No specific either of amulet or physic can afford protection. Epilepsy is brought on by causes which either unduly excite or greatly enfeeble the nervous system and brain generally, — such as the large use of alcoholic drinks, insolation, violent passions, intense exertion of the intellect, and plethora on the one hand, — or fear, sexual intercourse in extreme, masturbation, close and impure air, want of sleep, and general feebleness on the other. Can we expect any one remedy to countervail the deleterious operation of all these various causes? Epilepsy, most common in tender age, disappears often when the period of puberty is reached. Surely we cannot suppose any specific cause, certainly any fixed organic lesion in the brain or elsewhere, which had originally predisposed to this disease. The tendency to epilepsy, or the precursory state of the functions antecedently to a paroxysm of the disease, is manifested in disordered health in various ways. An amelioration of this and a consequent prevention of the disease is not, however, to be procured by any one medicine or specific. The occasionally distinct periodical character of epilepsy, and the length of the period, sometimes a year, between the paroxysms, seem to preclude the idea, in such cases at least, of a fixed organic cause, either in the brain or in any part of the nervous system, or in the blood, by deterioration of this fluid. In fine, whether we regard the predisposition, hereditary or acquired, to epilepsy, the causes inducing and the phenomena which accompany it, or the absence of any characteristic or even fixed lesion in the brain or other organ of those who have died of the disease, we cannot persuade ourselves of anything peculiar in its pathology beyond a predisposition in the brain to be impressed by various agents, some external to the organs, some in their internal changes. In the abating of this predisposition and withholding or removing as much as possible the exciting causes, will consist the treatment of epilepsy. For this treatment to be successful it must not be specific; but rather adapted to the varying constitutions, habits, and functional disorders of the patient, and it must be both hygienic and medical, and continued for a length of time. One of the physiognomical characteristics of epilepsy, constituting in fact a predisposition itself, is a strumous habit. Now, every one the least conversant with pathology, knows that in order to produce a change in a habit of this kind, and thus to ward off the diseases incidental to it, whether they be scrofula, tubercle, or certain forms of dropsy, as well as epilepsy, we

must, if not reconstitute the tissues, at least procure and maintain a sustained healthy digestion and hematosis until the work of absorption and nutritive secretion has been carried on so long as to have replaced the old by new materials — both of interstitial deposit and of rhythmic excitement of the organs, as by new blood and lymph. But this requires time, perseverance, and methodical hygiene, all of which elements and means must be enlisted in our favour, and in aid of, it might be medical heresy to say, in place of, agents strictly medical. Of little avail, then, will it be for any of you, who may hereafter be called upon for the purpose, to prescribe for a case of epilepsy, unless you make up your mind to carry out these conditions faithfully and patiently as far as you are concerned, and obtain the consent of the patients and friends to aid you, and to do themselves justice in the case as far as they are concerned.

Varieties. — Epilepsy has been divided by M. Esquirol, who has made the disease a subject of special study and investigation, especially in connection with insanity, into two species, the idiopathic and the symptomatic, and of these several varieties, viz., 1, that in which the seat or point of departure of irritation is in the digestive apparatus; 2, the angiotenic or bloodvessel system; 3, the system of white vessels; 4, the reproductive apparatus; 5, the periphery of the body. All these various causes are more or less active according to the predisposition of the individual.

Causes. — Women are more subject to epilepsy than men. As respects age, the tendency to epilepsy is greatest in early life. Of sixty-six cases of epileptic women noted by MM. Bouchet and Cazauviehl, the larger number were females first affected with this disease between birth and the fifth year. Thirty-eight of these were victims to epilepsy before menstruation, and twenty-eight afterwards. The hereditary character of the disease is generally admitted. The writers just named tell us that in 110 patients respecting whom they had made the inquiry, 31 were hereditary cases; and Esquirol found that in 321 cases of epileptic insanity, 105 were descended from either epileptic or insane parents. A very limited acquaintance with the disease must soon convince one of the truth of this feature in its history. A particular conformation of brain indicated by a flatness and squareness, or such as generally accompanies idiocy, is indicative also of epileptic predisposition. In such cases it is not uncommon to see the complications of these two forms of disease. But we are not to suppose epilepsy the product or associate always of imperfectly developed brains and feeble intellects, when history points out its having attacked Julius Cæsar, Mohammed, Petrarch, Rousseau, and Napoleon. Knowing, however, that all inordinate affections of the mind may induce a seizure in persons predisposed to the disease, we cannot wonder that they should have been sufferers in this way. Esquirol states that fits of passion, distress of mind, and venereal excesses, hold the next rank to terror, sudden alarm, &c., in exciting the disease. According to Licher, cited by Dr. Copland (*Med. Dict.*), out of 80 cases, 60 were occasioned by frights of various kinds and degrees; but of 69 cases MM. Bouchet and Cazauviehl found only 21 that could be referred to this cause.

With a cerebral predisposition various and unlooked for changes in the general health, or local irritation, will bring on an attack of epilepsy. A man who had received a blow on his head was seized with epilepsy after the wound healed; and he only procured exemption from the attacks by its being again opened. A young man, twenty-eight years of age, experienced epileptic attacks whenever the weather was stormy. In his case atmospheric electricity acted on a carious tooth, the extraction of which was followed by a cessation of the epilepsy. A person who had contracted a syphilitic disease, and who had a bubo in the groin, was seized with epilepsy when he was cured of the bubo.

A small piece of undigested meat, or nut or other fruit hard of digestion; worms; unduly retained or too abundant fecal matter; irritation of the bladder or of its neck; pressure by a slight node on a sentient nerve; any sudden impression on one of the senses, or strong emotion or intellectual strain; too much sleep, or sleeping with the head low, will severally suffice to bring on an epileptic attack in the person predisposed.

The *symptoms* of epilepsy, on which I shall not, however, enlarge, have been divided into those — 1, before the coming on of the paroxysm; 2, during the paroxysm; 3, immediately after this occurrence; 4, in the interval between the paroxyms. Sometimes there are no premonitory symptoms, and then the paroxysm comes on suddenly and with fearful violence. When these symptoms are present they vary both in number and intensity. Commonly some complaint is made of vertigo and headache, and the eyes and face are more or less injected and suffused. Various abnormal sensations are complained of in some part of the head or one of the limbs. The passage of this pain or anomalous sensation from the part where it is first felt, as at the end of a finger or in the foot, is drawn towards the brain: when it reaches this organ the fit comes on; the patient falls down insensible, and is seized with violent convulsions, foaming at the mouth, deeply injected and almost livid face, starting eyes, &c. I have known this sensation, called *aura epileptica*, when it reached the heart, to cause violent palpitations, and sometimes to cease here; but, more commonly, it would pass thence to the brain and be followed by the epileptic convulsions. Occasionally it will start from the face, in the cheeks or temples, and be accompanied by severe twitches and a feeling of dragging or darting of the muscles of the part before the brain is affected. Not unfrequently it is in the power of the patient when he first feels the *aura* in a limb to arrest its upward course by quickly passing a ligature or a handkerchief drawn tightly round the limb between the *aura* and the brain.

Various are the degrees of sensibility, cutaneous and other kinds, manifested by epileptics, or by the same person in different stages of the disease. Sometimes there is insensibility to common excitants, and even sinapisms and vesicatories produce little effect in this respect; and at other times the sensibility of the skin is extreme. Spinal irritation will show itself in the progress of the disease, but not in any uniform relation to it.

The *organic* or *textural* lesions in persons dead of epilepsy are in

large proportion found in the brain, its meninges, or the cranium; and especially are the cerebral vessels congested if death had taken place during the fit. But, on the other hand, there are cases in which no change either in the structure of the brain or of any other organ can be found adequate to cause the disease.

Unfavourable as the *prognosis* in epilepsy generally is, we ought not to be discouraged from carrying out a properly designed treatment which we know will on occasions reward our exertions. Even when complicated with disease of the heart, most probably obliteration of the mitral valves, and deficient power in the ventricle, I have found epilepsy to be amenable to remedies, and the sufferer restored to usefulness and ability to fulfil the active duties of life; the exemption at any rate for a whole year replacing paroxysms of every few days' recurrence.

Notwithstanding the occasional cures performed by an empirical treatment, the rational ought to have the preference. Hence, instead of forthwith beginning to dose an epileptic patient with sulphate of zinc, nitrate of silver, indigo, or oil of turpentine, the remedies which just now rank highest in medical opinion, it is more fit, reasoning from the principles of medicine and our knowledge of the variety of phases in which epilepsy manifest itself, to adapt the treatment, both hygienical and medical, to the different exigencies growing out of peculiarities of temperament and constitution, prior habits, and present exposures, and also complication of some other disease with the assumed one, or morbid susceptibility of the brain. Little good can we promise ourselves from any remedy or course of treatment so long as the exciting causes are in action, whether these be the depressing or the more exciting and perturbating passions, excessive or even common venereal indulgences, either allowed by the marriage tie, or unlawfully procured by promiscuous intercourse, or worse than all, by self-pollution or masturbation. Even the, at other times laudable, exercise of intellect on some favourite subject, and especially intense mental occupation, either in the pursuit of science or of ambition, must be refrained from. If woman be the subject, we must have ascertained the state both of her moral as well as physical being, before we can prescribe with a prospect of success, that is after knowledge of cause.

If the patient be plethoric, the suitable means of reduction will be directed; but we must distinguish well between real and simulated fulness of the bloodvessel system, and also between the temporary congestion of the cerebral vessels which follows high nervous excitement and subsides with the disappearance of the latter, and the real excess of blood sent to the brain as well as to all the other organs. It is not often that large, certainly not repeated, bloodlettings are required in epilepsy. More is gained by equalising the circulation by the occasional detraction of blood topically, followed by revulsives, than by venesection. The class of revulsives on the present occasion should consist of purgatives, from which the patient will often declare himself to be much relieved; irritants to the skin of the extremities, or, if there be a local pain or morbid sensibility in some part of the spine or intercostal spaces, or at some spot

near the heart, a blister to one or other of these parts. Fixed cerebral disorder, manifested by alternate vertigo and faintness, drowsiness, unequal frame of mind, deviation from the natural feelings, ought to prompt to the keeping up a discharge from the nucha by a series of blisters or by a seton; or that which I prefer, a succession of small blisters along one or other side of the spine. This last practice is useful also when there is a weakness and an evident diminution of locomotive power on one side, manifested by, among other symptoms, a slight halt in the gait, and a less ready grasp of an object with the weakened hand.

If anemia and a soft and flabby state of the voluntary muscles, and a correspondingly soft and flaccid state of the heart, as indicated by auscultation and the pulse, exist, we must not think of detracting blood, but rather have recourse at once to tonics; sulphate of quinia where the paroxysms assume anything like a periodical character as they sometimes do, and in other cases chalybeates combined with aloes, or an equivalent purgative to keep up a soluble state of the bowels.

But our success eventually in the cure of epilepsy will be found to turn on the adoption of and perseverance in hygienic means of treatment — so adapted to the constitution of the patient and circumstances of the case as to act on the several organs in a manner corresponding with the effect produced by medical agents. More especially are the functions of the stomach, brain, and locomotive apparatus to be regulated by the soundest discretion. Thus, the food must be of such a nature as to furnish adequate nourishment without irritating the stomach or bowels, and be calculated at the same time to obviate constipation. This last would cause a fulness of the cerebral vessels inviting the disease; whilst diarrhœa or occasional looseness, by interfering with regular digestion, contributes to a mobility of the nervous system by which it is more open to the operation of common exciting causes. Permanent and efficient derivation from the brain will be obtained by regulated and full bodily exercise, so as to divert a large amount of blood into the voluntary muscles and at the same time to determine to the skin and maintain a sensible perspiration. The tepid bath, and after a while the cool bath, and assiduous friction, will contribute to the proposed design of derivation, and also to give that tone to the nervous system by which it is rendered less morbidly impressible to the common excitations; either those from without or those occurring in the discharge of the organic functions. Equable temperature of the skin and its uniformly agreeable seasation ought to be maintained by warmth of the feet and an avoidance of heavy hat or head-dress, or even of a thick head of hair, and ligature of any kind, as by stock, tight cravat or shirt collar, round the neck. Some recommend that the scalp should be shaved once a week and well rubbed daily with a flesh-brush, after the tepid shower bath or a simple process of pouring a flagon of cool water on the head inclined over a large basin. There is, however, after all, no means so efficient to remove the morbid excitability of the nervous system, which so continually invites to a paroxysm of epilepsy, as regular and full exercise. With this view

the patient must put himself in a course of training, and persist in it for a long period, until he feels that his whole constitution is changed, and that he is proof against all the trials which before, at each moment, would make his heart palpitate with violence, his limbs tremble, and his mind confused in all its perceptions. But in order that the expected benefit may be derived from exercise, the extremes of undue repletion and abstinence must be avoided. A full meal will oppress the brain, encourage drowsiness and disinclination to exercise, and fasting will pervert healthy sensibility, and break the rhythm of the functions of the nervous system. More especially prejudicial is a full meal or a repast of stimulating food at an advanced hour in the day or in the evening; while, on the other hand, the period of fasting should not be long between rising and breakfast. Suitable variety can be procured from day to day without much mixture of articles of food on the same day, or above all, at the same meal. Never ought more than one kind of meat, plain roast or boiled, or preferably to either stewed, be eaten at a meal. In the selection of vegetables and the use of fruits a similar rule should be followed, so as to avoid, primarily, irritation of the stomach, and, secondarily, that of the intestines, and particularly of the lower, by a needless amount or imperfect change of the excrementitial portion to be exonerated. If the patient be young, or of a full and plethoric habit, it will be advisable to abstain entirely from animal food, or to use it in very restricted quantity. Drs. Fothergill, Heberden, and Abercrombie, recommend an exclusively vegetable diet; and the first and last lay great and deserved stress on entire abstinence from strong or intoxicating drinks. Little prospect of permanent recovery can be held out so long as they are used by the patient. Tobacco, as a perturbator of the nervous system, which suffers alike by the large use, and by occasional abstinence from this vile weed, ought to be thrown aside at the same time. In fine, if we would give the patient a fair chance of entire restoration, he ought to be exempt as much as possible from all these causes, which either weaken the nervous system, and thus augment unduly its susceptibility to impression of every kind, or which cause or increase plethora, and thus multiply and give additional force to common and otherwise physiological stimulants. While we are engaged, on the one hand, in diminishing by a proper tonic course, consisting chiefly of hygienic means, the original undue susceptibility of the brain and nervous system generally, we must sedulously withhold every irritant which might task this system beyond its powers.

A brief mention of some of the most prized medicines, chiefly of the class of tonics, which are employed in epilepsy, will conclude my remarks on the disease at this time. I have spoken of chalybeates, as applicable to a particular state of the system in epilepsy, characterized by anemia and a soft and flabby state of the voluntary muscles with palpitation and feeble pulse. Not dissimilar to this state of things are the nervous epilepsy and the uterine epilepsy of authors, for the relief or cure of which the preparations of iron are among our best remedies. In strumous habits or decidedly scrofulous subjects the iodide of iron is serviceable.

Nitrate of silver has perhaps obtained more suffrages in its favour

than any one medicine for the cure of epilepsy, especially among the English practitioners. The dose is a sixth of a grain gradually increased to three or four grains, three times a day. Dr. Powell in some cases has increased the dose to fifteen grains, in pills, but he rarely found stomachs that could bear more than five grains in solution. The usual mode of administering it, in pills made with bread, has been objected to, on account of the chloride of sodium which this contains: it is easy, therefore, to substitute some simple vegetable powder or mucilage. The great objection to the prolonged use of lunar caustic is the blue or bronzed colour of the skin to which it gives rise. Dr. Johnson asserts, however, that there is no instance on record where the complexion has been affected by the medicine when restricted to three months' duration. But even to this point it is not necessary, or at least advisable, to go; and hence we ought to discontinue it for a while, after a month or six weeks' use. Nitrate of silver is best adapted to the asthenic stage or form of the disease, and may be usefully combined with hyosciamus or with camphor.

Sulphate of zinc and *oxide of zinc* have always maintained a reputation in epilepsy. Dr. Babington (*Guy's Hospital Reports*, No. xii.), in a paper on this disease, indicates his preference for the sulphate of zinc, which, if not quite so efficacious as the nitrate of silver, is free from the objections to which the latter is subject, viz., its strong action on the stomach and the discoloration of the skin. This gentleman has given the sulphate in larger doses than are generally recommended. In some instances he has directed as much as thirty-six grains three times a day. He has found this quantity to be taken equally as well in solution as in pills, care being taken gradually to increase the dose.

Sulphate of copper has been recommended by not a few practitioners on the strength of the numerous cures alleged to have been performed by it. Dr. Hawkins prescribed it in a dose of a fourth of a grain combined with sulphate of quinia. The cuprum ammoniatum was by some believed to be still more efficacious, but later extended trials have not sanctioned the first impressions on this head.

Oil of turpentine should be regarded as one of our best, if not the best remedy in epilepsy. I have not compared it with nitrate of silver; but have found it far preferable to any of the other metallic preparations and to indigo. I directed it often in large and purgative doses, or from ℥ss. to ℥i., usually conjoined with castor oil, in the same quantity; and in the intervals gave it in smaller, or drachm and half drachm, doses with mucilage of gum arabic. When the patient is enfeebled, and the skin cold or torpid in its functions, I prescribed the sulphate of quinia with the oil of turpentine, with good effect. In some nervous and irritable subjects, its action on the neck of the bladder is injurious by exciting the brain and endangering a return of the paroxysm.

Recently the praises of *digitalis* have been revived by Dr. Sharkey, whose essay (*An Inquiry into the Effects of Digitalis in the Treatment of Idiopathic Epilepsy*), is chiefly intended to set forth the efficacy of this medicine in the disease. Doctor Sharkey, as the title of his essay implies, believes digitalis to be adapted only to the idiopa-

thic and uncomplicated forms of epilepsy. The best mode of exhibiting the medicine is in infusion with strong beer or porter, in the proportion of 3½ ounces of the recent leaves of digitalis, bruised, to a pint of the malt liquor. Macerate for seven hours, and then strain. Of this, four ounces are to be taken with ten grains of the dried leaves, or of the dried root, of the *Polypod. quercus.* The treatment of epilepsy with digitalis should begin immediately after rather than immediately preceding a fit.

Mr. Mansford attaches great value to galvanism in the treatment of epilepsy. The apparatus which he used is described by him as follows: —

It was said, that in order to fulfil the indication stated at the commencement of this section, it was desirable to establish a negative point as near the brain as possible, and a positive one in some distant part of the body. Accordingly, a portion of the cuticle of the size of a sixpence being removed by means of a small blister on the back of the neck, as close to the root of the hair as possible, and a similar portion in the hollow beneath, and on the inside of the knee, as the most convenient place: to the wound in the neck a plate of silver, varying according to the age of the patient, from the size of a sixpence to that of a half-crown, was applied — having affixed to its back part a handle or shank, and to its lower edge, and parallel with the shank, a small staple, to which the conducting wire was fastened. This wire descended the back till it reached a belt of chamois leather, buttoned round the waist — it then followed the course of the belt, to which it was attacked, till it arrived opposite the groin on the side it was wished to be used; it then passed down the inside of the thigh, and was fastened to the zinc plate in the same manner as to the silver one. The apparatus so contrived was thus applied: — A small bit of sponge moistened with water, and corresponding in size to the aperture in the neck, was first placed directly upon it — over this a larger piece of sponge of the same size as the metallic plate, also wetted, was laid — and next to this the plate itself, which was secured in its situation by a strip of adhesive plaster passed through the shank on its back, another above, and another below it. If these be properly placed, and the wire which passes down the back be allowed sufficient room that it may not drag, the plate will not be moved from its position by any ordinary motion of the body. The zinc plate was fastened in the same manner — but in place of the second layer of sponge, a bit of muscle answering in size to the zinc plate was interposed: that is, a small bit of moistened sponge being first fitted to the aperture below the knee, the piece of muscle (a piece of soft buckskin is more cleanly than the muscle and equally as efficacious) also wetted then followed, and on this the plate of zinc. The apparatus thus arranged will continue in gentle and uninterrupted action from twelve to twenty-four hours, according to circumstances. This last is the longest period that it can be allowed to go unremoved: the sores require cleaning and dressing, and the surface of the zinc becomes covered with a thick oxide, which must be removed to restore its freedom of action; this may be done by scraping or polishing: but it will be better if removed

twice a day, both for the greater security of a permanent action, and for the additional comfort of the patient.

The treatment during a paroxysm will be very simple. The tight parts of the dress, if there be any such, should be loosened; the head a little raised; a piece of wood or wire introduced into the mouth and held between the teeth to prevent the tongue from being bitten. The face may be sprinkled with cold water.

For a plain sensible view of the treatment of epilepsy, I refer you to the article on the disease to Dr. Cheyne (*Cyclop. Pract. Med.*), and for copious details on all the points of pathology and treatment to Dr. Copland's Medical Dictionary. Both these works are now in the course of republication in the United States.

DISEASES OF NUTRITION — CACHEXIÆ.

LECTURE CXXII.

DR. BELL.

DIFFICULTY OF CLASSIFICATION OF DISEASES, termed Cachexiæ—Cullen's and Copland's definition—Dr. Williams's explanation of morbid deposits.—SCROFULA—Is not contagious, but spreads by hereditary transmission—Cullen's definition; its incompleteness.—*Symptoms and Progress*—Countenance—Swelling of lymphatic glands, cellular tissue, and joints—tumid abdomen—Irritation of the ocular, nasal, and pharyngeal mucous membrane—Swelling and other changes of the tonsils; cough; ulcerations of the tongue; disorder of digestive mucous membrane.—The scrofulous *facies*.—In a more advanced stage, inflammation and ulceration of the lymphatic glands of neck—Discharge of pus and cheese-like product or tubercle—Abscess of cellular tissue—Similar cacoplastic deposits in serous membranes, and in pancreas, liver, mesenteric glands and urinary and genital organs.—The bones, especially the extremities of long bones and the vertebræ affected—Curvature of the spine and distortion of the thorax—Scrofulous disorders of the skin, eye, and ear—Irregularity in nervous and muscular systems—Brain and senses sometimes very susceptible—Sometimes great vivacity—sometimes dulness—Intellect sometimes precocious, sometimes deficient—Irritative fever—Complicated with uterine disorders, hysteria and epilepsy—Special *pathology* of scrofula—deterioration of blood and deposit of granular pus and tubercle.—*Causes*—Inherited predisposition the chief cause—Scrofula preserving its characteristic features in all countries and climates—Transmission by descent more general than supposed—Affinity between tubercle and scrofula—Acquired diseases of parents—Cause of scrofula in their children—syphilis; excessive venery; paralysis; insanity—Hereditariness does not pass over one generation to appear in another—Cause not unit—Difference in the age of the parents—Effects of French conscription—Crowded lodgings—impure air—defective nutriment—Examples—Scrofula prevails in the negro population—Morbid states—as the exanthemata—exciting causes of scrofula.

HITHERTO a tolerably natural division of diseases, on a physiological basis, has been followed in these lectures, by Dr. Stokes and myself, and you have had placed before you, in regular series, descriptions of the diseases of the *digestive*, *biliary*, *renal*, *genital*, *respiratory*, *circulatory*, and *nervous* apparatus, a great majority of which you were taught to observe and to combat under two aspects, of increase or diminution of the phenomena of tissue and organ; inflammation and its morbid products coming under the head of the former;

debility and anemia with various associated disturbances of the nervous system under that of the latter. There have been, however, even thus far, notable exceptions to this simplicity of pathological outline, as in the instances of tuberculosis of the lungs, bronchial glands and meninges of the brain, and in the case of melanosis and cancer of the lungs. These might properly enough be studied under the head of the class of diseases to which I purpose now, for a brief period, directing your attention, viz., those of nutrition, or the cachexiæ; but considering the irritation and inflammation of the lungs, glands, and meninges, respectively, and of the functional disturbances of respiration and innervation to which tuberculosis and cancer give rise in the organs in which they are deposited, our present distribution of them must, upon the whole, be regarded as the most appropriate.

In the diseased states of the economy, of which I am next to speak, the case is widely different. Whether it be a vitiated and often an inorganic product that may be found in very different and remote parts, and with which are associated disturbances and depravation of nutritive life in general, as in scrofula, or a gradual and successive poisoning of the tissues and a perversion of nutritive functions, as in syphilis, we shall find it impossible to refer these diseases to any one apparatus, or measure their anatomical lesions by the changes in any one texture. In the progress of these and some other analogous diseases, we meet, it is true, with inflammation and its destructive effects in different tissues; but still, no one of them can be called phlegmasia of any tissue nor of the tissues in succession; so, although they may be accompanied often by great debility and languor of function, neither can we speak of them as diseases of mere debility, measurable by dynamic forces. These are often, generally indeed, in their advanced stages characterised by anemia; but both an explanation of cause and a *ratio medend*, deduced from defective composition of the blood, would be fallacious.

These difficulties in the way of classification presented themselves even to nosologists, who did not confine themselves either to an organic or to a physiological basis, but who were content if they could find affinities in groups of symptoms, as in *febres*, *phlegmasiæ*, &c. The diseases now under notice they were obliged to designate by the term *cachexia*, from κακος, ill or bad, and εξις, habit, which by its extreme generality conveyed really an abstract idea, not deducible from the state of any one organ, or even combination of organs, but of the whole body without specification. Thus we find the definition of *cachexia*, which is the third class in Cullen's Nosology, to be — "a depraved habit of the whole, or great part of the body, without any primary fever or nervous affection." Dr. Copland (*Dict. Pract. Med.*) amplifies the definition in these terms: "Depravity of the constitution, without fever, affecting more or less the solids, the circulating fluids, and the secretions." In the third order of this class, or *Impetigines*, Cullen places scrofula, syphilis, scurvy, elephantiasis and lepra, as genera in the order here mentioned.

Even at the present day, with a more intimate knowledge of the condition of both the solids and fluids and of their precise products in the diseases now under consideration, we have made little advances

in their nomenclature and classification, and we are fain still to use the epithet cachectic to express a state of general feebleness of function and depraved secretions, associated with altered relations of the component elements of the blood to each other. Nor, if we wish to be more specific, can we do without the expletive prefix, of *kakos*, or bad, as, for example, in the term cacoplastic applied by Dr. Williams (*Principles of Medicine*, par 452), to that low grade of morbid action in which, owing to the poverty of the blood in red particles, lymph of a granular nature or the formations described under the names of cirrhosis and granular degeneration of the kidney, and yellow tubercle, are effused and deposited. These products have still some organization, although of a very low grade. In degree beyond this again, more or less of the product of morbid action is aplastic, or totally incapable of organization; as we find to be the case with scrofulous pus or common tubercle (*op. cit.*, par 485, and 556, 557).

Scrofula. — After this brief introduction, I now proceed to speak of *scrofula*, a disease which, in its multiplied relations to other morbid conditions of the economy and in the associated derangements of function and its morbid and sometimes irremoveable products, as also by its frequency and hereditary transmission, assumes an importance beyond that of most diseases in the nosological catalogue. Scrofula is not contagious, but a community, in a period of years, will, in large numbers, be poisoned, one may say, by its diffusion, by means of alliances contracted between the diseased with the healthy, and their offspring again becoming so many fresh sources of propagation by subsequent marriage and parentage. But I am anticipating my remarks on the etiology of this formidable disease.

Symptoms and Progress. — Scrofula is defined by Cullen: "Tumours of the conglobate glands, especially in the neck, swelling of the upper lip and columna nasi; redness of the face and softness of the skin; bloating of the abdomen;" but this is quite too imperfect a specification either of seat or of leading symptoms; and is withal not distinctive even as far as it goes. Redness of the face and softness of the skin, for example, so far from being characteristic features, are only seen in some individuals of the sanguineo-lymphatic temperament. A white or muddy complexion and dry rough skin are quite as commonly met with in the scrofulous diathesis. The tumid abdomen is often associated with swelling of the mesenteric glands, which are, at the time, in a state of engorgement, similar to that of the lymphatic glands of the neck and the bronchial glands. Either occurring at the same time or alternating with the disorder of these glands, is indolent swelling of the cellular tissue, and some one or more of the joints. Irritation of the mucous membrane is seen at the conjunctiva and borders of the eyelids, and in the nose and throat, implicating, also, the tonsils, which are in a state of mixed chronic and subacute inflammation for a long period. The enlargement of these bodies irritates the glottis and keeps up a harassing cough, which, in its paroxysms, is accompanied by much hawking and thick mucous secretions, and occasionally, by partial efforts at vomiting.

It is of some importance for us to be aware of the appearance and organic changes of the tonsils in scrofulous subjects. These parts

are so affected as to jut out in rounded tumours from between the arches of the fauces; and they are peculiarly prone to inflammation, which, when it occurs, is often attended by so much swelling as to threaten suffocation, especially when stimulant astringent gargles have been incautiously employed. The inflamed tonsils become speedily spotted with aphthous crusts, which are succeeded by superficial ulcerations, always indolent, and sometimes ending in brown excavated ulcers, which have been known to exist for weeks without any remedy being used, and then yield to quinia or other preparations of cinchona.

Scrofula occasionally attacks the tongue, the disease alternating with strumous eruptions, especially on the face, and exhibiting in its progress small knots or nodules superficially imbedded in the substance of the organ, which are succeeded by sloughing ulcers, with much pain, profuse salivation, furred tougue, and fetid breath. Under proper treatment these ulcers become clean, contract and heal; but the hardness remains and smaller fresh ulcers form. The contiguous mucous membranes are frequently affected with scrofulous disease; as well those on the inside of the lips and cheeks and on the fauces, as on the pituitary membrane, constituting in the last case one of the varieties of ozæna.

The digestive mucous membrane is the seat of disorder at this time, manifested by irregular appetite and abnormal secretions — with alternations of constipation and diarrhœa.

As respects the scrofulous *facies* or countenance, M. Lugol justly remarks, that it is not so much indicative of the disease in general as of its appearance on the face. To this latter variety more peculiarly belong thickening and induration of the skin and cellular tissue, coryza, hypertrophy of the lips, *septum nasi*, cheeks, eyelids, and especially the borders of these latter, the lobe of the ear, but most of all the upper lip. These traits often prelude the invasion of tubercular phthisis; but we are not to look for them in the majority of manifestly scrofulous subjects.

In the occasional development of adipose and cellular tissue, constituting a certain degree of *embonpoint* and even freshness of complexion, the scrofulous diathesis may sometimes be so concealed as to simulate full health, particularly in women; but these appearances are deceptive, and too often are replaced by undoubted evidences of disease.

In a more advanced stage of scrofula we meet with inflammation and ulceration of the lymphatic glands, in which the skin also is destroyed, leaving an open sore, with irregular, jagged, and thickened borders, of a dull red colour. It is now that a characteristic secretion of imperfect granular pus and cheesy-like products or tubercle are seen. At times, the subcutaneous cellular tissue is the seat of chronic phlegmon passing into abscess — the cold abscess of some writers — which is accompanied with very little heat, and, in place of being circular, is usually oval. Tuberculous matter is occasionally found mixed with the imperfect pus and serous matter of these abscesses. Similar cacoplastic deposits are sometimes detected in the serous membranes, and in the pancreas and liver and mesenteric glands,

also in the urinary and genital organs of both sexes. Scrofulous ulceration of the uterus is a not unfrequent malady. The bones are often affected in scrofula: they become soft and vascular and especially in the spongy portions at the head of the long bones and the bodies of the vertebræ — giving rise to white swelling, separation of the cartilaginous coverings and caries, and to curvature of the spine and alteration in the natural size and shape of the thorax.

The skin is often the seat of troublesome and protracted scrofulous disorders, and particularly of the eruptive kind. The chief of these is the tubercular, which appear in preference on the face, neck, and upper extremities, and more frequently isolated than in clusters. Softening is one of their principal characters; but this is accomplished with extreme slowness.

Scrofulous irritation of the mucous membrane of the eye has been already mentioned among the earlier symptoms. I would now make the additional remark, that scrofulous or strumous ophthalmia is the most common variety of inflammation of the eye, and is, in fact, the chief disease among the children who are collected together in large numbers and are deprived of adequate exercise and fresh air, and not seldom, at the same time, of a suitable supply of wholesome and nutritive aliments. Beer relates that, in Vienna, nine-tenths of all the cases of ophthalmia in children are of a scrofulous character; and Benedict of Breslau estimates the proportion in that city as high as ninety-five in the hundred. With the variety termed *ophthalmia palpebrarum vel tarsi*, we are, also, familiar — the margins of the eyelids and the Meibomian follicles being the seat of the disease which causes vesicles and ulcerations in these parts. One of the most obstinate forms of scrofula, or rather a fixation of the disease, which it is most difficult to remove, is that seated in the lining membrane of the external auditory passage. It is usually marked by a profuse watery, thin mucus, and at length purulent discharge, forming what may be termed strumous otorrhœa. Seldom does it disappear under a period of some duration and without injury to the sense of hearing. In cases of greater gravity the membrane of the tympanum becomes inflamed and is perforated, the small bones of the ear are discharged and irremediable deafness ensues; or, perhaps, caries of the petrous portion of the temporal bone takes place, and the result is fatal.

Frequent irregularities are observed in the state of the nervous and muscular systems and in the circulation from the beginning of the first or forming period of scrofula. The brain and senses are often susceptible; the young subject manifesting great desire for variety of excitement and bodily movement, but soon tiring if indulged in this way. The disposition is capricious, in some cases prone to gaiety — in others habitually dull and sad. Equal differences are met with in the intellect, which is far from being as active and precocious as it is generally represented, in persons of the scrofulous diatheses. On the contrary, they are often slow of apprehension, if not positively stupid. The sleep is not sound, and is often disturbed by dreams.

Fever of the irritative kind, or that with a very frequent pulse and dry skin, and alternations of heat and cold, is quite common through

the whole progress of the disease. I have counted from 120 to 140 pulsations for weeks and even months in scrofulous children, from three to five years of age, in whom, at the time, there was no evident organic lesion, nor indeed any great functional disturbance except this of the circulation.

Various complications, if not themselves belonging to the disease, are met with in scrofula. Of these, I may mention uterine disorders, and particularly dysmenorrhœa and leucorrhœa, and great disturbances of the nervous system, such as hysteria, epilepsy, and certain forms of mental derangement.

The *special pathology* of scrofula may, in fine, be declared to consist in an altered condition of the blood, especially in a diminution of its red particles, and morbid or cacoplastic and aplastic deposits, granular pus, and crude, and, at times, infiltrated tubercle. I cannot convey to your minds better ideas of the state of the entire economy when under scrofulous deterioration, than in the following language of Dr. Williams (*Principles of Medicine*): —

"In persons of the diathesis now noticed, inflammation frequently runs a course, and leads to results different from those of inflammation in a healthy subject. Commonly the inflammation is more asthenic (§ 477); often it is more subacute or chronic (§ 479) than usual; but in all cases, its solid products are not euplastic (§ 450), as in healthy persons; and may be either cacoplastic (§ 452) or aplastic (§ 453), according to the prevalence of the scrofulous constitution, the texture affected, and the quantity of the inflammatory product thrown out. Where the scrofulous diathesis is most developed — where the texture inflamed is an internal one, not freely discharging externally — and where the product of inflammation is most copious, — there the deposit will be most aplastic, consisting of scrofulous pus or yellow tubercle, devoid of regular structure, and wholly insusceptible of organization; and being not fit for absorption, it operates as a foreign body, irritating, obstructing, and compressing the adjoining parts, in various ways detrimental to their functions and structure. Thus arise tuberculous or scrofulous deposits and abscesses in lymphatic glands, in bones, cartilages, and in the connected cellular textures, tuberculous infiltrations in the lungs, and deposits in serous cavities. Where the scrofulous diathesis is less pronounced, and the inflammatory effusion less copious and more gradual, the result may be a cacoplastic product, susceptible of only a low organization; as gray, miliary, and tough yellow tubercle; cirrhosis, atheroma of arteries, fibro-cartilage, and other degraded living solids. These have been already noticed (§ 453, 454), and will again come under consideration as products of altered nutrition. The aplastic tendency of inflammation in scrofulous subjects is sometimes manifest in other ways in different textures. Synovial membranes of joints are softened into a brownish pulp (Brodie); articular cartilages and the cornea ulcerate, from absorption predominating over effusion (§ 466); the integuments of the face and other parts inflame in small cutaneous tumours or tubercles, which ulcerate, and the ulcers are phagedænic, spreading and destroying the nose or adjacent parts, as in lupus.

"It seems, then, that the most constant peculiarity of scrofulous inflammation is, that it degrades or arrests nutrition, by supplying a material in a condition little or not at all susceptible of organization. This leads us to inquire what is the condition of the blood in scrofula; and we are answered by the interesting result obtained by Andral and Gavarret before mentioned (§ 454), that there is an excess of fibrin (§ 195), but a deficiency or red particles (§ 185). The fibrin is, however, defective in vitality; and this seems to favour the hypothesis that the red particles are concerned in preparing this plasma (§ 210); when they are deficient, it is ill prepared.

Causes.—Of all the causes of scrofula, inherited predisposition is, as in the case of so many other diseases, the most powerful. Identical in its main and characteristic features in all countries and climates, these are represented afresh from generation to generation until the prolific germ is lost by final deterioration of frame and constitution—a natural means devised by Providence for the extinction of disease in a particular family or race. Even where the births are numerous, if the scrofulous constitution prevail, death carries off the great majority before they reach the age of puberty.

The transmission of scrofulous tendency from parents to children occurs to a much greater extent than would at first be supposed, were we to restrict our observation to the common evidences of scrofulous diathesis in the former. Tuberculous consumption and scrofula are closely allied, and they who die of the former disease, after having had children, have transmitted the tendency to scrofula. Commonly, indeed, the same form of the disease, whether it be pulmonary tubercle, obstinate ophthalmia, abscess, caries, rachialgia, &c., is inherited; but still a large number of the scrofulous are descended from parents who perished by pulmonary tubercle. In children of the same family we see some tuberculous, others scrofulous, if we may still be allowed to designate by different titles that which is probably the same disease, modified by the tissues in which it appears. Hence, also, the scrofulous become readily in no small numbers phthisical. Even when parents apparently in good health, but who were scrofulous in early life, have children, these latter are extremely liable to and often, in fact, suffer from the disease. So, likewise, although the parents may themselves be exempt from scrofula, yet if their brothers or sisters have been afflicted with it, their children may also become victims to the disease.

Acquired diseases of the parents often give rise to scrofulous inheritance in their children, as, for example, when the former have had syphilis. So strong was a belief in this nature at one time, that Astruc and many physicians of the latter half of the eighteenth century asserted scrofula to be but degenerated or modified syphilis. It was, also, believed that a child would become scrofulous if the mother or wet nurse were affected with a syphilitic taint. The physical degeneration and extinction of so many families in Spain, caused by scrofula, are alleged to have for anterior cause syphilis, which became so common and committed such ravages after the discovery of America and the trade, wealth and vices which followed that memorable event.

Excessive indulgence in venereal pleasures has been indicated as another cause operating on those who afterwards became parents towards their procreation of scrofulous children. Precocious marriages, as well as where the parties were far advanced in life before becoming parents, are enumerated as farther causes of the inherited predisposition to scrofula. So, also, disproportion between the ages of the parents is alleged to act in a similar manner.

Still farther extension is given to the inherited causes of scrofula by M. Lugol (*Recherches et Observations sur les Causes des Maladies Scrofuleuses*), in his supposing, in addition to those enumerated, transmission by parents who have been paralytic, epileptic, or insane.

On this topic M. Lugol protests against the common belief that the hereditariness of scrofula may skip one generation to reappear at the next; or, in other words, that the disease of the grandparent, passing entirely over the immediate offspring, may show itself in the grandchild. This supposition would imply that a man can transmit to his child that which he himself has not, or that there can be an effort without a cause. It seems to me, however, that the proposition is not fairly stated. It simply means, as I understand it, that the diathesis is not so active in the father as to manifest itself in him, and yet he may transmit his constitutional peculiarities, which will be sufficiently strong, with the aid of external causes, to develop scrofula as it had appeared in the grandparent. More probably, however, the additional tendency in the child is the result of the transmission of something of a scrofulous diathesis from the other parent. The cause is not always an unit, even as respects hereditary transmission. Thus, for instance, the father is scrofulous and the mother too young, or the latter may be scrofulous, and the father have suffered from syphilis.

M. Lugol makes emphatic mention of the conscription in France as a great cause of the extension of scrofula among the people, and their physical deterioration in consequence. During the wars of the Revolution, or from 1790 to 1814, nearly a quarter of a century, France was in a state of almost continual war, at first for defence, and subsequently for aggrandisement, requiring all the time immense levies of men in the prime and vigour of life. The invalid, the infirm, or those who married in haste to avoid the conscription, were those that remained to become the heads of families and keep up the population. One of the effects of the deterioration noticed after the peace was the shorter average stature of the soldiers, so that the requisite number could not be found of the standard height, which was in consequence lowered. Peace we learn has brought about an opposite and better state of things.

Congregation of many children in the same house or room, and stinted or bad food, with deficient exercise in the open air, are frequent external or exciting causes of scrofula, and hence foundling hospitals and orphan asylums furnish every where such a large quota of the disease.

The direct or immediate effects of deficient and bad food are not so evident, as we might at first suppose, in the production of scrofula. This cause, when continued to the second generation, will have ef-

fected such a change in the growth of the tissues, and deterioration in the nutritive functions, as probably to develop the disease, more especially if the depraving operation of bad air have been concurrently active. A friend of Mr. Phillips (*Lectures on Surgery*) furnished him with the following results obtained from one parish in Wiltshire (England): "There are in this parish forty-nine families, the heads of which earn seven, eight, or nine shillings per week The number of children in these families amounts to one hundred and fifty-three; they have many of them scarcely rags to cover them; they scarcely get any animal food, and live principally on what would seem to be an insufficient quantity of coarse bread, potatoes, and some butter-milk. Of these children only three presented any of the usual symptoms of scrofula." Compared with this is the picure of a London population given by Mr. Phillips himself. In four courts in the parish of St. Marylebone, he found ninety-three families, containing two hundred and one children, the greater number running about, some engaged as errand boys; very few with shoes or stockings, most of them with clothing insufficient to cover them; scarcely any of them with enough to protect them from the cold; fed upon pretty good bread, potatoes, and an occasional piece of meat — in fact, much better fed than the children of the Wiltshire agricultural labourer. Of these children nineteen presented manifest signs of scrofula, affecting the glandular system, the eyes, or the bones.

In our own country, scrofula is far from being so prevalent as it is in different parts of Europe; but on the other hand we do not enjoy that entire immunity from the disease which some have pretended. In the negro population it is of not frequent occurrence. But it would be an error to suppose that the attacks of scrofula are restricted to the children of the needy, and the destitute with insufficient food. We know that, in Europe and occasionally in this country, we meet with it in persons very differently circumstanced; and I remember well hearing Alibert, when lecturing on the subject at the *Hopital St. Louis*, ask, with a somewhat triumphant air — if poor and insufficient food and other sedative causes brought on scrofula, and if it was a disease of mere debility, how came it to be so common among the well-fed English who ate beef-steak and drank porter? The sons of George the Third were sufferers from this disease; and it was to hide the disfiguration produced by the scars from scrofulous ulcers of the neck in the young princes, that the fashion of large rolling cravats was introduced.

After giving full weight to these exceptional cases, it is still, however, pretty evident that that portion of a people who live congregated together in close narrow streets, and dark and illy ventilated and damp or underground apartments, and whose food is bad and scanty, and clothing not adequate to protect them against atmospherical vicissitudes, are the greatest sufferers from scrofula. Deficient ventilation and want of active bodily exercise in the open air are the causes which can be most insisted on.

Various pathological causes, in the prior occurrence of different diseases, have been specified as productive of scrofula. Among these are

hooping-cough, and the exanthemata generally, and above all measles: these should, however be regarded as causes exciting into morbid activity the scrofulous diathesis, but not as producing it. Other morbid states, commonly spoken of as exciting or occasional causes of the disease, are, in fact, prodromes or precursors. Of this class are slow gastric fever, the fever of growth, slow dentition, and worms. Scrofula, supposed to follow at times abortion, is rather the predisposing cause of this state. Erysipelas is common in scrofulous subjects, and should be considered, moreover, as an exciting cause of the disease in them.

M. Lugol attaches little importance to all the occasional causes of scrofula to which I have just made brief reference. Their action he believes to be dependent entirely on the degree of inherited predisposition. He admits, indeed, that when some of these causes are permanent, they become decidedly injurious to the persons or people subjected to their influence, and preclude the possibility of the latter having robust children. The study of this part of the etiology of scrofula is important in connection with treatment, which cannot be efficacious so long as patients affected with the disease continue to live surrounded by and subjected to the causes.

LECTURE CXXIII.

DR. BELL.

SCROFULA (*Continued*) — *Treatment*—Indications of cure—Elements of disease presented by Dr. Williams—Importance of *prophylaxis*—Knowledge of causes suggests means of prevention—Outlines of prophylaxis and cure—Necessity of perseverance and of time for a cure—Proper notions respecting the tonic treatment—Purgatives to precede iron and iodine—Fresh air, wholesome food, and exercise, necessary conditions for curing scrofula—Use and effects of iodinic preparations—Small doses with large dilution to be preferred—No necessity for the large doses used by some physicians—Iodide of iron—Mr. Phillips's success with—Most convenient form—Iodide of zinc—Hydrochlorate of lime—Lime-water—Arsenic, to be kept back until other remedies are tried—Alternate use of iodide of potassium and carbonate of iron, or the potassio-tartrate of iron—Bromine—Bromides of potassium and of iron—Ointment of bromide of potassium—Cod-liver oil—Preparations of walnut leaves—Mercury; when admissible—When narcotics are proper—These combined with mercury or iodine—Most common forms or varieties of scrofula—Tabes mesenterica—Alleged connection with enteritis—Outlines of treatment—*Scrofulous Ophthalmia*—Symptoms and treatment—*Tuberculous affections of the skin*—General indications of cure—*White Swellings*—Modified treatment—*Diseases of the ear*—Importance of many remedies adapted to scrofula.

TREATMENT. — You are in a measure prepared, after the sketch which I have placed before you, of the scrofulous modifications of structural lesions of the tissues and organs, so different from simple inflammation and its consequences, and of the radical changes in the function of nutrition, to deduce the indications of cure of scrofula. Repeating the language of Dr. Williams (*op. cit.*, par 565): "The elements of disease chiefly to be kept in view in the treatment are: — 1. *The disordered condition of the blood, and its causes;* 2, *the disordered distribution of the blood, and its causes;* and 3, *the presence*

of the deposit, and its effects and changes. The second element comprehends the varieties of local hyperæmia, which we have found to be so much concerned in producing the higher kind of cacoplastic deposit (§ 553), and in promoting the formation and changes of those of a lower character (§ 560). Hence, the remedies against inflammation, determination of blood, and congestion, are frequently more or less needed in the prevention and treatment of cacoplastic and aplastic deposits. But, except as preventives, the utility of this class of remedies is generally limited to those of a topical kind, such as local bloodletting, counter-irritants, revulsives, derivants, and alteratives (§ 174)."

If in any disease the prophylaxis be regarded of paramount importance it must be in scrofula, of the approach of the bad symptoms of which such early premonition is given by the occurrence of various minor disorders, even if not by a marked and characteristic physiognomy. A knowledge of causes ought of course to suggest the necessity and means for their removal, and this alone will often go far towards an entire suspension of disease, and give the hygienic, and, if need be, therapeutical remedies, opportunity for complete recuperation. The blended outlines of prophylaxis and cure are well set forth in this paragraph of Dr. Williams's work, viz.: —

"566. The more constant and important element to be considered, in the treatment of cacoplastic and aplastic diseases, is the first named — the diseased condition of the blood; and this more demands attention, the more general and the more degraded are the deposits. The first point to be attempted is the removal or counteraction of the several causes before enumerated (§ 564), as contributing to induce the diseased condition of the blood. Thus a sufficient supply of food of a nutritive quality — free access of pure dry air and light, while the warmth of the body, particularly of the surface and extremities, is carefully secured — the removal or counteraction (so far as is possible) of diseases impairing digestion and excretion, and of depressing mental or bodily influences, — are among the first objects to be aimed at in treating cacoplastic diseases. Where excessive losses of blood or other evacuations have contributed to lower the plastic process of nutrition, a generous animal diet, and tonics, especially those containing iron, are especially indicated. Where the altered condition of the blood can be traced to an excess of ill-developed fibrin accumulating after the cessation of growth, the termination of pregnancy, the amputation of a limb, or the sudden stoppage of an habitual purulent or other discharge — means to eliminate the superfluous matter from the blood, either by increasing the natural secretions, or by establishing an artificial drain by blisters, setons, issues, suppurating counter-irritants, &c., are distinctly indicated; whilst tonic and invigorating measures may be also useful to raise the plasticity of the blood to a higher standard.

"The foregoing measures may be considered rather as preventive than curative; but in so far as they may succeed in arresting the growth of deposits already formed, and in improving the nutritive function in general, they will favour the limitation of the deposits, and their gradual absorption or quiescence in contraction (§ 557) or calcareous transformation (§ 561).

In order to give the requisite opportunities for the efficacious operation of the different agencies enlisted in the prophylactic and curative treatment of scrofula, their regular and persistent use for a length of time is of paramount necessity. Patients in chronic maladies or invalids threatened with the approach of disease are wearied if positively curative and renovating effects are not manifest in a short period of time; and physicians are too often prone either to partake of their discouragement or to fail to attach adequate importance to the prodromes or insidious approach of the disease. The change, whether it imply a removal from locality and lodgings in which the air is close and impure, or the substitution of plain, wholesome, and nutritive food for that deficient in these qnalities, must be extended beyond a few days or weeks, or even months, if we hope to produce any change in the diathesis and to prevent the speedy recurrence of the disease under the operation of the very first unfavourable causes.

The same rule of regularity and persistence for a lengthened period must govern in the use of analeptics or euplastic remedies, such as chalybeates and other tonics, so soon as we detect the even slight ophthalmia or chronic enlargement of the tonsils and certain physiognomical traits of facial scrofula. If there be thickening of tissues and glandular swellings, and the iodide of potassium be deemed useful, it also ought to be persevered in for a long time, alternately with suitable laxatives, or itself combined with a saline laxative, until the symptoms disappear and the diathesis be, in a measure at least, altered. In specifying chalybeates and iodine salt, I do not mean that the preliminary treatment should consist in the use of these articles, or be restricted to the classes which they respectively represent, but I instance them as the most active and the most generally useful both in incipient and in confirmed scrofula; and in order to impress on your mind the absolute necessity of continuing for a length of time either one article or a succession of articles until the organ may be supposed to be fully and permanently affected by them.

In undertaking the cure of scrofula, while we hold steadily in view the primary indications favourable to alter and modify the state of the blood and to prevent morbid deposit, or failing in this, then to bring about its absorption or its safe discharge, we are not to overlook the secondary functional disorders, nor omit to use the customary remedies for their removal. Hence, clear as may be the indications, under the general propositions just mentioned, to adopt the invigorating treatment, we are not to carry it out in the vulgar sense, by the uninterrupted administration of nutritive and medicinal stimulants, without regard to the state of the digestion and to visceral complications. The system can never be invigorated unless the stomach and bowels be fitted to discharge their chyliferous office. With this view it is necessary, in the disease before us, to act on them, at first, and occasionally at intervals in the subsequent treatment, by purgatives — compound powder of jalap, rhubarb and magnesia, senna and salts, sulphur water with a predominance in the first stage of saline substances, and, in the second, of iron. By moderate purging in scrofula we quicken the digestive action and increase the activity of lacteal absorption in one direction, and that of lymphatic and interstitial

absorption in another. We prepare also the way for tonics, so called, viz., vegetable bitters, quinia, and the preparations of iron, and the alteratives, such as iodine and the alkalies; the effects of which will be more sensible and salutary if laxatives be occasionally interposed.

But in order to render the above means at all available, we must enlist those other and antagonizing ones to the causes of the disease. These are wholesome nutritive food supplied in a quantity short of oppressing the digestive system; and country, at any rate, fresh and pure air, If, in addition to these, we can obtain the operation of active muscular exercise, we place the system of the patient under the sway of the genial and kinder influences, by which health is at all times most surely preserved, and readily recovered when lost. Mr. Phillips believes, "that by the well directed employment of strong muscular exercise, many cases of this disease, where even tumours are found in the neck, may be cured." M. Lugol speaks with great confidence of this means of cure, even in cases of white swelling of the knees and the joints of the lower limbs.

Of the iodine, in the form of the iodide of potassium in solution, and of a watery solution of the iodine through the medium of the salt just named, I can speak favourably from personal experience. But I must add, that I have found this medicine more serviceable in bringing about a healing process of the scrofulous ulcers, than in preventing the tumours from becoming open ulcers. In some cases, indeed, I succeeded in discussing the scrofulous tumours in the neck, which to all appearances would have ere long ended in ulceration. Commonly, I have directed an ointment of the iodiue and the iodide of potassium to be rubbed on the part in the form of ointment, at the same time that the watery solution was taken internally.

The proportion of the iodine to the iodide of potassium in the compound or Lugol's solution, is as one to two, viz., ℞. Iodin. gr. x., Potass. iodid. ℈i., Aquæ fluviatis vel pluvialis, ℥ij. Dose, ten to fifteen drops in a little sugared water for an adult and proportionately less for a child. More will be gained by the gradual introduction of the medicine into the system than by attempts at immediate saturation with full or large doses. These ofien irritate the stomach and cause some febrile disturbance, such as accelerated pulse, palpitations, vigilance, flushings of the face, throbbing of the temporals, dryness of the mouth, throat, and nose, and sometimes symptoms of coryza, with tremors, and, if the medicine be still continued, rapid emaciation. To give effect to any of the simple or compound saline preparations, large dilution is necessary, and hence the efficacy of various mineral waters which are strong therapeutically owing to their very weakness, pharmaceutically considered. On this account, I should give a preference to the weaker of the preparations recommended by M. Lugol under the head of ioduretted mineral water, as follows:—℞. Pulv. Iodin. gr. ¾, Iodid. Potass. gr. iss., Aquæ distillatæ, ℥viii. Of this an ounce to two ounces, farther diluted in sweetened water, may be taken two or three times daily by a child, and the entire quantity, or from six to eight ounces, by an adult, in the course of the day. The compound tincture of iodine, in which alcohol is substituted for water, in the

solution of the iodine with the iodide of potassium, is also directed in scrofula, but as more stimulating, its use should be restricted to lymphatic temperaments, in which there is an absence of undue gastric sensibility and, *à fortiori*, of irritation or phlogosis. The dose is ten drops, which may be gradually increased.

A simpler and still safer and quite efficacious preparation is the iodide of potassium alone, in simple watery solution. The dose for a child is from a quarter of a grain to a grain, gradually increased, in some instances to two and even three grains, although such an augmentation will seldom be required. Three grains is as much as is proper for a young subject during the twenty-four hours. I do not think that the instances recorded by different writers of the toleration by certain patients of enormous doses of this salt and of other preparations of iodine, ought to be received as a measure or guide for their habitual prescription and use in such doses.

The favourite preparation just now, for internal use, and the one which Mr. Phillips uses almost entirely, is the iodide of iron, the dose of which does not, he tells us, exceed in any case three grains three times a day. This gentleman has kept a register of 232 cases, in which he has exhibited the iodide of iron. The minimum dose has been a grain twice a day, the maximum that just stated. "Of these cases, only three times was it necessary to intermit the use of the medicines for a few days; in one of these it excited ptyalism; it was laid aside for a fortnight, again resumed and again produced ptyalism. Since that period, and within the last twelve months, the same patient, on her return from Margate, has been taking the medicine with the most decidedly good effects, and without ptyalism."

The most convenient form for administering the iodide of iron is the Liquor Ferri Iodidi of the American Pharmacopœia, in a dose of from twenty to forty drops twice a day in a little sugar and water. The iodide of zinc has been used with advantage. Muriate of lime and also lime-water have had their admirers. Arsenic is one of those remedies which ought to be kept in reserve until others have had a full trial. The alternate use, either from day to day, or from week to week, of the iodide of potassium, and of the carbonate of iron, or of another preparation to which I am partial, the potassio-tartrate of iron, will be followed by the good effects expected from the iodide of iron itself. This practice is to be preferred where the latter cannot be procured in a state of entire solution, as in the *liquor ferri iodidi*.

Bromine, combined with an alkaline base, and particularly the bromide of potassium, has been found quite efficacious both in scrofula and in chronic enlargements of the liver and spleen, and in some other affections in which the iodide of potassium is more frequently employed. The bromide is given in doses of from four to ten grains, three times a day, in the form of pill or solution, for an adult, but a fourth or a sixth of this quantity would be enough to begin with, in the case of a child between three and five years of age. This remedy is directed also in the form of ointment. Bromide of iron is, perhaps, Dr. Glover thinks, the most agreeable of the strong preparations of

iron—a praise which cannot be awarded to bromine itself, the sensation attending the swallowing of which is "truly horrid."

Cod liver oil has been not a little extolled for its curative powers in scrofula. The dose is from half an ounce, gradually increased to two or three ounces, three times a day — with a necessary proviso that the stomach of the patient can tolerate its use. Something of its disagreeable flavour may be mitigated by some aromatic oil or peppermint water or lozenges. In a child within the year a teaspoonful is an adequate dose. Containing as this oil does both iodine and bromine, it is a quite probable supposition that its virtues depend on these active elements. Its first or sensible effects are often nausea, sometimes vomiting, afterwards diuresis and diaphoresis, and laxative.

M. Negrier, of Angers, assures us that he has derived the most satisfactory results from the use of the preparations of walnut leaves. Each patient took daily two or three cups of infusion of bruised walnut leaves, sweetened with sugar or honey, and a four grain pill of the extract of the leaves, or a spoonful of syrup prepared with eight grains of the same extract to ten drachms of syrup. All the sores were washed with a strong decoction of the leaves, and covered with linen compresses steeped in the decoction, or poultices made with flour and the decoction. Seven of seventeen patients submitted to this treatment were cured after six months, and five nearly so. M. Negrier indicates his preference for the walnut leaves over all other anti-scrofulous remedies.

It was at one time an established rule in the treatment of scrofula, or where we had to deal with disease in a manifestly scrofulous habit, never to administer mercury. That there were good grounds for this prejudice one cannot deny; but to carry it to the entire exclusion of an occasional mercurial purge, and even mercurial alteratives, is going beyond the limits justified by experience. Thus, a purge of rhubarb and calomel will be useful to unload the bowels of accumulations which are so apt to form in strumous cases, and occasionally small doses of calomel, followed by rhubarb, magnesia, or saline medicines, serve to promote proper secretions both from the liver and the mucous follicles of the intestines, and thus aid towards a restoration of healthy digestion. The real error and positive mischief consist in a protracted use of mercury, or in making the whole treatment turn on the employment of the preparations of this metal, in place of regarding it as preparation for the true alterative course of fresh air, exercise, plain and nutritive food, bathing and friction, and the drinking of certain mineral waters. Failing soon to accomplish our purpose with mercurial alteratives, we must desist from their use, and rely on the means last mentioned, or have recourse to analogous agents of less equivocally salutary effects on the system. Of these, iodine in various forms, as already indicated, is entitled to our confidence, alternately, or even combined with certain vegetable bitters and earthy salts. If we have been properly instructed by a knowledge of the modifications which scrofula impresses on the morbid changes of the organs, we shall have recourse earlier to iodine and other alterative stimulants and tonics than the persistence

of some sub-acute inflammatory symptoms might otherwise seem to justify. Of the class of tonics the sulphate of quinia merits the earliest and most frequent trials. There is a state, however, of parts accompanied with great pain and some evidences of increased action of both the white and red vessels of a part, constituting mixed inflammation, which, though alleviated, is not cured by moderate depletion, and yet in which the use of tonics and stimulants is premature and injurious. In these cases, and they will include scrofulous tumours, both of the neck and mammæ, and of the mesenteric glands, as well as scrofulous enlargements of the uterus, testicles, &c., much benefit, certainly ease, is procured by selections from the class of narcotics. Of these, opium will, we must believe, ever hold the first place: next to it come cicuta, hyosciamus, belladonna, and stramonium.

In addition to their internal use, the external application of these narcotics in the form of poultices of the leaves, of fomentations by their decoctions, or of ointments and plasters directly on the part, constitutes an effective part of the treatment. I have, at times, combined the extract of belladonna, or, in other cases, of stramonium, with mercurial or iodide of potassium ointment, for a topical application, to be rubbed on, and then spread on muslin and put over the tumour. An old and favourite preparation, the camphorated mercurial ointment, in cases of indolent glandular swellings and diseased joints of a scrofulous nature, still deserves our confidence.

The use of external remedies in scrofula is not the least important part of the treatment. Simple enlargement of the lymphatic glands of the neck and other parts will be benefited by inunction with ointment of the iodide of potassium made of one drachm of this salt carefully triturated in a mortar with a drachm of olive oil, and then mixed up with six drachms of unguentum cetacei or of altheæ (simple cerate); or, in cold weather, of hog's lard. The ointment should be carefully rubbed in by moderate and even friction, night and morning, over and along the line or region of enlarged glands. A still stronger preparation is the compound ointment of iodine, made of a scruple of this substance with half a drachm of the iodide and seven drachms of lard, intimately mixed together in a mortar. The addition of half a drachm of rectified spirit to the two active ingredients prior to their incorporation with the lard will secure more entirely this process.

When the glands assume a more inflamed aspect, are tender to the touch or otherwise painful, washes of a solution of the acetate of lead, or cold poultices, kept moistened with the fluid, are serviceable. Contributing to this end, and at the same time acting as a discutient, is the iodide of lead, applied in the form of plaster or ointment.

As it is very desirable to prevent ulceration of glands affected with scrofulous inflammation, we shall not be backward in directing the application of leeches to the base and around the swelled gland, and afterwards warm fomentations. Then we have recourse to the cooling preparations already mentioned. These may be, on occasions, usefully alternated with some ointment or liniment of a narcotic extract, as of belladonna, or stramonium, cicuta, &c.

For scrofulous sores or ulcers, a great variety of external applications have been used; in the selection and succession of which we should be regulated by a degree of irritation and inflammation in them at the time; giving a preference at first to the sedative and narcotic with the emollient, and subsequently to the stimulating and even caustic articles. Seldom are scrofulous ulcers cured without recourse to this latter class, and that at a much earlier period than in the case of ulcers resulting from common inflammation.

Stimulant, *rubefacient*, and *caustic solutions* of iodine, are employed by Lugol of the following strengths:—

Stimulating Washes.			Rubefacient Solution.	Caustic Solution.
No. 1.	2.	3.		
Iodine . . . gr. ii.	gr. iii.	gr. iv.	℥iv.	℥i.
Iodide of Potassium . gr. iv.	gr. vi.	gr. viii.	℥i.	℥i.
Distilled Water . . ℔i.	℔i.	℔i.	℥vi.	℥ij.

Lugol uses the stimulating washes in scrofulous ulcers, ophthalmia, fistulous abscesses, &c. When the scrofulous surfaces require stronger excitement than usual, he employs the rubefacient solution. In tubercular tumours which have obstinately resisted all other means of treatment, the rubefacient solution may be applied in admixture with linseed meal (forming the *iodurетted cataplasm* of Lugol). To prepare the mixture, the poultice is first made in the ordinary manner; and, when moderately cool, a sufficient quantity of the rubefacient liquid is poured on it with a wooden measure. The caustic solution is used for touching the eyelids and nasal fossæ, to repress granulations, &c. — *Bell's Dictionary of Materia Medica* — Art. *Iodinum*.

Mr. Phillips makes an observation, in the accuracy of which I fully concur, viz., the rapid change which follows the employment of the iodine or the iodide externally, and which is manifested in a striking diminution of the tumour: but after a fortnight or three weeks the latter appears stationary. Then is the time to resort to a new form, which should be employed for a similar period, and in its turn give place to a third. Mr. Phillips, also, as I think, justly adds, that, without a concurrent internal administration of some preparation of the medicine, the effects of external applications are much less decided.

On the termination and mode of treating ulcerated scrofulous tumours, the remarks of Mr. Phillips will be found practically valuable. He warns us, that in the cases in which scrofulous matter has been deposited in its cheese-like form, "neither iodine nor any other remedy which we know, has power to procure its absorption; when it is deposited there it must remain; a point around which irritation is easily kept up, and about which, sooner or later, suppuration will take place, the abscess will either break, or art will interpose to facilitate this result by puncture, and it may thus be eliminated from the system." How very similar in these respects is tubercle to the cheese-like matter of scrofula? In a large number of cases, in spite of the most prudent treatment, the local disease will end in abscess; for instance, out of 89 cases, 33 presented this termina-

tion. It would of course be desirable that not only the thin seropurulent matter, which is usually contained in such abscesses, but also the scrofulous product should be evacuated before the thinning of the integuments has proceeded far and a violet colour is assumed. If the product have not undergone softening, often no evacuation of the matter will take place, but if it have, a slight oozing, bringing away from day to day small portions of this matter, will be the course of evacuation; and often, many months will elapse before the gland and its contents shall have been evacuated, and at the end of that time an unsightly cicatrix will be the consequence. This result is accomplished in the following way: one or two small openings in the thin violet-coloured integuments are the channels through which the matter is discharged. A more or less extended cavity exists under, produced by the breaking down of the gland and its surrounding cellular tissue. When the whole of this structure is broken down and evacuated, this surface presents granulations, which have a tendency to skin even without adhering at all, or on other occasions only partially, to the superjacent thinned integuments. The consequence of this is an irregular puckering surface, and when, as is often the case, the subjacent tissue becomes adherent to the deeper-seated parts, the deformity is increased by a pitting. To prevent this aggravation, two modes may be resorted to. When the time for procuring the evacuation of such a tumour has arrived — when the integuments have become much thinned — the best mode of opening it, is by applying the Vienna caustic paste to the part, taking care that the paste shall include the whole of the thinned structure. A fair and sufficient opening will be thus made; the evacuation will be more speedy, the remaining tissues will be healthy, and the cicatrix will be comparatively trifling. If, however, this have been neglected, or another course pursued — if the discharge be going on from one or more small points — if the integuments over the parts be very thin, then with scissors we should excise the whole of the violet integument, and we may then hope to lessen the deformity, which would otherwise succeed to the disease. But much valuable time would probably be lost, in the endeavour to heal the sinuses connected with the cavity; the various forms of iodine, in a more or less concentrated state, would have been applied to them, and the patient subjected to much suffering. And, here, Mr. Phillips states, in conclusion, that after much experience of such applications to these sinuses, he is decidedly of opinion that they occasion more pain and are much less efficacious than the nitrate of silver.

I must not terminate my remarks on the use of iodine externally in scrofula without mention of its application by means of a bath, as so strenuously recommeded by Lugol. The following table exhibits the proportions to which he gives a preference after many trials.

Baths for Children.				Baths for Adults.			
Age.	Water.	Iodine.	Hydriodate of Potassa.	Degree.	Water.	Iodine.	Hydriodate of Potassa.
	Quarts.	Grs (Troy).	Grs (Troy).		Quarts.	Drms (Tr).	Drms (Tr).
4 to 7	36	30 to 36	60 to 72	1	200	2 to 2½	4 to 5
7—11	75	48—60—72	96—120—144	2	240	2—2½—	4—5—6
11—14	125	72—96	144—192	3	300	3—3½	6—7

Hitherto I have spoken of the pathology and treatment of scrofula in general, without particular specification of seat, and of the modifications called for in the use of remedies. A few remarks must suffice on this latter part of the subject, which, viewed in all its amplitude, would bring under notice most of the diseases of the human frame,—since in nearly all of them we meet with scrofulous modifications.

The four most common varieties or forms of scrofula, are inflammation, swelling, ulceration, and tuberculous deposit in the lymphatic glands of the neck, which alone, in popular belief, constitutes scrofula; 2, analogous changes in the mesenteric glands, giving rise to a disease, *tabes mesenterica*, more thought of once than at present; 3, strumous ophthalmia; 4, white swelling; 5, certain skin diseases of the tubercular kind more especially. To this enumeration might with propriety be added those various disorders of the Eustachian tube and cavity of the tympanum, by which the sense of hearing is so often weakened and not seldom lost.

As much of what has been said on the general and topical treatment of scrofula was more directly applicable to the first form, or that in which the lymphatic glands of the neck are chiefly attacked, I shall not enlarge on it. The second, or tabes mesenterica, was briefly touched upon by Dr. Stokes in connection with ileitis. Without adopting it in all its entireness, he rather gave his sanction to the opinion of the Broussais school, that the irritation and enlargement, and subsequent morbid changes in the mesenteric glands, are consequent on the prior irritation and generally inflammation of the mucous coat of the ileum and its muciparous glands, and more especially at the origin of the lacteal-lymphatics that end in the glands. Now, although every one, who has made a few *post-mortem* examinations of subjects who during life had suffered from sub-acute and chronic enteritis, must have noticed this connexion, yet it would be an extreme and incorrect view to insist on these phenomena always thus co-existing. Every variety almost of morbid structural change has been seen in the mesenteric glands, in persons who have had either tubercular disease of the lungs or the tabes named after these glands, but without any lesion worth mentioning of the small intestines. Still, as the two forms of disease often co-exist, it is most prudent, while administering remedies with a view of curing the scrofulous diathesis, &c., resolving, if possible, the glandular tumours, to avoid irritating stimulants, whether they be nuiritive or medicinal, in our anxiety to meet the proposed indications from the tonic and invigorating treatment. We should keep clear, on the one hand, of diffusible stimulants, spices, and concentrated animal food, and on the other of

drastic purgatives. Excitable as many scrofulous patients are, and with their sensitive tissues very irritable, most stimulants would be almost as prejudicial as prolonged depletion. The former would increase any existing phlogosis in the glands or other organs, and in this way hasten their disorganization and the formation of tubercle, while the latter would at most only predispose to such formations.

If the diagnosis be clearly made out, and we have tumid abdomen and other symptoms of disorder of the lacteal glands, leeching at the iliac regions and a few mercurial laxatives may well precede and, with a wise discretion, alternate with the use of the recognised tonics. With these latter remedies we shall be more inclined, in the disease now before us, marked throughout its course as it so often is by symptoms both of intestinal and vascular irritation, to combine narcotico-sedatives, such as cicuta, stramonium, &c. It is under such circumstances that the blue pill has been found to be of undoubted efficacy, but never continued so as to produce pytalism. Inunction of the iliac and inguinal regions with mercurial ointment, or, if fears be entertained of its specific action, with ointment of the iodide of potassium, may now be employed as a discutient or resolvent with benefit. With these remedies should be associated the simpler vegetable bitters, and decoction and syrup of sarsaparilla ; and in completion of the course, if need be, to correct increasing or persisting anemia, the use of chalybeates, including the iodide and bromide of iron, with which may be occasionally alternated the sulphurous waters or the sulphuret of potassa, in small doses, with large dilution.

As the skin is dry and harsh in this disease, it will be necessary to act on it by at first the warm and vapour bath, and afterwards the cool salt bath ; and, if season and other circumstances allow sea-bathing.

Scrofulous ophthalmia, already mentioned as so common a disease among children, is distinguished, in addition to symptoms common to it and conjunctivitis, by small pustules, phlyctænæ, on the cornea or sclerotica, or most frequently on the boundary between them. The occurrence of these characteristic elevations in strumous ophthalmia, has led Mr. Mackenzie to regard this latter as an eruptive disease, affecting the conjunctiva, not as a mucous membrane, but as a continuation of the skin over the eyes ; and hence he calls it phlyctenulæ ophthalmia. Another symptom very common in this disease is the great sensibility of the return to light (*photophobia scrofulosa*), which has no proportion to the redness of the conjunctiva, nor to the inflammation. Redness, by the way, is not a necessary feature of scrofulous ophthalmia ; and when it does occur, it is more apt to affect the palpebral lining than the extension over the globe of the eye. There is often a copious flow of tears when the affection begins. With the morbid and excessive sensibility of the eye to light is generally associated disordered state of the digestive canal — white and furred tongue, costiveness, distended abdomen, morbid appetite, and grinding of the teeth during sleep. In the beginning the head is hot. There is generally an aggravation of symptoms during the day.

The organic changes often produced in the eye by this ophthalmia, are thickening and irritation of the conjunctiva and ulceration of the phlyctænæ, or the vessels which pass from the conjunctiva to the cornea,

and in place of ending in the ulcers extend and unite by their ramifications over the latter, and make the whole corneal covering or conjunctiva thick and vascular (*pannus*). The cornea becomes of a dull and brownish tint from interstitial deposition and sometimes effusion of blood. The iris occasionally becomes adherent to the cornea, which latter, being weakened, yields to the pressure from within, and then is produced the unseemly protuberance called *staphyloma*. In more advanced stages, or in originally more violent cases, the sclerotic coat and iris may be implicated, and we have hydrophthalmia and *staphyloma sclerotic*æ.

The *treatment* of scrofulous ophthalmia must be begun, if possible, by a removal of the child from the spot in which the disease originated, and in which it was subjected to the deleterious influence of impure air in crowded rooms by day and dormitories by night, and also of inadequate food. The first remedies will be laxatives of calomel and rhubarb, followed by compound powder of jalap. To these succeed calomel with chalk, or very minute doses of tartar emetic, or some laxative saline solution. This latter will contribute to restore the skin to its healthy function. To this end ipecacuanha and magnesia will also be useful. Occasionally leeches to the angles of the eyelids or the temples, or cups on this region, may be called for by the violence of the inflammation, although this will generally be amenable to the judicious use of antimonials.

Aware of the scrofulous nature of the disease and witness to the feebleness of nutritive life in the little patient, we shall soon have recourse to tonics after preliminary evacuation, but without waiting for that entire absence of all febrile irritation which, in the case of the simple phlegmasiæ, would be the most judicious practice. Of the class, the sulphate of quinia and the iodide of iron are entitled to the preference: they may be used in succession in the order in which I now speak of them, or in alternation. Between these may be interposed narcotics, if there be much irritation either of the eye or the general system. Kopp and Otto both speak in terms of the highest praise of the use by the conium maculatum in scrofulous ophthalmia. The formula is—℞. Extract. con. maculat. ʒi., Aquæ cinnam. spirit. ℥ss. Solve. Of this, give to children from three to five years, four drops three times a day, increasing the dose a drop at each time, even till it reach ten.

The regulation of the diet is of paramount importance in this, as it is, indeed, in all the forms of scrofula. At first the food should be of a reduced kind and in small quantity; but, before long, nutritious, without, however, being stimulating. Together with a liberal allowance of articles of varied vegetable origin we allow animal food once a day in moderate proportion.

The clothing ought to be warm and adequate to the covering of the whole body; particular vigilance being displayed in protecting well the feet against both cold and moisture.

Change of air laid down *in limine* as one of the first preliminaries for treatment, often works wonders; and more especially if it be from town to country, and in the summer season to the sea-shore, with the additional benefit of sea-bathing.

Various collyria of the narcotic and stimulating kind are had re-

course to earlier in this species of ophthalmia than in the simple inflammatory. Of these, preference has been given to tincture of opium, alone or in union with camphorated mixture, and solution of nitrate of silver, four or five grains to the ounce. Pencilling the skin of the eyelids by this solution, but of greater strength, or with the tincture of iodine, has been set forth of late as a good remedy. Counter-irritation by small blisters behind the ear or on the nucha, or better still croton oil, or tartar emetic ointment rubbed on these parts or between the shoulders is serviceable. In irritable habits, and in those in whom there is little organic life, blisters are troublesome, and sometimes have created mortification.

As a general plan of treatment, Mr. Lawrence (*Treatise on Diseases of the Eye*) finds "none more successful, after putting the alimentary canal in proper order, than the use of the emetic tartar ointment, with the sulphate of quinine internally, tepid fomentation, and regulation of the bowels by means of rhubarb."

Disorganising inflammation of the cornea, or in the more deep seated structure of the eye, is to be resisted by the cautious use of mercury, while the tonics before mentioned are to be used. In those insidious ulcerations affecting other tissues than the eye, I have had reason to be satisfied with the alternate use of mercury and of some iodine preparation.

If the extreme irritability of the eye is not speedily relieved by the general treatment, recourse may be had, with promptly good effects, to the extract of belladonna, in solution, introduced between the lids.

White Swelling of the Joints. — Under this common, although far from expressive or pathologically accurate title, I shall make a few remarks, chiefly in relation to the scrofulous diathesis of the subjects of this disease and the modifications of treatment demanded.

The scrofulous affections of the joints appear either in the form of inflammation of the synovial membrane with the secretion of curdy pus, or in that of inflammation in the cancellous structure of the bones, from which tuberculous matter is deposited. In this latter the cartilages and synovial membrane are secondarily affected. The most frequent seats of scrofulous articular disease are at the hip and knee-joints.

The disease sometimes begins with a dull and occasionally an acute pain of the joint, which is seldom continued, and may, after a period of varying duration, disappear, to return again, however, and become more persistent. Pressure increases the pain, or first developes it in some cases, whilst in others it elicits no complaint. Generally the pain is greater at the hip than the knee. I have seldom seen greater suffering than in a case of scrofulous inflammation of the hip in a little girl between five and six years of age, who had been allowed to remain in this state for some weeks without any regular treatment. Swelling of the part now shows itself, at first, from increased secretion of the synoval fluid; and, afterwards, or, in other subjects, from the inflammation and deposition at the spongy termination of the long bones where they contribute to form the joint. It is needless to describe minutely the anatomical changes in the synovial, osseous, and cartilaginous systems of the joint; but of their danger and often intractable character we can

have a good idea, from seeing the progress and results of inflammation of the cervical lymphatic glands. If cheesy or tuberculous deposits remain interfering with and stuffing up, as it were, the glandular tissue, how much greater is the risk of their mischievous action by interfering with the organic functions as well as the physiological ones of the joints, the attrition of which on each other is often painfully interfered with by the dryness and loss of secreting power of even a minute portion of the investing synovial membrane. Fever, night sweats and diarrhœa show the shock which the constitution has received from the protracted irritation of scrofulous joints, under the effects of which the patient ultimately sinks, emaciated and in the extreme of exhaustion.

The *treatment* in scrofulous affections of the joints will be general and local. The first is the more important of the two, and, until fully established, we cannot promise ourselves much from the latter. It consists, at first, of free purging; and if the inflammation of the joint, pain and febrile disturbance be considerable, bloodletting, preferably by cups or leeches on or near the joint; but if these means are not at hand, by venesection. But it should be borne in mind that even although the blood may show a buffy coat, for there is often an excess of fibrin in this fluid in scrofulous subjects, still we are not justified in having recourse primarily to, or in repeating the operation, merely on account of the violence of the pain, but rather with a hope of moderating the local inflammation and gaining time for the administration of remedies calculated to alter the scrofulous diathesis. Holding this intention steadily in view, we are not to carry out a rigid antiphlogistic treatment, such as would be called for in the simple phlegmasiæ; but after bloodletting, if it was necessary, and after and in the intervals between the administration of purgatives, allow the patient a moderate supply of nutritious substances; such as bread or rice and milk, well boiled potatoes mashed with milk, or flavoured with a little butter; bread and molasses, &c. So soon as the disease assumes a chronic character we should allow animal food once a day in addition to an adequate supply of vegetable matters.

If we begin purging by calomel and rhubarb, we should continue it at short intervals with some one of the following preparations: compound powder of jalap, senna and salts with manna, rhubarb and magnesia, sulphate of potassa and rhubarb; or compound extract of colocynth. Early recourse should be had to the use, internally, of the iodide of potassium, and if there be much languor of the functions, and cold skin, the iodide of iron, alternating with sulphate of quinia. Narcotic extracts will be administered here with similar views to those by which they were directed in scrofulous ophthalmia.

Counter-irritation to the skin of the joint constitutes the chief part of the local treatment. I need not specify the means by which this is accomplished. According as we desire simple rubefaction, vesicular eruption, vesication or pustular inflammation and ulceration, we shall have recourse to liniments, with water of ammonia or oil of turpentine as the basis, then croton oil, cantharides plaster, or tartar

emetic ointment. Firm and equable pressure by compresses and roller sometimes gives relief and aids absorption in the more indolent varieties of white swelling. Like all other parts of the treatment of scrofulous disease, counter-irritation must be maintained for a length of time before we can expect to see any notable change. Some physicians have spoken highly of the effects of tincture of iodine rubbed freely over the whole joint, and, after fomentations or cataplasms, to be again applied at moderate intervals. Coincident with the view under which the tincture is advised, is the use of the ointment, simple or compound, of iodine, to be rubbed over the joint, for a quarter of an hour at a time, twice daily.

Tubercular affections of the skin and others of a different class, such as eczema and some of the varieties of herpes, if not of direct scrofulous origin, are so much modified in their progress by the diathesis of scrofula as to require a constitutional treatment in accordance with this view; and local remedies must be regarded as of secondary importance in our *methodus medendi* in such cases. It is in these that, in addition to the alternation of antimonials with mercurials in alterative doses, and the free use of iodine and chalybeates, we sometimes find it necessary in the end to use arsenic. A powerful combination of mercury, iodine, and arsenic, called Donovan's solution, or solution of the iodide of arsenic and mercury, has been of late employed with great success in these and some other of the more intractable diseases of the skin. Beginning dose, five drops.

LECTURE CXXIV.

DR. BELL.

SYPHILIS—LUES VENEREA—Its divisions into local or primary, and constitutional or secondary syphilis—Two varieties of the local form—First, or gonorrhœa, not properly a syphilitic disease—Already treated of—Local or primary syphilis—Symptoms; chancres or sore of genitals; characters of Hunterian chancre; not diagnostic of syphilis; appearance of sore varying with the tissue affected—Not different degrees of poisoning and corresponding sores—No connection between appearance of primary sore and secondary eruption—True test of a venereal sore; inoculation propagating the like—A certain period of maturity for the poison to be transmissible; four or five days—Mistakes in diagnosis of sores on the genitals organs and of those on other organs—Poison sometimes transmitted by the medium of a person who does not receive the contagion—*Bubo*, secondary to chancre and to other sores on penis, and other causes—Inoculation, test of venereal bubo.—TREATMENT OF PRIMARY SYPHILIS—Prophylaxis to prevent disease at all, and next to prevent progress after first symptoms—Destruction of chancre necessary, or its conversion into a common sore—Remedies—General treatment; rest and antiphlogistic regimen; chancre persisting, the treatment required—Phagedænic ulcers—Mercurial dressings not required—Mercurial treatment of primary syphilis compared with non-mercurial—Safety and greater expedition of the latter—Mercury useful at times—Salivation unnecessary—*Treatment of bubo*—French practice successful before suppuration; Ricord's directions after suppuration.—SECONDARY OR CONSTITUTIONAL SYPHILIS—When syphilis is constitutional—Progress of disease in its successive stages—Hunter's description—his first and second stages corresponding with Ricord's secondary and tertiary forms—Proportion of cases in which secondary symptoms occur—The less proportion the sooner the primary disease is cured—Modes of transmission of secondary syphilis—Generally not communicable—Occasional suspension of symptoms—Difficulty of diagnosis of secondary syphilis—Varieties of venereal

eruptions; of sore throat—*Treatment of Secondary Syphilis*—Attention to co-existing acute diseases—These to be cured first—Derangements of function to be removed—Treatment, varying with the constitution, habits, and other diseases of the patient—Remedies in first stage or secondary form of constitutional syphilis—Mercurials useful; and occasionally iodine—Syphilitic ulcerations—Their appearance and treatment—Vegetations—In tertiary symptoms, or the second stage of Hunter, the iodide of potassium the chief remedy—Attention to the symptoms of phlogosis; these to be met by appropriate measures—Cyanuret of mercury; its advantages over the bi-chloride.

Syphilis — Lues Venerea — Pox. — In the practical summary which I propose to make of the venereal disease, it will be my endeavour to avoid giving additional cause of complaint, that, while treatise is added to treatise and volume heaped upon volume, the elucidation of the mysteries of the disease is not yet accomplished. I shall not be voluminous, nor shall I mysticise you by new and startling deductions; nor indulge in the oracular on the strength of alleged discoveries. After this pledge, it would hardly be consistent for me to attempt even a brief sketch of the contradictory opinions which have been advanced respecting the epoch and the place at which syphilis first appeared — whether it was known to the ancients, or whether it is a modern disease; and, admitting the latter, whether it is of European origin, or derived from America by the first discoverers of this continent. Of one thing we are pretty sure, that the disease did not attract general attention, nor become the subject of formal and repeated professional description and narrative, until after the siege of Naples by Charles VIII and his French troops in 1494. Comparing the accounts of syphilis at that period with its symptoms and progress at the present day, it is palpable that, although we fail to trace it to any distinct source, it engaged general attention in the latter part of the fifteenth century, owing to an epidemic aggravation by which it assumed the character of an eruptive fever almost contemporaneously with the appearance of the local contagion; or at a date after this latter incomparably earlier than the cutaneous symptoms now show themselves.

Divisions of Syphilis. — Syphilis has been divided by Hunter into local and constitutional; the first is that in which the parts only to which the poison is applied are affected; the second that occurring "in consequence of the absorption of the venereal pus, which affects parts while diffused in the circulation." Of the local form he and most writers make two varieties. "In the first, there is a formation of matter without a breach of the solids, called a gonorrhœa; in the second, there is a breach in the solids called a chancre." The local is, also, called primary syphilis, which includes, 1, gonorrhœa and gonorrhœal ophthalmia, or catarrhal affections, the non-virulent venereal diseases of Ricord; and 2, chancre or primary syphilitic sores, the virulent affections of Ricord.

The first of these varieties, or gonorrhœa, although a contagious disease, the product of a specific virus, cannot, it seems to me, be classed properly under the head of true syphilis, nor allied to chancre, which is the first or true primary stage of this latter. Gonorrhœa is a local disease; whether the matter producing it be in its usual seat, the urethra, or, as sometimes happens, affects the eye. No se-

condary symptoms properly constitutional appear, nor do we meet with a poisoning of the different tissues, and, as we have reason to believe, the blood itself. For this reason I described gonorrhœa among the diseases of the genital organs, and postponed any notice of syphilis until I could speak of it in its proper place under the head of cachexiæ, as a disease affecting the whole system; although it is undoubtedly local in its origin, and this origin generally in the superficial part of the genital organs. But to describe syphilis as a malady of these organs would be as unpathological as to call inoculated small-pox a disease of the skin of the arm, because the virus had been inserted in that part, and the first pustule appeared there.

Local or Primary Syphilis. — I shall, therefore, regard chancre, or an analogous sore on the genitals, as that which represents and is included under the title of local or primary syphilis; and shall afterwards notice, under that of secondary and constitutional, a series of symptoms and morbid phenomena evincing lesions of tissues and diseases of remote and dissimilar organs.

After a period varying from twenty-four hours to some weeks, from the date of sexual intercourse with a diseased person, the one hitherto healthy will have a sore on some part of the genital organs, which may be either erythematous or pustular. It shows itself in the male most frequently on the frænum or in the angle between the prepuce and glans. There is at first itching of the part, which is gradually changed into pain; the surface of the prepuce is excoriated and afterwards ulcerates, or in other cases a small pimple or abscess appears, which forms an ulcer. "A thickening of the part comes on, which at first, and while of the true venereal kind, is very circumscribed, not diffusing itself gradually and imperceptibly into the surrounding parts, but terminating rather abruptly. Its base is hard and its edges a little prominent." Such is the description by the author himself of the so much talked of Hunterian chancre, which was by him and many others believed to have a distinctive appearance, any ulcer on the parts wanting which could not be truly venereal. But an observation which Mr. Hunter himself makes immediately afterwards might have saved a deal of useless argument and commentary on this subject. It is, that, if the venereal poison be applied to the skin where the cuticle is more dense than that of the glans penis or frænum, such as that upon the body of the penis or forepart of the scrotum, a pimple results, which is commonly allowed to scab, owing to its being exposed to evaporation. The scab is generally rubbed off, and one larger than the first forms. Here we see that the same poison applied to two different tissues, or rather to two varieties of the same tissue, the muco-cutaneous and the cutaneous, will give rise to sores with such different physiognomies.

The fact is, that a great number of sores of different aspects may appear after impure coition, and be truly venereal. This variety was, however, alleged to indicate corresponding varieties or degrees of local poisoning of less virulence than that which gave rise to the true chancre. The first were called pseudo-syphilitic or syphiloid; the last alone was declared to be properly syphilitic. This, we are now pretty sure, is mere speculation. With Dr. Colles we might say, primary vene

real ulcers present an almost endless variety of character. As a sequence to this proposition, we are safe in denying that any definite relation exists between a particular form of primary ulcer and of secondary syphilis, as of eruption, for example. Have we any diagnostic test of true primary venereal sore? Until within these few years past the reply would have been in the negative, unless it had been said that the subsequent symptoms and course of disease, such as secondary syphilis, would decide. Now, however, owing to the talent and persevering industry of M. Ricord, we have such a test established by inoculation of the fluid of the suspected sore. If this latter be truly venereal, its fluid product introduced by inoculation into any part of the cutaneous surface will produce a similar sore; from which again its like may be transmitted in a similar manner, and so on indefinitely. But if the sore be not venereal, no result will follow the inoculation. Tried by this test the fluid of gonorrhœa did not give rise to a venereal ulcer, and but seldom to any kind of sore.

The experiments by inoculation were made on the patients themselves; that is, the matter of the sores with which they were affected was applied by inoculation to their skin alone—M. Ricord not believing himself justifiable in inoculating the healthy, at the risk of inflicting on them a serious and, in many of its aspects, a hideous and terrific malady. M. Ricord experimented with the matter of all the sores of secondary syphilis, but in no instance was any one of them propagated by inoculation. Even the primary syphilitic ulcer or sore is not transmissible in this way in all its stages; and hence one chief cause of the failures reported by those who assert that they have followed the suggestion and practice of M. Ricord. In order that secondary syphilis should supervene, it must be after a chancre or venereal ulcer of some (four or five days) duration, counting from the date of the infection. The most characteristic feature of chancre, the indurated margin, begins, according to M. Ricord, at the fifth day. "Mostly," he adds, "they are indurated chancres which are followed by secondary symptoms, and this induration would seem to indicate that the venereal principle has penetrated the system, and as long as it does not take place, we may conclude that the disease is superficial. I shall have occasion soon to show that, although in most cases the secondary has no other origin than the local and primary syphilis, yet, in some other cases, it is caused directly by contamination from those who are at the time suffering from the secondary disease."

Two errors are sometimes committed in the diagnosis of primary syphilitic sores, owing to their commonly having but one seat, viz., the genital organs of either sex: First, when any sore is seen on these parts, it is too readily assumed, or at any rate suspected to be venereal, particularly where the general character of the individual does not present a guaranty against exposure to the cause; and second, sores really syphilitic may be overlooked, or their nature misunderstood when they appear on other parts than the genital organs. Any part of a mucous surface or abraded skin may serve for the reception of venereal matter of chancre; and, accordingly, we find, at times, the accidental application of this latter to the anus, mouth, eyes, and ears, has been followed by similar chancre or sore and its customary con-

sequences. Dressers in the hospitals, or accoucheurs in making examination *per vaginam*, who may have had slight excoriations on the finger or at the junction of the epidermis near the nail, will sometimes contract primary syphilis. Although the disease is caught almost uniformly from another who was suffering under it at the time of sexual connection, yet there are instances of women who have had intercourse with diseased individuals, and afterwards communicated it to other men, without having become infected themselves.

Bubo, enlargement with inflammation of the lymphatic glands, for the most part of the groin, is an occasional, and it must be admitted, a troublesome aggravation of primary syphilis. Neither its absence nor its presence makes a difference in the features of the primary sore; nor do the secondary symptoms assume any peculiarity by its intercurrence. Bubo in its appearance, or tested by any organic change and symptom, offers no indication of its origin or real nature. Any lesion of the glans penis and often of the urethra at its upper part will give rise to bubo; hence we must expect to meet with this kind of glandular enlargement as merely sympathetic, following common abrasion and irritation of the glans penis and preputial covering, and even the pressure on the toe by a tight boot. There is, also, the bubo from gonorrhœa, which is sympathetic, and finally the true venereal bubo, the product of the absorption of virulent matter of chancre. The test by which to determine the real character of the bubo is stated by M. Ricord to be inoculation. If it be venereal, the pus in it after suppuration will give rise to chancre and its sequences; but otherwise not. In some rare cases we are told that bubo appears without any antecedent abrasion or ulcer of the penis; but even these may be supposed to have preceded from concealed chancre in the urethra, or to have followed a minute sore, too slight to have engaged attention before it had dried up, for, on questioning closely the patient, he will sometimes admit that there was such a slight sore on the glans penis or the prepuce. It is not sufficient, however, that a bubo ensue on a chancre in order to be virulent: it must be the consequence of the direct absorption of the virus by the lymphatics, and its introduction into a gland or ganglion. Sometimes in a large bubo we find suppuration of the cellular tissue surrounding the gland; and this latter itself in a similar condition. In this case it is the pus from the gland alone that, by inoculation, will give rise to primary syphilitic ulcer.

Treatment of Primary Syphilis. — It may be asked, before speaking of the remedies for actual chancre, whether something may not be done in the way of prophylaxis, and thus entirely prevent the disease. In reply, it is known that various washes have been recommended, some even before coition, but most immediately after it, with a view to neutralise the poison, supposing that the other party may, at the time, be labouring under the disease. The success of some of these applications has been asserted with considerable confidence, because we are told they neutralise and destroy the venereal virus. But this fact is not conclusive of their efficacy under the particular circumstances required; as they cannot always be applied to the delicate surface of the glans and corona penis of the strength that would prove adequate to destroy the contagion. M. Ricord found, indeed, that whenever

he added to the virulent pus of a chancre a caustic alkali or a weak acid, it was decomposed as dry animal or organic matter would be. In the same way the mineral acids and acetic acid, and the pure chlorides mixed with virulent pus, prevented it from producing its specific or poisonous effect by inoculation. The decomposing or prophylactic power of these substances does not extend, however, to the virus after it has been introduced into the tissues and infected them.

It remains then to determine whether prophylaxis in a more restricted sense may still be carried out so as to prevent the successive stages of primary and the coming on at all of secondary syphilis. On this point there is considerable difference of opinion among practical men. M. Ricord assumes, as the first and essential part of the treatment, the destruction by caustic (cauterisation) of any sore, be the solution of continuity ever so slight, that appears in the genitals after suspicious coition. Even after the lapse of three or four days the complete destruction of a primary venereal sore, chancre, or other variety, will sometimes prevent any farther progress of disease. "Whatever form a chancre may assume in its commencement, it ought to be treated by the abortive method; for there is no authenticated instance of ulcers destroyed within the first five days after infection, having afterwards given rise to secondary symptoms." Mr. Carmichael, Dr. Wallace, Sir George Ballingall, and other gentlemen with large practical opportunities of observation, adopt a like course. When we speak of cauterisation you will understand, not the entire destruction of the sore, but that of its virus and of its features, so that it is converted into a common ulcer or simple sore. Until this result is procured, the application of the caustic (nitrate of silver or fused potassa) is to be renewed after the fall of each eschar. In the meantime the ulcer should be covered with dry lint, and spread, as some advise, with simple ointment, on which may be placed a bread poultice on fine linen moistened with dilute solution of sugar of lead, and the whole covered with a piece of oiled silk. So long as suspicion attaches to the ulcer, it is extremely desirable to check the secretion and to absorb it as soon as secreted. Dry lint, by forming a kind of sponge, fulfils one of these indications; astringent washes carry out the other. Of these, M. Ricord is particularly partial to the aromatic wine of the French pharmacopœia; which is made by digesting four ounces of aromatic herbs, rosemary, rue, &c., in two pints of wine for eight days. The ulcer is to be well washed with this liquid, but not so as to make it bleed, and then lint moistened with the wine is to be applied. Before removing the dressings they should be moistened with the same liquid. In some cases of more copious secretion, a wine of tannin, made by the addition of two scruples of pure tannin to eight ounces of wine, may be advantageously substituted. If a more sedative action be desired, the addition of eight or ten grains of opium to the ounce will be directed.

This method of treating primary syphilitic ulcers without complication is the one which I have myself adopted with entire satisfaction, and is to my mind preferable to that advocated by Dr. Colles, who recommends that no attempt should be made to alter the natural features of the ulcer, the true Hunterian chancre, from the observing

which, he alleges, so many useful indications to guide us in the administration of mercury may be drawn.

During this first period of syphilis the patient should be enjoined to remain at rest, to adhere to a cooling regimen, and, if his habit require it, antiphlogistic remedies are to be used. Much irritation at the sore itself and symptomatic fever may sometimes require the use of leeches; but from the tendency of the bites to give rise to sores analogous to the primary one, it is advisable to apply them to the ulcerated spot itself. But, as this is not easy, it will be safer still to select a surface in the neighbourhood, such as the dorsum penis or groin, carefully protecting it by cerate and lint from the possible application of virulent pus until the leech-bites are healed. In anemic constitutions, on the other hand, a mild nutritive regimen and the simpler tonics are admissible.

The aborting treatment by cauterisation not proving successful, or the period of chancrous ulceration having been too long to allow of a hope of immediate eradication, the milder measures should be resorted to if we would avoid the complications and exasperation of symptoms arising out of erysipelatous inflammation and phagedænic ulcer. But, even although we may not encounter these in the case of our patient, we still must be prepared to meet with an indolent and stationary ulcer in which the secretion is dried up. If this is secondary on, or an imperfect cure of, the simple chancre, we suspend the use of the stimulants and astringents before recommended and have recourse to opiate cerate, made by adding an ounce of the vinum opii to a pound of lard, or emollient fomentations with the addition of a decoction of poppy. I have used in such a case, and I may add in venereal ulcers generally when cauterisation was not practised, the chloride of lime or of soda in solution.

Phagedænic ulcers, including the ulcerative and the sloughing, must be treated according to the extent of inflammaton of the parts and the constitutional sympathies, as well as prior habit of body of the patient. In the inflammatory variety, the cooling and antiphlogistic course is to be fully carried out; and after the subsidence of local and constitutional irritation, recourse may be had to the nitrate of silver, pure nitric or nitro-muriatic acid, and an alcoholic solution of corrosive sublimate for topical applications, and the iodide of potassium internally. Fistulous cavities are to be laid open. In the irritable phagedænic ulcers, these local remedies are preferable.

I have said nothing, hitherto, of mercurial dressings, ointments or washes, in primary syphilitic ulcers; and if I now advert to the subject, it is to caution you against their use, in the early periods particularly, as they have caused complications and results of the most troublesome kind; such as increase of secretion, a disposition to spread and burrow, and augmented sensibility.

A few years ago and it would have been regarded a still more serious if not criminal oversight to neglect the constitutional treatment of primary syphilis in all its varieties by mercury in some form or another. Into the history of the fluctuations of opinion and practice respecting the employment of this powerful medicine for good and for evil, I have not space to enter; nor is it necessary for our

guidance. It is sufficient for me to say, that tens of thousands of regularly recorded cases of primary syphilis have been treated without the use of mercury, in hospital, army, and private practice, and with results that attest the entire safety and propriety of this course. In Sweden, cases have been under treatment to the number of 40,000, in the various hospitals, both civil and military; one-half by the simple, the other by the mercurial method. The proportion of relapses by the former is stated to have been seven and a half, and that by the latter thirteen and two-thirds per cent. Dr. Fricke, in the Hamburg General Hospital, found, after an experience of four years, in which 582 patients were subjected to a mild mercurial treatment, and 1067 to a non-mercurial one, that the period of treatment was longer, relapses were more frequent, and secondary syphilis more severe when the mercury had been administered. Dr. Fricke insists on the four following indications in his non-mercurial treatment: the observance of strict cleanliness; perfect repose; a rigid diet; and the employment of antiphlogistics. More than five thousand patients have been treated by him without mercury, and he tells us, he "has still to seek cases in which that remedy may be advantageously employed." MM. Devergie and Rufz give returns corresponding with those of the German physician, just quoted. Dr. Fricke and M. Devergie make the duration of the mercurial treatment to be, respectively, eighty-five, and eighty to ninety days, and of the non-mercurial, fifty-one, and from thirty to fifty days. Without adducing farther evidence, we are now justified in replying in the affirmative, and in an opposite sense to the answer given by Sir Charles Bell to his own question: "Is there any experienced member of the profession, who, having a son of eighteen or twenty, and that son having a chancre, that would treat him without mercury? No: there is not such an unnatural person" (*Institutes of Surgery*). The comment on this is brief. That course of treatment which a professional man would recommend to any one of his patients, be he rich or be he poor, on a point especially touching the health in all after life, is such as he would recommend for his son; and that which he may deem essential for the latter cannot be withheld from the former. I, for one, would not hesitate, from the results of my own experience, to continue the non-mercurial practice. It is that which I have carried out for many years, and I have found no reason for misgivings as to its propriety.

But it would be absurd, on the other hand, to refuse determinately to give mercury in all cases and in every stage of syphilis. Where the ulcer is stationary, especially where it is indurated, we should prescribe mercury as we would do in any kind of obstinate ulcer, as an alterative, alternately or in combination with purgatives at one time and tonics at another. There is an additional propriety, in using mercury at this time, to expedite the entire healing of the ulcer, which cannot be said to take place if a hardened cicatrix remains, from the fact, that the risk of the occurrence of the secondary symptoms is in direct proportion to the period a primary sore remains open. Assuming this to be correct, the milder preparation of the blue pill, and next to this calomel, alone or conjoined with some narcotic extract, is to be pre-

ferred. Of late years the iodides of mercury have been highly extolled, but upon somewhat speculative grounds. The indication for continuing the use of mercury will be a salutary change in the sore: but if the latter be aggravated by extending the inflammation or in other ways, we desist from this medicine. In no case is is necessary to salivate the patient, and in every one a proper regimen should be insisted on, and the common and probable causes of disease sedulously withheld. Most of the bad effects of mercury and of the prejudices against it have arisen from its being pushed to the extent of causing ptyalism, and the associated irritative fever and subsequent feebleness of function. Any notable deviation from the usual state will be a signal rather to desist from than empirically to continue the use of mercury.

The *treatment of bubo* is to be conducted on the same principles and by the same remedies as in chancre. If there be febrile excitement or disordered digestion we may sometimes direct venesection and always purgatives. We shall have recourse more freely to leeches in the first stage of swelling, with heat and other phenomena of inflammation. Preference may be given to the method of M. Gama, chief surgeon to the Military Hospital of Val-de-Grace, which consists in applying four or five leeches at first, and when the bleeding begins to be diminished, to apply another relay of leeches, and so on, in order to keep up a flow of blood for a day. The disease still persisting, a blister is to be put on, of the requisite size to cover the tumour, and on the following day, when the epidermis is detached, a small portion of the lint is to be moistened with a solution of the bichloride of mercury, twenty grains to the ounce of water, and laid upon the denuded surface. This is to be kept in its place for two hours by bandages, or strips of adhesive plaster; when it is removed, a dark brown eschar will be found already formed. The parts are now to be covered with a simple poultice, a cooling lotion, or a solution of opium, and the patient is to keep as quiet as possible till the eschar thus produced has separated: when this has taken place the tumour is found materially diminished, or altogether gone. If the tumour be of large size, or very indolent, a second or even third repetition of the process may become necessary. This practice, recommended by M. Malapert, a French army surgeon, against the incipient bubo, either indolent or inflamed, has since been extended by M. Reynaud, with almost equal success, against bubo in its second and third stages, even where the collection of pus has been considerable. Hundreds of cases of bubo have been and are daily thus treated successfully in the French army without the patients being confined to bed, or without their taking mercury internally, or using it by friction. The practice has been adopted in the French Venereal Hospital, by MM. Cullerier and Ricord, with marked success. (Parker — *The Modern Treatment of Syphilitic Diseases, &c.*) The popular treatment for a number of years past in the United States, one from which I have found often advantage, consists in the application of a blister to the bubo and dressing the vesicated surface with mercurial ointment. If objections be made to the blister, or if the tumour be indolent, assi-

duous friction with mercurial or iodide of potassium ointment, and dressings of the same kept on the part, will sometimes prove to be an excellent discutient. It has even been recommended to use this kind of friction around the base of the swelled gland while the vesicated process was going on over its summit and body. Compression alone and friction with mercury, or of some iodinic preparation, will sometimes resolve the bubo: compresses soaked in a dilute tincture of iodine also tend to the same end.

When suppuration has taken place the practice generally recommended is to open the abscess, even though it may be at some depth below the surface; but it is only when the skin is deadened that caustic is used for the purpose. The open sore assumes very much the appearance of a scrofulous ulcer, and is to be treated accordingly. If, however, the edges of the incision ulcerate and the cavity enlarges under the skin, M. Ricord, after the second day, fills the latter with powdered cantharides, and covers the whole with a blister. The next day, if any induration be present, he applies mercurial ointment, and dresses the cavity with aromatic wine: but if otherwise, he dresses the surface of the blister with cerate, and covers it with compresses dipped in white decoctions, continuing the wine for the cavity. When the skin at the margin of the opened bubo hangs loose, is bluish and indurated, the repeated application of the nitrate of silver restores its borders to a healthy granulating action, and saves the necessity of recourse to its removal by excision or destructive cauterisation.

As regards the antisyphilitic by which so many understand the mercurial treatment, it is not more called for in bubo than in chancre. On general principles we may have recourse to mercury, as a salutary alterative and with a view to resolve glandular swellings, but not to correct or neutralize any specific taint or virus. With similar intention, iodinic preparations and the compound syrup of sarsaparilla may be used, and, judging from the results of my own experience, with beneficial results.

Secondary or Constitutional Syphilis.—After the absorption of the venereal poison and its passage through the lymphatics and glands into the general system, a new series of disorders is gone through, to which we affix the term of secondary or constitutional syphilis. They are divided into two stages; the first shows itself in disorders of the skin, throat, or mouth; the second, not so well marked as the former, is manifested by disorders of the periosteum, tendons, fasciæ, and ligaments. The progress of the disease, in its successive stages, is admirably portrayed by Hunter, to whose Treatise on the Venereal Disease, with Mr. Babington's notes, I would earnestly recommend you. If not the only work, it ought, of right, to be the first to which you will give a place in your shelves. Next to Hunter, for originality and useful applicableness of principles, is the Treatise of M. Ricord on Venereal Diseases. This latter gentleman divides the phenomena of constitutional syphilis into secondary and tertiary, which correspond closely to the two stages in the first and second order of parts affected in lues venerea, as laid down by Hunter. These divisions are not arbitrary nor unproductive of practical results, since the remedies useful in the one stage or order of parts diseased, are

inapplicable, and, in some instances, positively injurious in another order.

The proportion of cases of primary syphilis, in which the secondary or constitutional disease shows itself, has not been accurately ascertained. Its occurrence has been variously estimated after the two modes of practice, the mercurial and non-mercurial, adopted in the primary disease. If the latter have been followed out, the proportion of relapses or secondary symptoms is, we learn from one series of estimates, reduced to ten at the lowest, or at the highest to twenty, in the hundred. M. Bacot's summary makes the proportion at least one in ten, of secondary symptoms where no mercury had been given; whereas, on the contrary, the proportion of such cases is only one in seventy-five, where that remedy had been employed. But, on the other hand, the advocates of the non-mercurial practice allege that the cure which, in so many cases was a systematic abuse of mercury, since it implied salivation and that often profuse, gave rise to those very secondary or at least analogous symptoms which it was intended to prevent; or at any rate, that a hybrid disorder, more complicated, more exhausting, and not seldom more fatal, was induced by the liberal employment of mercury in primary syphilis. If we are to receive as accurate the estimates deduced from so many thousands of cases in different countries treated without mercury, the duration of which was so much shorter than that of those in which the mercurial practice had been followed, and then connect this fact with the postulate, that the speedier the cure of the primary disease the less risk is there of the secondary supervening, we cannot but believe there is some fallacy in M. Bacot's deductions, or imperfection in his data.

All persons are not susceptible of secondary symptoms, and, with M. Ricord, we are obliged to admit, that the occurrence of the latter is favoured by certain constitutional peculiarities which we cannot define. Sudden changes in the habits generally of the patient, pregnancy, disorders of the digestive system, habitual irritation of the throat, mouth or skin, and scrofula, are specified by him as causes predisposing to the supervention of constitutional disease. A practical inference of great moment deducible from this belief, is, that, in connection with the early cure of primary symptoms, should be careful attention to the general health.

The general proposition, that secondary syphilis in all its stages is incommunicable, is liable to some exceptions. A mother labouring under syphilis may communicate it to her child *in utero*, and the child may be infected after birth by a nurse who has at the time syphilitic ulceration of the nipples, or by its mother under the same circumstances, if the disease of the nipple have been derived from a strange child; but we are told, curiously enough, that no instance is known of a child, diseased in the manner just specified, infecting its own mother, although it will readily transmit the syphilitic disorder to a strange nurse. A woman thus affected, and in whom, together with ulceration of the throat and cutaneous eruptions, there are moist excrescences about the pudenda, may transmit the disease to the husband. Dr. Colles believes that the secondary form of syphilis may be farther imparted to other members of the family, by contact, use of the same

utensils, &c. He asserts, that its contagious property, but not its virulence, increases in proportion as it extends farther from its source.

The period which elapses between the appearance of primary syphilis and the occurrence of the secondary disease varies. It may be within two weeks, more commonly it is two or three months, and even longer. Tertiary symptoms, those occurring in the second stage or second order of parts of Hunter, appear at an indeterminate period. The stationary nature and occasional suspension of all the secondary symptoms are well described by Dr. Colles (*Practical Observations on the Venereal Disease and on the Use of Mercury*).

The precise *symptoms* of secondary syphilis and the order of succession are admirably described by Hunter; but with all the attention that has been given by him and others to the subject, the task of diagnosis is still difficult, whether we have regard to the ulcerations of the throat and mouth, the eruptions on the skin, or nodes and other affections of the fibrous system. In this, as in other cases of doubt, we must form our own opinion, not so much from any one symptom as from a review of all the symptoms and circumstances connected with the disease. The variety of venereal eruptions is so great as to baffle description; and if we were to try to affix certain characteristics to them in general, such as copper-coloured or circular blotches or a mottled state of the skin, we should only mislead. Most of the forms of skin disease may show themselves with a syphilitic hue or modification. The more distinct forms of these eruptions are described, under the following divisions, by Mr. Babington (*Notes to Hunter on the Venereal Disease*, Am. Edit., p. 262-4) into—1. Tubercle; 2. Lichens; 3. Psoriasis and Lepra; 4. Rupia. M. Rayer, in his great work on the Skin, after enumerating under the head of Syphilides, or venereal eruptions, twelve forms, specifies them in the following order of frequency: Tubercles, squamæ, papulæ, excrescentes, exanthemata, secondary cutaneous ulcers, phlyzacious pustules, alopecia, onychia, bullæ, vesiculæ. To the description of these he devotes nearly a hundred pages of his book.

In venereal sore throats the variety is little short of that observed in venereal eruptions. They are described by Hunter and Babington, and classified by the latter. The most general form appears to begin in the centre of the tonsil. In the early stages it is attended with very little pain or swelling, and is seldom observed until it has formed a distinct ulcer. This species of sore throat often attends tubercular eruptions on the skin. Venereal sores often commence on the surface of the mucous membranes, by a small foul ulceration, which passes at an early period into rapid and extensive sloughing. These ulcers frequently accompany rupia. A third appearance, which is shortly described by Hunter under the name of an ulcerous excoriation, is of very common occurrence. It is distinguished by the opaque white colour of the surface. This complaint very often accompanies psoriasis of the skin.

Treatment of Secondary Syphilis. — The great outlines of treatment of constitutional syphilis are soon laid down. They include attention to the state of the system generally and the removal first of acute diseases which may be associated with the venereal. The

young and hitherto vigorous subject, or one of a full habit, may require venesection and the antiphlogistic regimen, including the free use of antimonials, and low diet. He, whose digestion has long suffered, must have this rectified by appropriate means, medicinal and hygienic. The reduced and exhausted by long dissipation and profligacy, and the constitutionally lymphatic and anemic, will be benefited by tonics and nutritive food, and indispensably require fresh air, and if it can be procured, tepid and warm bathing. To these latter the iodide of iron will do double service, both by giving tone and removing in a degree at least the syphilitic disorder.

In the first stage or secondary form of constitutional syphilis, that in which the mucous membranes and skin are more especially affected, mercury finds its most numerous and rational advocates; nor does scrofulous complication prevent its use by some of the most experienced of these. In English and American practice, inunction and the blue pill, or calomel and opium, are more commonly directed. In France and on the continent generally, a marked preference is given to corrosive sublimate, combined with opium or aconite. I ought, however, to except M. Ricord and a few others who recommend at this time the proto-iodide of mercury. He begins with one grain for a dose, combined with opium or extract. cicutæ, the latter in quantity from three to five grains, and he carries the iodide as far as six grains in the day, but does not exceed this. Where there is much restlessness and irritability, no uncommon associates of constitutional syphilis, opium, extolled almost as a specific in the early times of the venereal disease in Europe, has been of late more appreciated for its curative virtues, in addition to its purely anodyne properties. As an adjuvant to mercury and iodine, it is worthy of all notice. I shall not pretend to deny the utility of the mercurial practice in secondary syphilis, but I can speak confidently after positive experience of the success attending the use of iodine in tincture, and of the iodide of potassium, with the compound syrup and decoction of sarsaparilla in cases of venereal disease, both of the tonsils and mouth, and tubercular ulcerations—after mercury had been prescribed by those who preceded me in vain.

In speaking of secondary forms of syphilis I did not advert to the syphilitic ulcerations which properly belong to them. They have generally a specific character, are excavated with thickened and defined edges, and a foul surface, secreting an offensive pus. Their situation is generally about the nose, the edges of the mouth, the eyelids, the ears, or the mastoidean region; they are also common upon the mammæ, near the umbilicus, in the axilla, the groins, or around the edges of the nails. The constitutional syphilitic ulcer often makes its appearance in the form of fissures, depending upon the disposition of the skin in the parts where the ulceration then takes place: these varieties are seen upon the skin of the scrotum, in the vicinity of the anus, the umbilicus, or the commissures of the fingers and toes, the folds of the skin of the eyelids, the lips, the palms of the hands or soles of the feet. — (Parker, *op. cit.*)

The treatment of these ulcers will be governed by the same principles as those by which we are guided in that of primary syphilitic sores

and tubercular ulcerations; but, in addition to local remedies, constitutional ones will, also, be demanded, such as the preparations of iodine, or of mercury or arsenic, as recommended in the syphilides generally.

Vegetations or excrescences, of varied form and appearance, upon the skin or edges of the mucous membranes, constitute the last variety of the syphilides or venereal diseases of the skin; and I may add, that they are often, to the last degree, hard to remove. Sometimes they are mere results of balanitis or posthitis. Various stimulating and cauterising applications have been used for their removal, such as solutions of corrosive sublimate, sulphate of copper, nitrate of silver, and chloride of zinc; or chlorides of lime or soda, mild but very useful remedies in these cases. The article which is most eulogised, however, at the present time, for topical use, is the muriate of gold. When the vegetations are clearly of venereal origin, or coincide with constitutional symptoms, an internal treatment is required, mercurial or otherwise, as may be indicated by all the circumstances of the case.

It is more especially, however, in the tertiary symptoms, or where the fibrous and osseous systems are affected, as with nodes, periostitis, nocturnal pains, caries and tumours of the bones, &c. that the best results have been obtained from the use of the iodide of potassium. M. Ricord begins with a dose of ten grains, dissolved in an ounce of distilled water, distributed through the day; and increases it by ten grains every three days. He has carried it as far as a hundred and forty grains in the day without any bad effect. I give you the observations of this able writer and practitioner, but without recommending you to imitate him in administering such very large doses of this medicine. I have derived all the desired effects from it in doses not exceeding five grains daily. Its salutary operation is aided by preparations of sarsaparilla. In constitutional syphilis supervening on a scrofulous diathesis, the iodide of potassium, while a powerful, is a safe and benign remedy, and has, under such circumstances, great advantages over mercury.

In periostitis forming a node, you will not neglect to use the remedies indicated by this inflammation as if it had occurred without any syphilitic origin; and hence cups around and close to the node, or leeches directly on it, followed by blisters, will be found of themselves excellent discutients, and prepare admirably for the use of the iodide of potassium, both by inunction on the part and internally.

In these tertiary forms of syphilis, mercury has been found to be generally inefficacious. M. Biett has treated some cases successfully with the arseniate of soda.

When, a little while ago, I told you that the bi-chloride of mercury was the favourite preparation with continental surgeons in the treatment of constitutional syphilis, but added that with some of them the iodide of this metal was of late preferred, I ought to have apprised you of the fact of the cyanuret of mercury having supplanted the bi-chloride in the practice of such experienced persons as M. Cullerier, for example. The cyanuret is more soluble and not so liable to decomposition, acts more quickly, and does not occasion those pains in the stomach and bowels that so frequently accompany the

prolonged administration of the bi-chloride. It may be administered internally in pills or in solution, and externally in form of pommade or ointment. Dose, from a sixteenth of a grain to a grain. Mr. Parker, in his useful summary of the pathology and most approved modes of practice in syphilis, gives a number of formulæ for the administration, both internally and externally, of the cyanuret of mercury.

FEVERS.

LECTURE CXXV.

Fever—General considerations on—Erroneous modes of investigation—Importance of the labours of French pathologists—complication of fever with local disease—Primary and secondary fevers—Relation of, to local changes—tendency to spontaneous termination—Principles of treatment—Errors of Brown and Broussais—Researches of MM. Gaspard and Magendie—Their pathological conclusions—Importance of the knowledge of secondary lesions—Effect in preventing crisis—Treatment—Humoralism and solidism.

It may be safely asserted, that in the whole range of medical science, there is no subject on which so much has been written and so little known as fever. You will find, in the writings attributed to Hippocrates, a series of observations on the rise, progress, and termination of febrile affections, which it must be acknowledged are characterized by singular beauty and truth; and I think I may venture to say, that such is their extreme accuracy, such the comprehensiveness, acumen, and power of the master mind that made them, that scarcely a single one has been overturned by the researches of modern times. From the period of Hippocrates almost down to the present day, the contributions to this department of medicine, though numerous and varied, were of very inconsiderable importance; they effected little towards the improvement of our knowledge of fever, and many of them were calculated rather to puzzle and mislead, than to throw light upon what was difficult and obscure. In place of studying the phenomena and effects of fever, instead of applying themselves to what was tangible and useful, the minds of medical men were occupied in tedious but profitless attemps to discover the proximate cause of fever, and it was to this subject that the labours of some of the greatest men in medicine were exclusively directed for a series of years. The consequences of this was, that our knowledge made no real progress, and as little was known about fever in the time of Cullen and Brown as in that of Hippocrates. We had innumerable discussions as to its cause and nature, we had a vast quantity of learned writings and ingenious speculations, but they produced nothing available for practical purposes, nothing tangible or real. The investigators failed, because they reversed the Baconian method of arriving at the truth; they first built up a theory, and then thought to make the phenomena of nature square with it; they forgot that, to be truly philosophical, we must first recollect, compare, and arrange facts; and, when we have done this, we may deduce from them a theory, cautiously, and

with a strict regard to truth. They did not pursue this course, and the consequence is that they added nothing to the sum of our valuable knowledge. Their disciples knew nothing more than was known to Hippocrates; in fact, they knew less, for their notions on the subject of fever had reached them through an erroneous and distorted medium. The followers of Cullen viewed it through the theories of Cullen, the Brownists through those of Brown; both alike forgot nature, and both were consequently inferior to Hippocrates in true knowledge. They attempted to discover the proximate cause of fever, and they failed, as men generally do, when they attempt to investigate first causes. We know very little, indeed nothing, of the nature of first causes; they are, and will in all probability remain for ever, beyond the range of human intellect. It may be argued, that Cullen and Brown did not seek to ascertain the first cause, but only the proximate cause of fever; but this is only a play upon words, both are shrouded in the same obscurity, and in both the same difficulty attends our investigations. Even suppose we say with Cullen, that fever is a spasm of the extreme vessels; or with Brown, that it is asthenia of the whole system, what do we learn by this, or what use is our knowledge? Have we more defined and accurate notions of fever? — Certainly not. They failed, as all men do who occupy themselves in the fruitless labour of searching after first causes. There is but one First Cause, and even of Him we know nothing accurate, but what He has vouchsafed to reveal.

Modern pathologists have pursued a course very different from this, and the consequence has been that they have arrived at the most splendid results. Instead of attempting to investigate proximate causes, they have studied the *phenomena and effects of fever*, they have examined dead bodies, they have accurately appreciated the series of pathological changes they present, and endeavoured to connect those changes with the symptoms. In this great work the French pathologists took a prominent part; indeed, I think it may be asserted, without fear of contradiction, that a vast proportion of our improved knowledge on the subject of fever is due to the French. It has been, I regret to say, too much the fashion to decry the labours of the French pathologists; but I believe this has been chiefly done by persons who would gladly possess the knowledge they affect to despise. The French pathologists have pursued with respect to fever the same method they have so successfully employed in the investigation of other diseases; and though their researches have not thrown any important light on its proximate cause, they have taught us a vast deal as to its phenomena and complications, they have established a great number of valuable facts, and unfolded a series of beautiful truths; and, I need not say, that it is in the appreciation of these facts that a proper knowledge of fever consists.

In the first place, they have strongly drawn the attention of the medical world to this great truth, which should be engraven on your minds — *that mere fever, without local disease, is of very rare occurrence.* Here was a new and extraordinary light thrown upon the

misty doctrines of the older pathologists. With them fever was a nonentity, something they endeavoured to describe but could not, something apart from and totally unconnected with organic change. The result of this mode of viewing the question was a variety of crude hypotheses and fanciful speculations. Bear this always in mind — mere fever, unaccompanied by local disease, is very rarely met with. Recollect, too, that it has been established beyond the possibility of doubt, *that fever, complicated with local disease, is the rule, and its non-complication the exception.* We have further learned from modern pathology, *that every system and every organ in the body may be, and frequently is, diseased during the course of fever, and that, in the vast majority of cases, death is the result of one or many local inflammations.* We further learn, that the character and symptoms of fever are infinitely varied, and that the cause of this variation mainly depends on the seat, the number, and the nature of the local affections. It is to these that we are to attribute the principal modifications in the character and phenomena of fever, and it is by these that its course and termination are mainly influenced.

Dr. Fordyce, in his work on fever, attempts to give a definition of the disease, and as I feel convinced that it is, if not a definition, at least one of the best descriptions of fever, I shall give it as nearly as possible in his own words. The style of this description is quaint but expressive. "Fever," says he, "is a disease which affects the whole system; it affects the head, trunk, and extremities; it affects the circulation, absorption, and the nervous system; it affects the skin, fibres, muscles, and membranes; it affects the body, and it affects the mind; it is, therefore, a disease of the whole system in the fullest sense of the term. *It does not, however,*" says he, "*affect the various parts of the system uniformly and equally, but, on the contrary, sometimes one part is more affected than another.*" This last observation is totally at variance with the idea that fever is a mere morbid condition of the whole system without reference to local lesions, for he expressly states that it does not affect the whole system uniformly and equally. This excellent view of fever seems to be borne out completely by modern pathology, and particularly the last part, where he says, that in cases of fever one part is more affected than another. We have, for instance, cerebral fevers, nervous, bilious, gastric, and catarrhal fevers, by which, it is to be observed, we do not mean to imply that there is nothing more than simple disease of the brain, or nerves, or liver, or bowels, or respiratory system, but that in each of these fevers disease predominates in some particular part. So that when we speak of these fevers, we speak of such a disease as Fordyce has described, in which one part of the body is affected more than the rest. In many of the schools you will still meet with Cullen's division into synocha, synochus, and typhus, a division by which we gain nothing at all, these terms being but mere words and no more. Will any one define what is meant by synocha, or synochus? Will any one say what is typhus? Will any one say that a particular class and character of symptoms and morbid changes apply to any of these affections? It would be quite impossible. What we generally find is, that in the

different cases of what have been termed synocha, synochus, and typhus, though they may present the symptoms belonging to each separately, yet in these same cases, at some period or other, the symptoms pass into one another so as to confound the original distinction. We have synocha to-day, synochus to morrow, and then typhus: or we may have typhoid symptoms at first, and inflammatory ones afterwards, and so on. We find, too, *that similar causes will produce in different individuals essentially different forms of fever*, and hence it is that we cannot found any distinction of fevers on their exciting causes. Nothing is more common than to see in two patients the same lesion producing, in one the synocha, in the other the typhus of Cullen. Thus, whether we look to the progress, symptoms, or exciting causes of fever, we find that this division has no foundation in nature, and is purely scholastic.* Synocha, synochus, and typhus, are but mere names without meaning, terms which belong to the dogmatism of theory, and not to the expression of truth, yet it is dreadful to think of the numerous lives which have been sacrificed at the shrine of this dogmatism.

Fevers may be divided into two classes. We have, in the first place, fevers which we may call primary or essential, in which we find (as far as human investigation can go) affection of the whole system, of the fluids as well as of the solids. This general state of the whole system seems in such fevers to have the initiative, constituting the first step in the process of disease; but it is also true, that in almost every instance of essential fever, local disease springs up at some period or other of its course. We have, then, in these fevers this primary state of the system, the cause and nature of which are unknown, and we have this followed by various secondary lesions, affecting different parts of the body, and presenting characters by which we can arrive at a knowledge of their nature, more or less.

In the second class of fevers, we place all those in which the first affection is local, and the fever secondary. Observe the distinction between this and the former class. In the first kind, or primary, the local disease is consequent on the fever; in the secondary, fever is the result of local disease. Let us take an example of each. A person in health is exposed to the contagion of typhus; he becomes languid and week, has troubled sleep, bad digestion, and low spirits; after some time, what is called fever sets in, and during the course of this various local diseases may supervene. In the other case a person, also in health, from exposure to cold, or from some local injury, gets an attack of inflammation of the lungs, or some other local lesion, and, as a consequence of that lesion, has symptomatic fever.

Now the relation which the fever bears to the local symptoms in each of these cases is different. In the first case, the fever is pri-

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* [This important truth, so long familiar to the profession in the United States, through the writings and lectures of Dr. Benjamin Rush, is not yet fully admitted and appreciated by the European schools of medicine. — B.]

mary, and the local affections secondary; and it may happen that, although the local diseases may be modified or removed, the fever will still continue; but in the second, the fever always vanishes on the removal of the local disease. We have to enter on the consideration of the first of these to-day, and to examine that morbid state of the whole system in which local disease supervenes at some period of the fever; in other words, where the lesions of particular parts or organs are symptomatic of the fever.

I have already mentioned, that one of the great truths at which modern pathologists have arrived, is, that local disease commonly occurs during the course of fevers. It has also been established that, in the great majority of cases, the cause of death is one or more local inflammations. The experience of every candid pathologist is in favour of this doctrine. Patients seem to die of fever, but the fact is that some die by the brain, some by the lungs, others by the digestive system, that is to say, during the course of fever they get disease of various organs, some of the brain, some of the lung, and a vast number of the digestive system, often sufficient to destroy life if there was no fever at all. It is an undeniable fact, that, in the great majority of cases, there is local disease of some part or other of the body, and that a vast proportion of fever patients are carried off by local inflammation. How plain, then, is the deduction from these facts, that the man who neglects the viscera in fever is practising with his eyes shut.

So much for the first great fact of the complication of fever with local disease, and its important bearing on practical medicine. But there is another general consideration with respect to these primary fevers, they have a tendency to terminate spontaneously; of the cause of this spontaneous termination we are still in ignorance. One of the most simple and familiar examples of this is the paroxysm of an intermittent. A patient, who is at present apparently in good health, will in the space of an hour or less be attacked with severe rigors, followed by all the symptoms of fever, a flushed countenance, hot skin, quick pulse, and high coloured urine, and in some time afterwards a copious perspiration breaks out, which is attended with complete relief to the symptoms, and the patient gets well again. From this time until the period of the next attack he continues to all appearance in health. Now, if we consider each of these paroxysms as an attack of fever, we see in them an evident disposition to terminate spontaneously. The same thing occurs, in the case of the exanthemata. Scarlatina, measles, and small-pox, have a regular course, which generally terminates at stated periods; they also exhibit a succession of stages characterized by corresponding symptoms. We observe the same disposition to terminate spontaneously in most continued fevers, and it has been further remarked, that this spontaneous termination generally occurs on particular days. We have then two great leading facts in the history of all primary fevers, first, that they are most commonly complicated with local disease, and, in the next place, that they have a great tendency to terminate spontaneously and on particular days.

Now, gentlemen, you will please to observe, that a knowledge of

these two very important facts furnishes us with two great indications — one, to discover and remove, or modify the local inflammations; the other to support the patient's strength so that he may not become exhausted during the progress of the disease, and thus lose his chance of this spontaneous favourable termination. These two indications, though apparently incompatible, are not so in reality. You will of course understand that the extent to which we pursue one or other of these indications, must necessarily vary according to circumstances. The rapidity, violence, and particular seat of the local inflammation, the duration of the attack, the age, sex, and constitution of the individual, all these are circumstances which must be taken into account in adopting any plan of treatment, whether calculated to remove local disease, or support the patient's strength.

The similarity between the different individual cases of fever, is too faintly shadowed out to amount to anything like identity; in fact, there are no two cases of fever perfectly alike. You might as well expect to find two human beings exactly alike as to find two cases of fever perfectly similar. The causes of this remarkable variation are reducible to the extent, variety, seat and complication of local disease, and to the peculiarities of the patient's constitution. These two clases of circumstances produce infinite varieties in the appearance and character of fevers.

The followers of Brown saw nothing in fever but debility, and their practice was to support the strength, and give stimulants from the commencement, ignorant of the fact, that neglected local inflammation will produce and keep up debility. The followers of M. Broussais, on the other hand, think that fever is sympathetic, that it depends on local inflammation, and that it must be subdued by depletion. Truth lies between. We must do both, we must combat the local inflammations by antiphlogistic means, and we must support the patient's strength by a well regulated regimen. These two indications are by no means incompatible, but their application must vary according to circumstances. If it be true, then, that local disease is very common in fever, and a frequent cause of death, it is plain that to practice without a knowledge of the state of the viscera, would be acting like the physician mentioned by D'Alembert. He compares him to a blind man armed with a club, who comes to interfere between nature and disease. If he strikes the disease, he kills the disease; if he strikes nature, he kills nature.

A discussion has arisen in modern times, as to whether we should look upon all fevers as sympathetic. This is one of the leading doctrines of the school of M. Broussais. He declares that all fevers are sympathetic, that there is no such thing as an essential fever, or, in other words, that there never exists that peculiar morbid state of the *whole system* to which we apply the term fever; that in all cases fever is the result of local lesions, and that on the removal of these lesions its cure will depend. To this conclusion the school of M. Broussais was compelled to come in consequence of their exclusive solidism. They endeavour to reduce all the phenomena of life, whether in a state of health or disease, to the mutual action and influence of the viscera and solid parts on each other. They are solid-

ists, in the strict sense of the word, and can have no conception of fever as existing independently of some primary local lesion. But it seems that the leading points of this doctrine have not been able to stand the test of an impartial examination, and may at present be looked upon as disproved. You will see at once the importance of this, when you consider that if it be true that all fevers are sympathetic, the practice must necessarily consist in the discovery and removal of local lesions, and no more. But I said that these doctrines are now disproved, and the following arguments may be laid before you in proof of this statement.

In the first place, let us inquire whether any cause acting on the whole economy is capable of producing local disease. Mark, the object of our inquiry is to ascertain whether any cause operating on the whole economy is capable of producing local disease. Now, I believe it is quite certain that such is the fact, and that we may have, first, a morbid condition of the whole system, and, consequent on this, various local lesions. Several continental pathologists, but in particular MM. Gaspard and Magendie, have shown, by repeated experiments, that we can produce all the phenomena of typhus in the lower animals by introducing putrid substances into the system. These gentlemen injected putrid substances into the veins of animals, and applied them to the surfaces of the wounds, and in every case where these experiments were performed, they observed that the animals became ill, had languor, loss of appetite, thirst, prostration — in fact, all the symptoms of bad typhus; *and, in case of death, that they exhibited, on dissection, local lesions corresponding with those we meet with in the human subject in fever.* Now, observe, these animals were, previous to the experiment, in a state of perfect health; they are, then, subjected to the operation of a cause which is found to produce a morbid state of the whole system; they die, and on dissection inflammation and ulceration of the mucous membrane of the digestive tube, and other lesions, are discovered in almost every instance. It would be quite absurd to say here, that the ulceration of the bowels was the cause of the morbid symptoms, for the animals were previously healthy. We can come to no conclusion, then, but that the introduction of putrid matter produced that morbid state of the whole system which is termed *fever*, and that the local inflammation was the result of this state. It is the same thing with respect to the exanthemata. A child is exposed to the contagion of small-pox; for some time nothing particular is observed; he then gets ill and feverish, and this is followed by an eruption of variolous pustules. Here we have a local disease consequent upon a circumstance affecting the whole system, and in this, as in the former examples, the local lesion is secondary. We might as well argue that the pustules were the cause of the symptoms in one case, as to say that the ulceration of the intestines was the cause of the other. Every one, I think, will admit that the pustular eruption in a case of small-pox is secondary, and not the cause of the symptoms; and the same argument will apply to the secondary affections of typhus. If it be true, as appears by M. Magendie's cases, that fever follows the introduction of putrid substances into the body, and that the mor-

bid state of the system produces inflammation of the intestinal mucous membrane: if, too, we admit that in small-pox the pustules are secondary, and consequent on a morbid state of the whole system originating in contagion, the same argument will hold good in all cases of local inflammation (whether of the liver, lungs, brain, or any other organ), which may arise during the progress of fever. These facts are adduced in support of the first part of the argument — that local lesions may be and are consequent on that morbid state of the whole system to which the name of fever is applied.

The next thing to be observed with reference to this question is, that if it be true that typhus is merely symptomatic of local disease, it would then follow *that there should be as constant a relation between the symptoms during life and the morbid changes seen on dissection*, as there is between the fever of pneumonia and the changes presented by the lung. But this is not at all the case, for we find that there is no constancy, no uniformity, either in the seat or extent of the local disease. Two patients will exhibit symptoms of typhus not differing in any material point, and yet, on dissection, you will find little or no traces of disease in the intestinal canal of one; in the other, you will find in the same parts a vast amount of disease. Two others will also present symptoms very similar; in the one you will find the lung healthy and normal, in the other you will find it extensively disorganized. Would it not be absurd to assert here, that the fever was symptomatic of the local lesion, seeing that there is no constant relation between the symptoms and the morbid changes, either as to situation or extent? Again; it is a fact, that you may have several patients presenting different symptoms, and yet, when you come to examine their bodies, you find the same morbid changes in all. One may exhibit all the phenomena of typhus; in another, this condition is but slightly marked; in a third, it is absent; and yet, on dissection, you find a similarity of local lesion. Lastly, it may be argued that if typhus were symptomatic of any particular local lesion, we should be able to cure it by removing that local lesion. This, however, is not always the case; that it sometimes does occur I am willing to admit, and this is therefore to be considered as the weakest of my arguments. But, on the other hand, if it be admitted that the local lesions are accidental and secondary, we can easily understand why their removal should not necessarily cause the removal of the fever. Such are the arguments on which I ground my objections to the doctrine—that all fevers are merely symptomatic of local disease; and in these views I think I am borne out by the opinions of the soundest modern pathologists.

But though we admit that local inflammations are secondary, and bear the same relation to typhus as the eruption of small-pox to the morbid state that precedes it, still they are not the less important; and it is by a careful study of them that we arrive at a key to correct and successful treatment. They are of great importance from being exceedingly common in fever; in fact, so common that their occurrence is the rule, their absence the exception. They are also, in the majority of cases, the cause of death, and this they bring about in two different ways. First, directly, as in a case of simple inflamma-

tion. A patient in fever, who gets an attack of violent enteritis, may die of it as well as if he got an attack of primary enteritis; or he may die of pneumonia coming on during the course of his fever as well as the man who dies of pneumonia from cold. Thus we see that the secondary inflammations may produce death directly. They may also produce it indirectly, by preventing the efforts of nature towards a favourable termination. You recollect I told you, that in fevers there is a strong tendency to terminate spontaneously and on particular days. Now, we find that this disposition is greatly impeded by the presence of local inflammation, so that local inflammation may operate to the destruction of life in two ways; either directly, by its intensity and extent, or indirectly, by preventing a critical termination.

This leads us to look still deeper into the matter. We find that these local or secondary affections may also produce a train of sympathetic phenomena of a very remarkable character. There is no reason why enteritis coming on during the course of a fever may not react on the economy as well as the enteritis from cold, which we know generally produces symptomatic fever. In the case of two patients, one, for instance, meets with some lesion of the intestinal mucous membrane, and, as a consequence, gets enteritis and sympathetic fever; another gets enteritis during the course of a typhus; in the one case, the local lesion plainly reacts on the system, in the other this is less apparent, but there is no reason to suppose that it does not produce some effect on the system in one case as well as in the other. The law appears to be this, that in almost all cases of fever there is a combination of the essential and the sympathetic fevers, the essential the result of the first cause, and the sympathetic the result of the local lesions which arise during its course. Indeed, nothing seems to be better established than that local disease reacts on the system and prevents a critical termination. You will get a very good idea of this by considering the paroxysms of an intermittent. What are the periods in which an intermittent is most liable to terminate favourably? The earlier ones. What are the periods in which a favourable termination is least likely to happen? The later ones. Now what are the periods in which there is little or no accompanying organic lesion? The first or earlier. What are those in which there is more or less of organic change? The later, in which we generally find, on making a careful examination, that disease of some organ, or organs, has taken place, and is presenting an obstacle to a favourable termination. It is the same thing with respect to fever.

In the treatment of fever, it is a most important rule to investigate the condition of the viscera, and remove, if possible, any existing local inflammation. By this we accomplish a double purpose; we prevent the direct danger of death from the violence of local disease, and we obviate the inconveniences arising from sympathetic irritation. We give nature fair play, we reduce the case to a state of the greatest simplicity, we prevent the liability to new local affections, and we thus effect a great deal towards a favourable termination. It is an interesting and singular fact, and one dwelt on by the school of Broussais, that in many cases of fever, the removal of the local inflammations is speedily followed by a subsidence of the fever. It is

chiefly from this fact that they argue in favour of the opinion, that all fevers are symptomatic of local disease. This argument, however, as I have already proved, is more specious than solid. The true reason is, that by removing local disease we remove the barrier which opposes the salutary operations of nature. Every attempt at a favourable termination is impeded by the coexistence of local disease, and the more intense and extensive this is, the greater is the obstruction. You are not by any means to conclude that a fever is symptomatic, because it disappears on the removal of local disease; the true explanation is, that by subduing the local inflammation you have removed a focus of irritation, and given scope to the preservative powers of nature.

These I believe most firmly to be the true principles which should guide us in considering the subject of fever. They have been obtained by careful and accurate deductions, and are based on a numerous series of well conducted experiments. Weigh the matter calmly, and I think you will be disposed to agree with me, that fever in its origin implies no tangible condition of the system, and that we know it only as consisting of a group of phenomena, varying as to their cause, seat, effect, and duration. The humoralists erred by fixing its seat in the fluids, the solidists by limiting its locality to the solids. We recognize no distinction between the fluids and solids, so far as fever is concerned; they all form parts of the great whole; one cannot act without the other, but their mutual reaction is extensive and various. From these considerations we deduce the important rule, that there is no mode of treatment universally applicable, and the man who treats fever with wine and stimulants only, or he who contents himself with purgatives and diaphoretics, or he who limits his practice to leeches and the lancet, that man knows nothing of fever. Though his hair be gray and his authority high, he is but a child in knowledge, and his reputation an error. On a level with the child so far as a correct appreciation of the great truths of medicine is concerned, he is very different in other respects; his powers of doing mischief are greater, he is far more dangerous. Oh! that men would stoop to learn, or at least cease to destroy!

LECTURE CXXVI.

Intermittent Fever—Definition and character of—Phenomena of the paroxysm—Cold stage—Internal congestions—Pathology of—Hot stage—Ague not a simple fever—Affections of various viscera—Theory of Broussais—Effects of bark, quinine, &c.—Modus operandi of.

To day we commence the consideration of intermittent fever. One of the most prominent characters of this affection is expressed by its name; we have all the phenomena of fever making their appearance at certain periods, and then disappearing, leaving an interval in which the constitution seems to be in the normal state, and continues so until the supervention of a second attack. It has been also

termed a primitive or essential fever, in which there is no original local disease, and where the fever, in the beginning, is not symptomatic of any local lesion. We may define intermittent fever as a primitive, or essential fever, composed of many paroxysms which recur at certain periods, and in the intervals between which we have a state of apyrexia, or freedom from fever. This definition, though applying to the great majority of cases, is still to a certain degree imperfect, for we meet with examples of this disease in which the periods of attack are by no means regular or certain, and the state of apyrexia between the paroxyms not well marked. Thus, in two cases of intermittent, we observe that in one the patient appears, during the interval, to be completely free from fever, while in the other we find that the febrile symptoms continue to a certain extent after the subsidence of the paroxysm. As a general definition, however, the foregoing is tolerably good, and will be quite sufficient for practical purposes.

Another remark to be made on this subject is, that an intermittent is not necessarily an essential fever. We may have it from lesions of various kinds. You are all familiar with that form which attends bad cases of stricture and retention of urine, and which has been called urinary fever. Here we have fever of an intermittent character, not essential, but depending upon a local lesion. We have many other instances of a similar kind, and I could easily multiply examples.

I shall not take up your time by entering into a description of the various divisions of intermittent fever; it is a species of knowledge unconnected with any point of great practical importance, nor does an acquaintance with the nature of the disease, so far as frequency of paroxysm is concerned, shed an useful light on its treatment. The same principles of treatment are applicable to quotidian, tertian, quartan, and every other variety of intermittent. Besides, we know nothing whatever of the nature of an intermittent. We are here as much in the dark as we are in the case of continued fever. We are still in complete ignorance as to the cause of the periodicity which is so remarkable a feature of this as well as of other diseases. It is enough for us, in the present state of medical science, to know that such things exist, and, leaving the researches after the cause of the disease, and its periodicity to future investigations, let us study the effects of the disease, and direct our attention to things within our reach.

Let us, as far as we can, examine what takes place during the paroxysm of an intermittent. I think it is my duty, as a lecturer on practical medicine, to direct your attention to this point rather than to the history of intermittents: this is, I grant, not devoid of interest, but it is a subject on which you will find ample information in the various systematic treatises on medicine. My intention is to endeavour to point out the true principles of treatment; I shall, therefore, enter no farther into the history of intermittents than what is connected with diagnosis. This will certainly diminish the interest of a lecture on intermittent fever, but this cannot be helped; it would, in a limited course of lectures like this, be quite

out of my power to lay before you the mass of curious and instructive matter connected with the history of intermittents. The paroxysm of an intermittent fever has been divided into three stages — the cold, the hot, and the sweating; but it simplifies the matter very much, to consider it as divisible into two stages, the sweating being the result of the hot stage. With respect to the cold stage, I shall endeavour to establish three great propositions. In the first place, it appears (and this is highly important) that, in the majority of cases (I do not say in all, for there is no general rule in medicine), there is, during the cold stage, a perceptible lesion of one or more internal organs, and that there is congestion of many, if not of all, the viscera of the three great cavities. To use a modern phrase, we have, during the cold stage of an ague, a state of hyperæmia of the internal and anæmia of the external parts, or, in other words, the balance of the circulation is lost, the blood forsakes the surface and accumulates in deep-seated organs. The next proposition is, that this hyperæmia, from frequency of repetition, or excessive violence, may be accompanied by, or productive of, an inflammatory condition of these organs. Lastly, that organs thus altered may in themselves become sources of irritation, react on the system, and powerfully tend to keep up disease. You see, then, that, in considering the phenomena of intermittent fever, we must follow the same road as in continued fever, and regulate our inquiries more in relation to the effects than the cause of the disease.

The first of these propositions — that during the cold stage of an ague there is a congested state of almost all the viscera — is proved in every way that a pathological proposition can be proved. It is confirmed by an examination of the symptoms, by the results of treatment, and by the appearances seen on dissection. In this country, we very seldom have an opportunity of examining the bodies of patients who have died in the cold stage, for the intermittents of this country are trifling in comparison with those which are observed in warm climates. But the fact is fully borne out by an examination of those who have died in this country under such circumstances, as well as by the more numerous examples occurring in countries in warmer latitudes. Let us take the different parts of the system during the cold stage, and see how far the symptoms point out an accumulation of blood. First, let us review the nervous system. There is a feeling of tension and fulness about the head, the patient complains more or less of headache, the sensibility is diminished, and there is frequent stupor and coma, and in violent cases there may be convulsions. All these circumstances are indicative of congestion of the brain; and accordingly we find, where we have an opportunity of making an examination, that the venous system of the brain is in a state of engorgement. In some cases, the carotids and their branches have been observed full of dark-coloured blood, the congestion of the lungs having interfered with the process of aëration. In the intermittents of warm climates still more remarkable effects have been witnessed — enormous congestion of the vessels of the brain, and frequently effusions of blood into its substance; so that

the symptoms during life, and the appearances seen after death, tend to confirm the fact of congestion, so far as the brain is concerned. If we turn to the pulmonary system, we find that nothing is of more common occurrence, during the cold stage of an ague, than lividity of face, anxiety, cough, and hurried breathing ; and when we come to examine the chest, we find more or less dulness of sound on percussion, and the other physical signs of congestion of the lung. This is farther confirmed by dissection ; the lung is congested, and of a dark red colour ; it will often sink in water, and presents a condition closely bordering on hepatisation. If you examine the heart, you will find that its action is oppressed, the pulse is small and irregular, and the right ventricle, with the vessels attached to it, are found engorged. Proceeding to the abdominal cavity, we find the same indications of congestion. There is a sense of pain and fulness in different parts of it ; the patient has vomiting, often diarrhœa, and a copious discharge of urine ; all this shows a violent determination of blood. You have often heard of the tumefaction of the spleen which accompanies the cold stage of an intermittent. Now, so rapidly does this occur, and so extensive in the engorgement, in many instances, that shortly after an attack we can readily feel and trace it distinctly. On dissection, we meet with abundant proofs of congestion ; we find the liver highly engorged, the intestinal mucous membrane very vascular, the mesenteric and portal veins filled with blood, the kidneys congested, and the spleen enlarged. Cases of rupture of the spleen from excessive congestion during the cold stage of ague, and of hepatic apoplexy from the same cause, as described by Bailly. These facts are sufficient to prove the truth of the first proposition — that during the cold stage of an intermittent, most of the internal organs are in a state of congestion. We are led to suspect this from the symptoms, and our conjectures are confirmed by dissection. Indeed the most superficial observer must be struck with the remarkable retreat of blood from the superficial parts of the body. The skin is pale and shrivelled, the bulk of the limbs diminished, the countenance collapsed, the whole surface cold, and superficial vascular tumours are observed to lose their vascularity and become reduced in size. All these circumstances lead us to the supposition of internal congestion, and this is corroborated by the results of dissection, which show the various internal organs in a state of hyperæmia, and shows the retreat of the blood from the surface, and its accumulation in deep-seated parts.

The next proposition is equally important — that the frequent repetition or excessive amount of these internal congestions, may, and does, give rise to an inflammatory condition of the affected organs ; in other words, that the hyperæmic condition of certain viscera, during the cold stage of ague, and their subsequent organic lesions, stand in the relation of cause and effect. We find that the effect produced by the cold stage on the viscera, is twofold ; we may either have congestion independent of any organic change, or we may have inflammation. In some cases, particularly in those which occur in warm countries, the congestion is followed by violent inflammation ; in others, as in the cases of this country, we may have chronic in-

flammation produced. But whether we meet with one or the other, whether the inflammation be acute or chronic, we find that, as soon as the viscera become affected in this way, a state of constitution is brought on in which the power of the usual remedies is diminished and their use frequently prejudicial. New local inflammations are set up in various organs, *and these, which were in the beginning only the effect of the disease, become, by reacting on the system, the cause of its continuance.* In warm climates, where the congestion is excessive, there is nothing more common than to see fatal pneumonia, or violent gastritis, or rupture of the spleen, or cerebritis, supervening on a bad attack of ague. Strictly speaking, the production of inflammation in organs seems to belong more to the hot than the cold fit, and this we can easily understand. In the cold stage, the viscera are in a state of intense congestion; violent reaction then comes on with the hot fits; and when we have in any organ a stasis of blood, and violent action of its vessels, occurring during the existence of this stasis, it is not surprising that inflammation should be the result.

In the hot fit, all the phenomena, which we have been just now examining, are reversed. Everything indicates that the energy of the circulation is about being restored, and that there is a powerful determination to the surface. The pulse gradually rises in strength, the rigors gradually disappear; the skin, which was cold and shrivelled, becomes hot and tense; the face, which was blanched and collapsed, assumes a full and flushed appearance; the cough and hurried respiration are relieved; the vomiting, diarrhœa, and discharge of urine, ceases; and the stupor is removed. The vessels on the surface of the body becomes more and more distinct; and in those who have large superficial veins, those vessels (though there was no appearance of them during the cold fit) stand out in bold relief like so many thick cords. I have alluded before to the greater severity of the cold fit of the intermittents of warm countries; the hot fit exhibits a corresponding degree of intensity. The cold fit is generally accompanied by violent vomiting and purging, spasms and convulsions: the hot stage is attended with fits resembling apoplexy, and is frequently succeeded by intense pneumonia, cerebritis, and other forms of visceral inflammation. Such occurrences are rarely seen in the fevers of this country.

The great principle to be borne in mind with respect to intermittent fever, is, that during the cold stage the viscera are in a state of congestion, and consequently fitted for the reception of disease. When the hot fit comes on, this state of congestion generally disappears: but if it should continue, we shall have a chance of inflammatory action being set up in one or more viscera, and in this way we may have a number of points of irritation in the system, complicating the original affection, and tending to retard the operations of nature and art towards a favourable termination. You can easily understand, that if the lung, which has been in a highly congested state during the cold stage, does not, during the succeeding hot stage, throw off the load of blood completely, it will be less able to accomplish this at the next attack, and so on, until at length the process of inflammatory alteration is firmly established. The same observation applies to the other viscera. In some cases, just as in continued fever, we have the brain chiefly

engaged, in others the digestive lung, in others the system; and in the intense agues of tropical climates, we often have the three great cavities simultaneously attacked. You will observe here, that the production of visceral disease depends on two circumstances — first, on the intensity of the congestion, and secondly, on a frequent repetition of the attack, where the symptoms are less violent. In this country, the latter seems to be the principal cause.

From these considerations, we come to the important law that, after some time, we are not warranted in looking upon ague as a simple fever, but as a fever of a compound nature, involving affections of many important viscera, to which we must attend carefully, if we seek to practice with safety and success. It is singular, that the majority of medical men appear to look upon the effects of an intermittent as being very circumscribed. You have all heard of enlargement of the spleen. Now, I have known some practitioners who appeared to think that this was the whole pathology of intermittent fever; in fact, that there was a very close connection between enlargement of the spleen and ague. This, I need not tell you, is a very imperfect view of the question; the spleen suffers like other viscera, but there is no separate relation between its enlargement and the production of intermittent fever. The reason why attention has been chiefly directed to it is, because its lesions are generally more manifest than those of other viscera. It is composed of a loose, spongy, erectile tissue; it receives in its natural condition a great quantity of blood; it becomes rapidly and extensively enlarged during the cold fit; and hence it becomes a very prominent and remarkable sign of the disease. But I believe that in all cases where the spleen is found to be enlarged you will also be able to detect disease of the liver or lung. All the viscera are more or less liable to suffer under similar circumstances; there is, in a word, no single acute or chronic disease which may not be the result of intermittent fever. In this country, it generally gives rise to chronic disease; in warm climates, acute visceral inflammation is more commonly the result. Here we arrive at another very important consideration, namely, that it may happen that the phenomena of an intermittent shall cease, and yet the chronic disease produced by the violence or persistence of the original malady will continue. This is exceedingly common. We frequently meet with chronic disease of the heart, lungs, or brain, with dysentery, diarrhœa, peritonitis, affections of the kidney, and chronic inflammations of the liver and the spleen, brought on by intermittent fever, in this country. These local affections are the result of violent congestion, and the continued irritation which accompanies the early paroxysms of the disease; and though the symptoms of ague may subside, the morbid irritation, which has been set up in the constitution, may proceed to such an extent that death may be the result of a complication of visceral affections thus produced; and this I believe to be the history of many chronic cases of ague. Chronic affections of the lung, liver, brain, and digestive system, are, then, the chief things to be dreaded or guarded against in a case of intermittent fever; for after all that has been said about the enlargement of the spleen, it seems to me to be the least important of the visceral lesions which

follow ague. It appears in almost every instance (at least as far as we can see of it in this country) to exercise but very little influence over the economy. In warm climates, indeed, it is sometimes so much enlarged as to produce serious inconvenience by its pressure and bulk. Thus, in South America, it has been observed, that in bad cases of ague the spleen has become so enormously increased in size as to fill nearly the whole abdominal cavity, producing great derangement of the digestive organs, and actually hernia. Dropsy, jaundice, chronic hepatitis, diarrhœa of an intractable character, various nervous affections, amentia, an atrophied state of the system, phthisis, hectic, typhus, all these constitute part of the morbid affections which follow in the train of ague as it appears in this country, and all will be found connected with various chronic visceral lesions which have been the immediate results of the original disease.

When called to treat a case of ague which has been going on for some time, you will generally meet with one of two things; youmay find that the viscera have, or that they have not, suffered much from the effects of congestion. Now, when organic changes of viscera take place, we have the remarkable circumstance of their active tendency to keep up the original malady. Here you will frequently see practitioners prescribing bark, and if you watch its operation, you will sometimes find that it does more harm than good. But if, on the other hand, attention be directed to the local lesion, neglecting the intermittent for some time, you will find that the removal of the local disease brings back the intermittent, more or less, to its original state of simplicity, and renders it amenable to the specific. Observe the importance of this. The same rule holds in intermittent as in continued fever; you must practise with an eye to the state of the viscera, and recollecting that the disease, which results from one, as well as the other, may be, in its turn, cause and effect. Here I shall take an opportunity of making a few observations with respect to a theory of intermittent fever which has been put forward by such high authority that we cannot pass it over. I allude to the theory of M. Broussais, in which he endeavours to show that intermittent and continued fevers are reducible to the same form, namely, an irritation of the digestive system. To this view of the question a great many facts are opposed, all tending to prove that disease of the digestive system (which is so common in intermittent as well as continued fever) is to be looked upon more as an effect than as a cause. It is absurd to say that intermittent fever is merely an intermittent gastro-enteritis, when dissection shows that we have not only disease of the digestive tube, but also of the heart, lungs, and brain. The fact of coexisting visceral inflammations was passed over by M. Broussais, and certainly it must be acknowledged that this is a very simple mode of getting rid of a strong objection. His doctrine was, that fevers, intermittent as well as continued, are only examples of the effects of irritation of the digestive system, the continued fever being significant of severe and extensive disease, the intermittent of an affection of a milder character. He also maintains that the rigors are produced by, and proportionate to, the internal irritation. Now, admitting, for argument's sake, the two first propositions, what do wefind to be the fact? That in continued fever, where the irritation is greatest, the

rigors are comparatively trifling, while in the intermittent, where the irritation is less violent in degree, the rigors are remarkably intense. Here we see intense rigors, with slight disease, and trifling rigors with intense disease, two facts strongly militating against the proposition of M. Broussais.

Another argument may be urged against these doctrines: I allude to the effect of bark. This is a point which very much puzzled the physiological school, and they have accordingly exerted all their ingenuity to explain it away. At first, I believe they were strongly inclined to deny altogether the specific powers of this remedy; they were subsequently, however, compelled to subscribe to the fact of its efficacy, which was too notorious to be denied, and they had then to explain how bark could cure gastro-enteritis. Hard as it was to explain how bark could be instrumental in removing gastro-intestinal inflammation, it was a matter of unavoidable necessity to attempt something like an explanation, in order to maintain the integrity of the physiological doctrine. They therefore set about the task, and endeavoured to show that bark cures the ague, or its cause, gastro-enteritis, by substituting one irritation for another. The whole gist of their arguments is founded on this point: — quinine, they say, is a stimulant; ague is the irritation produced by gastro-enteritis. Now, it is a fact that stimulants will frequently remove existing irritations; thus, we frequently observe, that blennorrhagia, chronic ophthalmia, and diarrhœa, are cured by stimulants. This argument, however, is more specious than solid. There are certainly cases of irritations of mucous surfaces which may be removed by stimulants, but these are cases of *chronic and not of acute disease*. No one would dream of employing stimulants in a case of acute febrile diarrhœa, few would think of applying irritants to an acutely inflamed and painful conjunctiva; it is only when the character of the inflammation alters, and the affection acquires more or less chronicity, that these remedies prove at once serviceable and safe. Now this is not the case in ague. If it depends upon an acute gastro-enteritis, we are, according to this line of argument, to conclude, in the teeth of their other doctrines, that the best mode of curing an attack of gastro-enteritis is to stimulate the inflamed mucous surface. Here, you see, we arrive at the argument *ad absurdam*. Another observation on this subject: — In a case of intermittent fever, supposing it to depend on gastro-intestinal irritation, it is a matter of indifference whether you give the bark during the paroxysms or during the intermissions. Now, it is a matter of experience, that bark will be far more effectual when given during the intervals of apyrexia. Again, if bark cured by producing a new irritation, we ought to see the symptoms of that irritation succeeding the administration of the remedy.

Thus, whether we look to the symptoms, the appearances seen on dissection, or the results of treatment, and the efficacy of bark, we must conclude that the morbid state of the digestive system stands in the relation of effect, and not of cause. As far as we can judge of ague, it appears to be some profound alteration of innervation, some affection of the whole system, the nature of which we cannot under-

stand, but the effects of which we perceive in the various derangements of internal organs by which it is attended. Intermittent fever is not intermittent gastro-enteritis, because dissection reveals various other important lesions, and because it is cured by bark, which has nothing in it calculated to remove acute inflammation. We know that if a patient labouring under ague has acute inflammation of the stomach, bark, so far from curing, will do him a great deal of harm. Bark cannot cure by exciting irritation, because, if it did, it would increase the supposed gastro-enteritis, and we should have more violent symptoms during the intermissions, the time when it is always given, than during the paroxysms. Lastly, there is no analogy between the effects of stimulants on acute and chronic inflammations. What the *modus operandi* of bark is, we cannot explain. Many things, connected with the phenomena of life in health and disease, are and probably will for ever remain concealed from human ken. We daily witness the effects of stimulants, but we cannot explain their mode of action. This, however, is no opprobrium to medicine. This is the right way of viewing the subject; part of it is capable of admitting an explanation, the rest constitutes a portion of the inscrutable arcana of nature. It unfortunately happens, however, that, for all practical purposes, the knowledge of these occult portions of medical science is as yet comparatively unimportant.

LECTURE CXXVII.

DR. BELL.

ALLEGED CAUSES OF INTERMITTENT FEVER.—Miasm, or malaria, an imaginary cause—Periodical fever prevails under most opposite conditions for the evolution of malaria—More attention due to sensible states of the atmosphere—Slight differences in locality modify climate—Phenomena of dew—Exposure of the labourers in the *Campagna di Roma*—Periodicity; common in all the disturbances of the nervous system—Remarks on *treatment* of intermittent fever—Remedies in the *cold stage*—bloodletting—Case of comatose intermittent—The fever attributed to lesion of the cerebro-spinal axis—Inference in favour of topical remedies of the spine—Treatment of the *hot stage*; cold drinks, and affusion or sponging with cold water; venesection; opium—In bad cases of a congestive character, the bark or some of its preparations.

I SHALL imitate the wise reserve of Dr. Stokes, in abstaining from disquisitions of a merely historical or speculative nature on intermittent fever. A period of several years has now elapsed since I recorded my disbelief in the hypothesis of this variety of fever, and indeed of periodical fevers generally, being caused by marsh air, or by any separate, peculiar, or specific emanation from the soil of marshes or from decayed vegetable matters, designate such cause by whatever term you choose, miasm or malaria. There are no circumstances assigned as competent to its evolution which, often, are not found without such result; and *e converso* it is claimed to be present and operative in the production of periodical fever when the commonly assigned circumstances or conditions are wanting. Bancroft tells us, that a humid soil abounding in vegetable remains, and acted on by heat, the range of which is from 45° to 100° Fahrenheit, is the most favourable for

the extrication of miasmata. This process is said to go on very slowly while the mercury continues below 45° F., and to be checked when it goes beyond 100° F. These conditions for the evolution of a febrific principle seem to have been made to suit northern latitudes, or climates commonly termed temperate; but if they were real, then ought the inhabitants of tropical regions, as the West Indies and the western coast of Africa, to be afflicted by intermittent and remittent fevers during the winter, and exempt from them during the summer and autumn, for, in the first of these seasons, the average temperature is about 70°, the most favourable, according to Bancroft, for the evolution of miasm; and in the latter the soil is exposed to a heat of 120° to 140° F., a heat which he tells us checks its evolution. Now, the facts of the occurrence of febrile disease are directly the reverse of the hypothetical assumption in this case. There is comparative exemption from periodical febrile disease during the alleged miasmatic season, and a large occurrence of them, during the period of alleged immunity.

Periodical fevers have originated and prevailed extensively in argillaceous soils, where no vegetable putrefaction was going on, nor at all suspected (*Chisholm—Medical Topography of the West India Islands*). So much importance did Linnæus attach to such a locality as this, that he wrote his inaugural essay, *Hypothesis nova de febrium intermittentum causâ*, to prove that periodical fevers originated in all those places where the soil abounds in clay, and only in such places. Von Aenvank of Louvaine, in the same belief, has endeavoured to account for the prevalence of those fevers in an argillaceous soil, by supposing it to possess the property of absorbing oxygen from the atmosphere, and thus impairing the purity of the latter.

Periodical fevers are met with in mountainous districts where the usually alleged sources of miasm are not seen. In the interior of some of the West India Islands, at an elevation of five or six hundred feet above the level of the sea, amongst a series of mountainous ridges, not directly exposed to currents of exhalations from swampy and low grounds, the form of disease is sometimes intermittent, sometimes remittent or continued, more generally dysenteric or ulcerative (*Robert Jackson on Fevers*). Intermittent fevers have prevailed with violence in dry sandy soils, as in Dutch Brabant, according to Pringle. Intermittents have been brought on by various crude ingesta (*Frank, Senac, Rubini*), by cold (*Alibert*), and by local irritation (*Giannini Delle Febbri*), without the persons thus suffering having been previously exposed to marsh effluvia. These were some of the facts which I adduced nearly twenty years ago against a belief of the existence of miasm; and which, in connection with the numerous fallacies and contradictions in the arguments in its favour, led me at that time to a public declaration of my sentiments on the subject, in a paper entitled *On Miasm as the Alleged Cause of Fevers*, in *Dr. Chapman's Medical and Physical Journal*, 1825. I felt that I was the more earnest in my opinion of dissidence from the received authorities of the day, because I reached it without prior purpose, when I was preparing lectures on endemic influences as illustrative of the ætiology of disease, and especially in connection with miasm; of the accuracy of the

doctrines respecting which I, at the time of beginning my investigations, entertained no doubt.

Nor can I profess greater belief in the doctrines of the volcanic miasmatists than in that of their vegetable and vegeto-animal decay predecessors. The evolution and operation, in the production of fever, of a subtle agent, termed miasm or malaria, is a purely gratuitous supposition, not sustained by direct evidence, seldom made plausible by analogies, and one which certainly does not advance us a step in the theory of the causation of fever beyond the results reached by our earlier masters in medicine, who were generally content to assign for causes, the extremes, alternations and vicissitudes of the sensible states of the atmosphere,—measured by its heat and coldness, dryness and moisture, density and rareness, different conditions of its electricity, and the force and continuance of certain winds. Each climate, and each season, the latter representing in a great measure a particular division of climate, has its diseases or groups of diseases; and he is either a singularly keen observer and successful reasoner, or very bold in reaching conclusions, who can deny the power of atmospheric extremes and alternations in one class, and admit them in another; or who, on the other hand, can see an uninterrupted chain of causation for any one disease. Surely the obvious causes of intermittent fever, in cold and moisture of the night succeeding heat and dryness of the day, acting on a body predisposed by excessive labour, impoverished diet, or intemperance, to say nothing of the operation of disturbed mental faculties, will go as far to explain the effects which follow exposure to these causes as cold, acting on a person previously heated, does in explaining the occurrence of a pleurisy, or a combination of atmospherical influences and defective nutriment acting on a predisposed body does in enabling us to conjecture the ætiology of tubercular disease.

In pathology, and under this head I include ætiology, from which late writers have chosen to disjoin it, the plain and easily found, that over which we almost stumble in our progress, is doggedly overlooked while gazing at some meteoric illumination, or peering into a mist, as if we could see through it all the objects of our search. The same error is often committed in other branches of scientific research. It is not long since the chief causes of disease were alleged, by some systematic writers, to consist in a perturbation and unequal distribution of the animal spirits, acrimony of the fluids, &c. Now, on this latter point, discarding the mystic we look at the material, and believe that we have gained immensely by the different direction which our inquiries have taken, and by the objects and subjects investigated. So ought it to be in the observation and study of external causes of disease. Miasm or malaria is as little satisfactory in our reasonings on general pathology, as vapour or a subtle fluid, accumulated in some organ and causing it to inflame, would be in special pathology.

It has been alleged, in defence of our assuming unknown agencies in an exposition of the causes of periodical fevers, that the known ones are inadequate to the production of the alleged effects. We may grant that heat will excite and cold depress, say the miasmatists, but their effects separately, or in alternate operation, are not analogous, cer-

tainly not identical, with those attributed to malaria, which acts in a peculiar or even specific manner upon the nervous system, and most probably also on the blood, by diminishing its vitality and preventing its unequal distribution, whereby come congestions and engorgements. But, if these persons were to see, as I have, more than once, a man dying from a sun-stroke, they would discover, in the rapid breaking down of his solids and the deterioration of his fluids, made evident by the smell of putrefaction from his body, that one property of atmosphere had an influence as potent as miasm itself. Take, on the other hand, diseases, the product of cold, when unequally and irregularly, yet for a length of time, it operates on the human frame, and what are its results? The scrofulous, the anemic, the sufferer from both acute and chronic pulmonary disease, and from hybrid articular inflammations, and the victims of fever itself, can answer.

A more minute observation of the differences of temperature and moisture, we might almost say of climate, with apparently very slight differences in locality, would go far to dispel the idea of the inadequacy of these patent agencies in the production of fevers as well as of some other diseases. In the same town, as in Montpelier in France, for example, the part facing the south, and measurably protected by a hill from the northerly winds, enjoys a different climate from that other part which is exposed to these winds and their accompanying chill and coldness. An artificial terrace, the different sides of a street even, will give such differences of solar exposure as to be equivalent to broad contrasts in climate. In the account of the influenza which prevailed in England in 1803, by Dr. Carrick, we learn that the inhabitants of that side of Richmond Terrace, in Clifton Hill, near Bath, which fronted the east, were universally attacked with the disease; while on the south side, the great majority, both of persons and families, in all other respects similarly circumstanced, escaped it entirely Two persons, who live in the same house, will, notwithstanding, if one lodge in rooms with a southern and the other in rooms with a northern exposure, be subjected to very different degrees of temperature and dryness of the air of their apartments, and will, in consequence, be constitutionally modified in the course of a twelvemonth, or even of a winter, to as great an extent as if, during the same time, one of them had lived in Italy and the other in England; or one in New York and the other in Charleston. We suppose that both of them sleep without fires in their chambers. Now, here are two persons whose diet may be the same and their exercise out of doors nearly alike, but whose susceptibility to the operation of morbid causes has become very different by the mere interposition of a wall between them, by which the exposure of one to the light and air is north and that of the other south.

It is a source of marvel that a family in a house situated near a mill-pond should be affected with ague and fever every year, when another family living half a mile off escapes entirely. How, say the miasmatists, can you explain this contrasted result by any notable difference in the sensible qualities of the air; and must we not have recourse to the admission of an occult cause, — miasm or malaria? Why not assign as the cause the last discovery, made in Western Africa, of sulphuretted hydrogen being the deleterious

agent? To this supposition it will be immediately replied, that if it were the case, the people would be sorely afflicted with periodical fevers in large cities. But first let us ascertain the extent of the known before we give up ourselves to imaginings of the unknown. A few yards, more or less of rank grass, or a shrubbery, in place of gravel walk, will create differences of a climatic nature to those who stand, or still more who lie down, a few hours near them. Let two men stand sentinels for a night, separated from each other by a few yards only, clad in all respects alike from head to foot; but the one be in the centre of a grass-plot and the other on a rocky soil, or even gravel walk. The first will be exposed to cold and moisture greater by many degrees than the latter, owing to the radiation of caloric from the vegetable growth and the formation of dew or precipitation of moisture in consequence, and he will be much more susceptible to even common physiological stimuli in the morning than the other person. Let a man who is lightly clad pass, during his walk late of a summer evening, from an open gravelled or paved space to one covered with grass and shrubs, and he will in a moment experience a chilly feeling, which, if he were to remain stationary long on the spot, would end in a regular chill, followed, on his reaching home, in the morning, by reaction or morbid heat, and afterwards a moist skin. For interesting elucidations on these points, I would recommend you to read *Wells on Dew*.

The poor labourers of the *Campagna di Roma* are exposed during a long day to the sun's heat, and when night comes with its coolness and dews they undergo another exposure, from which their miserable huts and scanty covering of clothes fail to protect them. Their nervous system necessarily suffers after a few alternations of solar excitement and nocturnal sedation, and fever is a natural consequence: it is the more readily induced, because nutritive excitement, as the best protection against external morbid causes, is deficient. Their food is poor, chiefly vegetable, and that wanting in due proportion of glutinous and farinaceous principles. This picture will serve to represent the condition of many of our countrymen on plantations and farms at home, with the difference in their favour of more abundant and substantial food, and against them of alcoholic stimulation and consequent indirect debility. If the fever from which persons thus exposed suffer were the product of a subtle poison of miasm, few in the regions in which it is evolved could escape its power; but when we find the richer Romans spend the season in their châteaux without being attacked, and that even their poorer neighbours, who protect themselves from the effects of sudden atmospherical changes by wearing flannel next the skin, and persevere in keeping their houses dry, are equally exempt, we cannot attach much importance to this imaginary cause, to the exclusion or oversight of the appreciable distemperatures of the air and often concomitant poverty of diet.

Periodical fevers are most frequent and violent in climates and localities, and during or immediately following the season of the greatest contrasts and alterations in the sensible states of the atmosphere. The modifications of these states will depend much on the nature of the soil itself, as in its being bare or clothed with herbage

its contiguity to water, exposure to particular winds, and partial currents of air either out of doors or in a house. Protection from disease will be just in proportion to the care and success with which the inhabitants guard themselves against extreme vicissitudes of eason and weather — the noonday sun and the evening dews and coldness, rain, and easterly winds, and, as regards personal exposure against dwelling and sleeping in damp apartments, being imperfectly clad, and neglecting the rules of regimen.

If we extend the inquiry into the causes of continued fever, and especially of typhus, are there not obvious agencies at work without invoking contagion or miasm from the living body? Do not the damp cellars, or other close and ill-ventilated lodgings of the crowded poor, poisoning each other with the exhalations from their persons, and the not always removed excretions of the children and the bed-ridden; their scanty and deficient food; overtoil or drunken languor, constitute causes adequate to produce fevers of the worst grade; when ever so slight a difference, in the character of the season or additional stint of food occurs? One great and a serious disadvantage of the malarious or miasmatic doctrine, is, that it leads to, has actually caused, a neglect of much of that course of observation of the circumstances modifying both the physical and moral nature of man, which distinguishes a Hippocrates and a Sydenham, and others who have travelled in their footsteps. Another disadvantage, as respects the people generally, is, that, hopeless of shunning this subtle agent, maaria, or their heads filled with speculations and contradictory notions of its origin and nature, they either fail to adopt any proper precaution, or they have recourse to it in the wrong spirit and in an inefficient manner. They think that they must of necessity either inhale this miasm, or, according to others, swallow it, and amid their fears and their anxiety they overlook the simple and old-fashioned means of protection against diseases, the products of atmospherical mutations and extremes. Differently impressed and taught, they would know that, if their cutaneous surface be adequately protected from a sudden reduction of temperature and currents of cool air, by flannel next the skin and correspondingly warm outer clothing, they may breathe the air of the most malarious district with as much freedom as they would that of the third zone of the mountain of Teneriffe; and that, if they use wholesome food at the seasonable hours, and procure a regular state of the bowels, they may subject their food to as prolonged mastication and insalivation as they choose without any apprehension of swallowing miasm with their saliva. They ought also to learn that, worse by far than inspiring marshy air, or swallowing as much as can be incorporated with their saliva, during the autumnal months, will be sleeping one night between damp sheets, or in a damp and cold room, however carefully all the outer (*malarious*) air may have been excluded for days previously. One more fact of importance ought to be impressed on their minds, viz., that exposure to a noontide sun, pouring down its heat with relentless power, is perilous, even though they may be told that at this time miasm is volatilised and rendered in a great degree innocuous. The absence of miasm will not, after such exposure, give them immunity from headache, feverish heat and feverish thirst, followed by some languor

and lassitude, and a proneness to be depressed beyond due measure by the coolness and humidity of the evening and night following.

In the winter, a man who gets cold, as the phrase is, or whose skin is chilled, when it had just been perspiring freely, contracts angina; in the spring similar exposures will be followed by pleurisy; in the summer by cholera morbus or bilious colic; in the latter part of the summer by remittent or congestive fever, and in the fall by intermittent fever. In no one of these cases would the mere exciting cause be sufficient without antecedents. Is there, then, any more propriety or necessity for including malaria among these, in the last than in the first case? Not all they who are exposed to cold after heat in the autumn have intermittent fever in consequence; nor be it said in reply, do all they who are similarly exposed in the winter contract angina, or in the spring pleurisy. If the magic link of malaria be requisite to complete the chain of causation in one case, it is equally so in the other — for all are equally defective; or if we assume entireness for one, the others are just as complete.

Of *periodicity*, as one of the characteristics of a large class of fevers, I cannot now speak with the details that I allowed myself in some former lectures of mine on intermittent fevers. It is enough for my present purpose to point out to you the fact, that nearly all the functions of the several parts of the nervous system are performed periodically; and that when diseased their phenomena have a tendency to periodical recurrence. Intermission, therefore, or periodicity, is no proof of miasm or the like specific cause acting on the nervous system or on the organism at large.

I proceed to make a few remarks on the treatment of intermittent fevers, additional to those laid down by Dr. Stokes. In common, we ought not to weary the patient with the administration of drugs during the cold stage, but content ourselves with allowing him simple warm drinks, such as herb teas, and clothing to the extent he craves. If he feels nausea and a desire to vomit, as the chill is subsiding and about to yield to the hot stage, he may drink some warm water, or salt and water, or a little warm camomile tea, to encourage vomiting and relieve the stomach. This operation is the more proper if food have been taken not long before, and is probably not yet digested. There are cases, however, in which the congestion in the cold stage is so great as to require immediate abatement, in order to prevent the organs from being fatally oppressed by the accumulation of blood in them. Strong stimulants have been sometimes administered with this view, but erroneously as regards doctrine, and injuriously as regards the patient. The remedy which has of late years obtained some favour is of an entirely opposite kind — I refer now to venesection. Dr. Rush has recommended it, and I know it was tried by some of his pupils; but the late Dr. Mackintosh was the first to acquire for it general interest among the profession.

My own experience of bloodletting in the cold stage of fever is limited. In two cases in which I adopted this practice, the result was not of a favourable nature. One was evidently benefited; but neither in this nor the other was I dispensed from the necessity of subsequently bleeding them in the interval, before the disease was arrested.

To these I ought to add a third, which, from its rare occurrence and the formidable nature of the symptoms, merits a more particular notice. It was of a comatose intermittent which occurred in a young mulatto man, who had been confined to his bed for three weeks by gastric remittent fever. The paroxysms came on at irregular intervals, and were always marked by a frequent and rather full pulse, acrid heat of the skin, especially over the abdomen, and a burning thirst. Frequent bleedings from the arm and cuppings over the abdomen had been practised; purgatives of a saline and mercurial character were occasionally administered, which gave some relief at the moment, but always left the stomach and abdomen more tender to pressure, and the skin hotter to the touch. During nearly the whole time the tongue was loaded in the middle with a whitish-yellow coat, while its borders and tip were red and shining. After the expiration of the above period convalescence seemed about to be established; the pulse was nearer a natural standard, thirst less urgent, and temperature of the skin, except over the epigastrium, of an ordinary nature. Pressure on the abdomen rendered the pulsation of the aorta very perceptible. The patient gained very little strength, although he was allowed light animal broth and farinaceous food. At my visit in the afternoon (of September 17th, 1828), I found him in a state of great apathy, with an inclination to doze. The pulse was not materially altered, nor was there any other new symptom. A blister was directed to the back of the neck, and a laxative of rhubarb and magnesia at bedtime. At 11 o'clock, P.M., I was sent for in great haste, and on my arrival found the patient in a state of complete coma, utterly insensible to all objects of sight, sound, and touch; his limbs at first extended, remained in whatever position they were placed; the pulse was barely perceptible, and the breathing very slow. It was impossible to make him swallow anything, or to elicit from him the slightest evidence of consciousness. On applying my hand to the epigastrium, I could feel the abdominal aorta beat with considerable force; so did also the carotids. The contractions of the heart were frequent and laborious. The blister had been put on, but no medicine taken. Sixty leeches were now applied over the epigastrium, and sinapisms to the extremities. After the leeches had begun to fill, the pulse lost somewhat of its extreme tenuity, and by the time they were detached, it had regained its natural volume, was soft and compressible. The patient at this time began to move his eyes and the muscles of his mouth and face; he turned a little towards one side, yawned and stretched herself. The extremities were still cold and unaffected by the sinapisms. Before all the leeches were removed, the skin became moist in places; and finally a sweat covered the face, trunk, and limbs, with the exception of the hands and feet. Enemata of tepid water were administered at different times through the night. In the morning, though languid, he was partially sitting up in bed, by leaning on his elbow, helping himself to some light nutriment. In the afternoon of this day he experienced some rigors, which disappeared in the evening with moisture on the skin.

On the evening of the following day, 19th, by eight o'clock, he was

in nearly the same state as on the 17th, being completely comatose. Cups in large numbers were now applied to the temples and over the abdomen, so as to detract about ten ounces of blood. The effect was salutary, and the recovery even more prompt than from the first attack. Enemata of cold water were given on the present occasion.

An examination of the symptoms of the case on the morning of the 20th, as presented by the pulse and skin, seemed to justify the use of the quinia, from which the furred and chapped tongue on the preceding days had deterred me. A minute inspection of this organ now showed me that under this dry and cracked coat it was pale, and rather thicker than natural. This appearance was readily recognisable by looking at the tip and sides of the tongue. A solution of the sulphate of quinia in water, ten grains to the ounce of fluid, was directed. Of this a teaspoonful was taken every hour until the afternoon. There was then a very slight exacerbation. The medicine was resumed on the following day, and continued for several days. The patient was thenceforward clear of paroxysmal attacks, and gradually and regularly regained his strength and health.

Here was an extreme case, in which the coma, evidently a substitute for the cold stage of intermittent fever, was, apparently at least, relieved on both occasions by a free abstraction of blood. The subsequent reaction and distress were very inconsiderable, and did not, on either occasion, prevent the patient from sleeping quietly during the remainder of the night. Were I to meet with a similar case of congestive or malignant intermittent with that which I have just now detailed, I should give five grains of the sulphate of quinia at once, and repeat the dose every two hours until twenty grains had been taken.

Local bloodletting, which as yet I have merely alluded to, in connection with our present subject, will become a more conspicuous part of the treatment than heretofore, if we adopt the pathology of intermittent fever which supposes this disease to be a lesion of the nervous system, and more particularly of the cerebro-spinal axis; and that the sensation of cold and the pain of aching of the back and limbs result from a disorder of the spinal cord. Dr. Kremer, near Aix-la-Chapelle, has, within these few years past, pointed out a symptom in corroboration of this pathology, which will more directly indicate the propriety of local bloodletting. It is, a more or less severe pain on pressure of the first dorsal vertebra, made from behind forwards with the fingers upon the spinous processes of the individual vertebræ, and not upon several together. If intermittent fever is considerable, or old or masked, pressure on the first dorsal vertebra, by giving pain, will, as Dr. Kremer alleges, suffice to evince the existence of fever. The pain exists during the paroxysms, as well as in the apyretic interval, is stronger in epidemic than in sporadic intermittent fever, exists in all fever, and continues during the sequelæ (*Brit. and For. Med. Rev.*, vol. viii.). Corroborative of this view are the observations based on fifty cases by Dr. Grossheim, who does not, however, pretend to restrict the pain to one vertebra, as Dr. Kremer did. Dr. Grossheim found the pain to be most frequent in the middle of

the dorsal portion, especially in quotidian intermittents. The extent of the pain also varies considerably; one or two of the vertebræ only may be tender; and the pain rarely occupies the space of more than five or six; it may also be situated at distant parts with intervals in which none is excited by pressure. The pain was more severe during the paroxysms than in the intermissions. Do we not see a strong affinity between these pains, in their seat and character too, and those of dorso-intercostal neuralgia which I have so recently described to you? Dr. Grossheim was led to try the effect of reducing the local excitement or irritation in the fever; and, accordingly in five cases, he applied eight or ten (German) leeches over the spine in the situation in which pressure gave the most pain. In four of these this application sufficed without any other remedy being used to prevent a return of the paroxysm. I shall make the application both of the pathology and the pratice deduced from it, which I have now briefly noticed, when I speak of congestive fever, to a proper view of which the remarks already made are intended as an introduction.

Confirmatory of the views of the German writers, is a case which I find recorded in the *Amer. Jour. of Med. Sciences*, vol. xvii., by Dr. Malone of Florida, and which is the more valuable because it occurred at a date (1834) anterior, by some years, to the published statements in Europe. Dr. Malone, in his *Remarks on Spinal Irritation*, gives the following particulars respecting the second of the two cases which are the subject of his paper. It was of a lady of a sanguine temperament, aged thirty-five, who had just recovered from an attack of bilious remittent fever after a sickness of two weeks' duration. When visited by Dr. Malone, she had chills every day, with complaint of pain in the back, and general aching sensations all over. Believing that the disease was kept up by spinal irritation secondarily developed, he made an examination and found the *lower part of the neck and upper half of the dorsal column tender in several places.* Just before the coming on of the chill, Dr. Malone applied a large mustard cataplasm between her shoulders, and continued the camomile infusion, which he had before prescribed in moderate doses. The result was the prevention of the chill. She applied the cataplasm once afterwards, and had no more chills. Dr. M. adds, that the applications of mustard cataplasms to the spine is quite a common thing in the country (Florida). He deduces a conclusion from the above case and analogous facts, that intermittents are frequently continued, if not actually produced by spinal irritation.

Whether we believe that the phenomena of pain in the back and limbs and rigors proceed from a disorder of the spinal marrow itself, or of the spinal nerves, and probably the ganglions of the sympathetic, contiguous to and connected with them, we shall find indications for topical remedies to the spinal region. Of these, leeches or cups might be first used, and afterwards, if necessary, counter-irritants by mustard, vesicatories, &c. The latter order of irritants will be more beneficial in this way in warding off an attack of fever than when applied either to the abdomen or the extremities. I have had five vesicated surfaces on me at once, but without their preventing the recurrence of a paroxysm of intermittent, a double tertian, from which I was suffering at the time in Canton.

The intensity of the pyrexial disorder during the hot stage of intermittent fever is not dependent on the length or violence of the cold stage so much as on the extent of stimulation by the use of internal excitants, or, I ought rather to say, by the amount of stimulants given; for, although they have slight action at the time, during the period of comparative insensibility of the nervous system, yet their operation cannot fail to be violent and injurious so soon as the stomach and the other organs which so readily sympathize with it recover their normal sensibility. A knowledge of the natural reaction after chill and depression, and of the danger of its increase by stimulants administered during the chill, ought to make us wary in allowing such articles to be taken at all at this time.

If great and painful determination to the brain, or lungs or abdominal viscera exist during the hot stage, we may draw blood from the arm with great relief to the patient, the paroxysm will be shortened and the sweating stage more complete and critical. In common, however, it will be sufficient to allow the access of cool air, if procurable, to the patient, and direct cold drinks, including slightly acidulated ice water, and if the fit be long, the affusion of cold water over the whole body. The excessive heat and restlessness and oppressed breathing are promptly and agreeably relieved by this remedy, which also removes thirst, and reduces the frequency of the heart's action. The cold or the cool bath is the remedy in the hot stage of intermittent as it is in the analogous exacerbation of remittent fever.

LECTURE CXXVIII.

DR. BELL.

INTERMITTENT FEVER (*Continued*).—Treatment in the apyrexia, or interval—Confidence in Peruvian bark and sulphate of quinia—Large clinical experience with this remedy—Dose, and period for administration—Good effects of cinchonic preparations in enlarged spleen with intermittent fever—Various formulæ of the bark and sulphate of quinia—Complications of gastro-enteritis and bronchio-pulmonary phlogosis with the fever—Modified treatment—Still to regard bark as the remedy—Danger of empirical practice in protracted intermittents—Nutritive tonics and chalybeates in certain anemic cases—The cold bath—circumstances under which proper—Great number of remedies for intermittent fever—All the astringents and bitters and some stimulants used for this purpose—Chief substances to have recourse to as unavoidable substitutes for cinchonic preparations—arsenic and arsenite of potassa—Prussian Blue—Sulphate of iron—Sulphate of copper—Narcotine—Piperin—Alum and nutmeg—Gentian and galls—All the vegetable astringents in virtue of their tannin—Tannin alone sometimes used—Generally some bitter added to the astringent—Indigenous productions—Dogwood, or Cornus florida and Cornus sericea.

I NOW propose, in conclusion of my remarks on the treatment of intermittent fever, to say something on the remedies during the apyrexia or interval and the complications with this disease.

In justification of my confidence in bark, or sulphate of quinia, I may be allowed to adduce the following statement: — At first in Virginia, then in Canton (China), and subsequently during a term of twelve years as one of the physicians to the Philadelphia Dispensary, during part of which time the cases of intermittent fever were very numerous, I have had charge altogether of fully three hundred patients

with this disease. I state this fact for the purpose of mentioning another, and of leaving you to draw from it the practical inference which it is my design to inculcate respecting the little necessity for hunting after new tonics or new combinations of tonics, if we place the stomach and viscera generally in a fit state to receive the quinia. Of these three hundred cases I do not think that I have used either vegetable bitters and astringents or arsenic in place of bark or quinia in ten cases; and I do not remember to have experienced any great difficulty in curing my patients in every instance except two. I do not say that there were not relapses after they passed out of my hands: but of this I had no knowledge.

In simple intermittent fever characterised by temporary congestion in the cold stage, temporary excitement in the hot, and crisis or termination by sweat, the bark or sulphate of quinia, alone or combined with opium, will almost always suffice to prevent the return of the paroxysm, and with it the recurring congestion. The same remedy is equally efficient in removing the congestion when it has assumed a more fixed character, as in an enlarged and tumid spleen, or liver, or even lung. In my lecture on *the Diseases of the Spleen*, when speaking of enlargement of this viscus associated with intermittent fevers of every grade, I stated that there is no remedy of equal efficacy to sulphate of quinia in full doses. I also remarked, and I repeat my language used on that occasion, although in anticipation of the treatment of congestive fever, that the control which the sulphate of quinia is found to exercise over enlarged and congested spleen, would of itself, even if direct testimony were wanting in favour of the practice, prompt to the free use of this medicine in congestive fever, although the spleen be not specially implicated. The whole portal circulation, in this form of fever, is in a state closely analogous to that of the spleen, viz., accumulation and obstruction of the blood in the immense venous meshes of the stomach, the intestines, and the liver. The kind of medication successful in one chain of this great circle can hardly fail of good effect in the others.

But while I thus speak, as if it were now a familiar fact, of the sulphate of quinia as representing the bark itself in the case of intermittent fevers, it would be wrong to claim for it entire identity or entire equality of therapeutical effects. Hence, when the indications are clear for the use of the salt of quinia, and it fail us, recourse should be had to the bark, either in substance or in decoction or cold infusion. This last, in wine-glassful doses, three times a day, may well alternate with the quinia at the same time, or replace it for a while. Extract of the bark has also been found to be quite an efficacious remedy.

The following formulæ will be found adapted to carry out the intentions in administering bark and its chief preparations. I premise that, in strict chemical accuracy, the term di-sulphate is that applicable to the imperfect salt commonly called sulphate of quinia.

℞. Sulphat. Quiniæ, ℈i.
Pulv. Opii, gr. ii.
M. et adde Syrup. q. s. ut ft. mass. in pil. x. dividend.

Of these the patient will take one every two hours during the interval

between the paroxysms. Should constipation prevail, five grains of aloes or ten grains of the compound extract of colocynth may be substituted for the opium. Still better, where there is gastric irritation or disordered biliary secretion, is the addition to the sulphate of quinia, of blue mass, in a dose of five to ten grains. If time be allowed, the blue pill might be taken over night and the quinia during the day, or until near the expected time of the paroxysm.

If a fluid form be preferred, the following prescription will answer very well, supposing that, owing to the dry skin and reduced circulation, opium is required or allowable.

℞. Sulphat. Quiniæ, ℈i.
Aquæ Menth. Viri, ℥iv.
Acid. Sulphuric. dilut. gtt. xx.
Sulphat. Morphiæ, gr. ss.
M. ft. solutio.

Dose, a table-spoonful or half an ounce every two hours during the paroxysm. If it be preferred by the patient, some other aromatic water may be substituted for the mint; or, after the sulphate of quinia is dissolved in two ounces of water and the dilute sulphuric acid, two ounces of syrup of ginger may be added to make up the quantity as above. Where prompt and early diffused operation is desired, the salt of quinia ought to be given in a state of adequate solution.

Febrile irritation still persisting during the interval, with determination to some organ, and yet the urgency of the case requiring resort to the sulphate of quinia, the risk, generally overrated, of the undue excitement from the quinia, will be lessened by the addition of the tartrite of antimony or tartar emetic. M. Gola recommended the following:

℞. Tartrat. Antim. gr. iii.
Sulphat. Quiniæ, gr. x. M.
Ft. pulv. vi.

Of which one is to be taken every two hours during the apyrexia. He states, that the first dose sometimes produces vomiting of bitter substances, sometimes alvine evacuations. Sometimes no evacuation takes place, but the fever always ceases. A smaller proportion of the tartar emetic, or one grain in the six powders, will be preferred.

The sulphate of quinia and extract of the bark may be thus combined:

℞. Quiniæ Sulphat. ℈i.
Extract. Cinchon. ℥i.
M. ft. pil. xx.; of which two are to be taken two or three times a day.

If the cold infusion of bark be preferred, it is made in the proportion of an ounce of the powder of the red bark to a pint of cold water. After twelve hours maceration, strain, and give a wine-glassful at intervals. If hot water be used, two hours maceration will suffice. A more efficient and delicate preparation is the compound infusion of cinchona of the United States Pharmacopœia,

made by macerating for twelve hours one ounce of powdered bark in a pint of water, to which a fluid drachm of aromatic or dilute sulphuric acid is added. Dose, same as of the simple infusion. Half a grain or a grain of the sulphate of quinia may be dissolved in each dose or this compound infusion. Sometimes with the decoction of the infusion is mixed the extract of the bark, as in this formula :

℞ Decoct. Cinchonæ, f℥v.
Extract. Cinchonæ, ℥i.
Aquæ. Cinnam. f℥i.
Syrup. Zingib. f℥ss. M.
Dose, a table-spoonful every two or three hours, as indicated by the case.

The powder in half drachm or drachm doses is sometimes given, mixed with two or three ounces of the decoction. A popular and useful addition to the bark is the serpentaria root, in powder, or, preferably, in decoction.

As respects the dose of the bark, we had not some years ago the choice which we now have. Bulky and unpleasant to the taste as it is, the patient could seldom be pursuaded to take more than a drachm or two at a time, and even then it was not without difficulty that it could be retained by stomachs rendered often irritable by the disease itself. If decoctions or infusions were substituted, still the same objection to a certain extent applied, and, at any rate, they seldom furnished an adequate quantity of the active principles of the bark. Tinctures, simple and compound, made more drunkards than cures. Against adulteration of the bark itself it was hard also to be protected. Great, then, ought to be our gratitude to Messrs. Pelletier and Caventou, for placing at our disposal the alkaloids of bark and their salts, which possess a uniform strength, are readily soluble in different menstrua, and prepared in different ways, and which allow of so many adjuvants of a more or less agreeable nature being used with them.

Difference of opinion still prevails respecting the time at which the antiperiodic should be given, as well as the dose. Guided alike by physiology and therapeutical experience, we should, it seems to me, direct a full dose, adequate to impress strongly and diffusively the nervous system, and establish a new action in it, before the approach even of the morbid change which constitutes the paroxysm. Some time must elapse for preparation for the morbid process — and some time ought to be allowed for the remedial one to be set up. You had better, then, so soon as the paroxysm is well over, by the subsidence of the hot stage into sweat, give five grains of the sulphate of quinia, and repeat it every four hours until four doses, or twenty grains, have been taken before the expected return of the next paroxysm. Opium or laudanum, according as you prescribe the sulphate of quinia, in pill or in solution, may be combined with it, if the symptoms seem to require it.

In the frequent complications of gastro-enteritis and of broncho-pulmonary irritation and phlogosis, a modified treatment should be instituted. Often, after the fever has lasted some time, and if the patient

has been careless in his regimen, and continued to expose himself to atmospherical viscissitudes, that which was simple irritation with congestion of the digestive mucous surface, becomes now phlogosis, which is participated in by the liver and measurably by the spleen; and we find, in consequence, a pulse of some tension and frequency during the interval of the paroxysms, a symptom which will be more decided if there be coincident pulmonary disorder. There will be, also, pain in the right hypochondrium extending round to the epigastrium, a sallow complexion, yellowness of the conjunctiva, and other symptoms which seem to point conclusively to derangement of the liver.

Now comes a time of trial, if not of peril, for the patient. He is liable to farther suffering from the disease, and he is subjected to some risk from the treatment that may be directed by his physician. If bark or sulphate of quinia have been used up to this time, the continuance of the chills seems to call for increased doses of this antiperiodic; and if it fail to prevent the fit, other medicines, both vegetable and mineral, are had recourse to with similar intention; and the poor patient's stomach is subjected to a succession of stimuli, and not seldom of irritants, which still further derange, if they do not positively either inflame it, or increase existing phlogosis. Other practitioners, again, under the influence of a hepatic pathology, set about giving mercury in order to salivate, and thus "to cure the chills." Hardly, however, have they had time to boast of success, which at first rewarded their efforts, by the suspension for a while of the paroxysm, when they find the fever returning with, it is true, not as much violence as before, — only because the patient is weakened by the mercurial course. When in Canton and a sufferer from double tertian fever, and not in a fit state to take the bark, twice I put my system under the influence of mercury so far as to have my gums slightly touched. For a while the disease was suspended, but it soon reappeared on my first exposure to night air, when administering for the diseases of others. So have I always found it to be in the few whom, without meaning it, I have salivated in intermittent fever — provided the bark of quinia were not given immediately afterwards in adequately full and repeated doses.

There is yet another mode of treatment at this juncture, such as I have described it, where there is some gastro-enteric disease, with hepatic and splenic congestion, and perhaps corresponding disorders of the pulmonary if not cerebral circulation. It consists in recourse to venesection, or occasionally, in place of it to local bloodletting. I can speak in terms of very decided commendation of this practice, to which, when yet a student of medicine in Virginia, I had recourse, in the case of a young man of a spare habit of body who had been much reduced by repeated attacks of intermittent fever. Bark and arsenic had been administered in vain. Influenced by the recommendation of Senac, whose works on Intermitting and Remitting Fevers I had just perused, I opened a vein in the arm of my patient during the next hot fit, and took away a pint of blood. The relief was immediate; the force of the paroxysm soon subsided; the apyrexia was complete; and a few doses of bark were sufficient to

prevent the next fit. He speedily recovered his health, and strength, and remained clear of intermittent fever. From that time to the present I have not hesitated to use the lancet in every case of periodical fever, in which either the apyrexia was not so complete as to leave the patient entirely clear of all gastric and cerebral distress, or in which the paroxysms had been of frequent recurrence and untractable under the use of the bark. I have usually preferred, when the choice was in my power, to bleed during the hot stage to the doing it in the apyrexia; but the experience of every additional season convinces me that in this latter state, also, the employment of the lancet will realize all our best hopes.

But let me not be misunderstood as an advocate for bloodletting to the exclusion of bark and tonics. No cure can be considered permanent unless this medicine or analogous articles be given; and every other means ought to be regarded as preparative or adjuvant to this *the* remedy in intermittent fever. Whoever relies on bloodletting alone, or on mercury alone, or on the cold bath alone, or on all these in due alternation for the cure of intermittent fever, trifles with the health if not the life of his patient, and manifests both an ignorance of the experience of the past and a blindness to the present. The opposite and extreme opinion and practice are equally reprehensible; as when no means of relief or cure are thought of, except in the use of bark or other bitters and astringents, and arsenic, and no other cause of failure is admitted than the want of power in the drug. Hence, if bark or its preparations fail, these empirics try bitters singly and in combination, or vegetable astringents with these: then mineral preparations, — of arsenic, iron, zinc, and copper; they run the round of the grossest empiricism, following the prescription of every professional friend, ransack books, confer with old women and nurses, and dream of nothing but of some new tonic, or new combination of old tonics, strengthened by various wines, tinctures, and the like. It never occurs to these good men, that excellent as bark and its congeners are, and indispensable for the cure, there are complications of visceral disease with the disorder of the nervous system that require a suspension for a while of the tonic course, and even the use of remedies of an opposite nature. Often, after the patient has suffered from intermittent fever for weeks and even months, during all which time he may have been duly dosed with the most approved tonics in the most approved doses, a suspension of all remedies, of either the tonic or the stimulant class, — bark, and serpentaria, wine, and brandy, whether it be simple or medicated, under the name of tincture; and abstinence from common food, restricting himself to simple water for drink, and jellies or amylaceous articles for aliment, have been followed by freedom from the paroxysm and comparative comfort. But let us not, in a spirit of hasty generalization, proclaim, that intermittent fever is caused and kept up by gastritis or gastro-enteritis, and that leeches over the epigastrium and gum-water will suffice to cure it. Doubtless, if the poor patient has been stimulated for some time with highly seasoned animal food and liquors, or has voluntarily kept himself half intoxicated, in order to be "a little above par," he will be very

liable to high gastric irritation, perhaps gastritis itself, and doubtless, also, he will find relief in leeches to the epigastrium, gum-water, cooling drinks, and laxative enemata. But these are not so much means of cure as for putting the system in a proper state to be cured by bark, or sulphate of quinia. Of these preparatory and auxiliary means, calomel, or, that which I prefer, blue pill, in a dose of five grains taken at bed-time, so as, either alone or with the aid of a few grains of rhubarb in the morning, to act on the bowels as a mild laxative, is worthy of commendation. This may be repeated every night for three or four nights, and constitute, for this period, the only medicine; or, if the case be urgent, we can give, with a much better prospect of its displaying its antiperiodic properties, sulphate of quinia in the morning or early part of the following day.

Another extreme of opinion is that on which I have already animadverted, and which consists in treating intermittent fever, as but a modification of remittent bilious fever, and as such, after equalizing morbid excitement, or placing the system "at par," by venesection and purgatives, to let the cook administer the tonics procured from the butcher, and the poulterer, and the baker, and disregard all others. Failure and disaster will attend still more signally the course of this advocate for unity, than they did that of the other who relied on bark alone.

But there is a period in intermittent fever, or rather there is a class of subjects labouring under this disease in its own appropriate regions, who will be signally benefited by nutritive tonics. They are the sallow, the emaciated, — except where the spleen is protuberant, — the ill-fed, having lived on crude fruits, and drunk bad water; and, in fine, they who have become, among the men, anemic, — among the women, chlorotic. These are the subjects on whom iron works wonders, increasing the red particles in their blood, and giving them colour, animation, and new life. By the influence exerted, also, secondarily through the blood on the nervous system, the latter acquires such tone as to be able to resist the operation of the atmospheric and the other unhealthy influences, such as of bad food and bad water. By chalybeates the disease may be prevented from making its attacks in those hitherto exempt; and by these same means it may be suspended in those suffering under its inflictions, and even in some cases entirely cured. As a general rule, however, we can only so far rely on iron as an indirect, but yet, under the circumstances now sketched, a very important curative agent, by its improving the quality of the blood, diminishing and to a certain extent removing congestion, and giving to the nervous system, by richer blood, a better nutriment to its healthy sensibility, which is indispensable for the discharge of its functions.

I have alluded to cold bathing in intermittent fever; but as a remedy used both in the paroxysm and during the interval, it merits a more distinct notice. Occasionally we hear of practitioners relying exclusively on the cold bath for the cure of intermittents. A knowledge of the directly sedative effects of cold, and an observation of its power of reducing febrile action to the normal healthy standard, as in the hot stage of intermittent fever, will make us slow to direct it

during the interval, when there is often little or no superfluous excitement, and the predisposition to chill is manifestly great. It is hardly wise to imitate a paroxysm of fever by subjecting an individual, whose nervous system is rather enfeebled than excited, to a cold bath. He is necessarily chilled; has some rigors; and in the most favourable state a subsequent glow and reaction. Nor does the disturbance end here; pains in the limbs and head and languor are often complained of by those who use the cold bath, when the system is not above the natural level of excitement. From these premises, not a little strengthened by experience, I should feel inclined to regard habitual cold bathing, in the interval, as a hazardous remedy, and rendered often mischievous by the prevalent errors regarding its *modus operandi*. Very different are its effects when used in the hot stage of intermittent, or in the more permanent capillary excitement of gastro-cerebral fever, usually denominated typhus. Then the morbid excitement of the sanguineo-nervous structures, which enter into the composition of the membranes, and are chiefly instrumental in the secretions, including that of caloric, is abated and often entirely removed; the patient is rendered tranquil, and enjoys a pleasant slumber unbroken by the former irritations of heat and thirst. Just in proportion as the state of the patient during the interval approaches to that exhibited in the hot stage will cold bathing be useful, but not otherwise. Hence, if there be a continued dry heat of the skin, frequent pulse with thirst, and little or no appetite, we shall derive good effects from cold affusion in the period between the paroxysms. This remedy is not, therefore, as often taught, akin to bark; the two stand opposed to each other in their effects, and their use is only properly called for under different and opposite circumstances: the one to allay morbid irritation and inflammation; the other to give tone to parts already feeble.

After having laid down the principles which ought to guide us in the treatment of intermittent fever, and stated the chief remedies to render the treatment effective, I do not feel myself called upon to enumerate all the substances, which, from the different impulses of love of novelty, empiricism, ignorance, and false hypothesis, have been used with a view to cure this disease. Regarding it as one of debility, all the tonics and astringents, and some of the stimulants of the materia medica, have been, at some time or another, enlisted for the purpose. Bitterness, even when allied to narcotic properties, has been, also, supposed to be a sufficient indication for adding to the long and tedious list. A physician who can procure Peruvian bark, or the salts of its alkalies, need scarcely regret his ignorance of the whole class of imperfect substitutes for this *febrifugum magnum*: but as there are times and places in which bark is either not procurable at all, or in scant quantity, it is right that some of the most readily attained and cheapest of these should be known to him.

Next to the bark, on the score of alleged remedial value, and, in the minds of some physicians, excelling it, in certain cases, is the arsenious acid or white arsenic of the shops, and among its preparations, solution of the arsenite of potassa (*liquor potassæ arsenitis*), or "Fowler's mineral solution." By a strained analogy, arsenic is familiarly spoken of as a tonic, when, in fact, its operation on the ani-

mal economy rather contrasts with, than resembles that of, cinchona, and the vegetable tonics generally. So far from exciting, it rather depresses, and hence it may be given in the paroxysm and in states of the system in which other articles of the class to which it is referred are generally admitted to be uncalled for and injurious. This, added to the smallness of the dose and the insipidity of the article and its cheapness, have contributed to give vogue to arsenic as a febrifuge among different classes of people. By children, and those who are as bad as children in their aversion to any medicine with a disagreeable taste, the solution of the arsenite of potass is naturally taken with a readiness and regularity, which were often impossible when the bark or any of its preparations was prescribed. We cannot, however, despite the recommendation of Fowler, who first introduced it into regular practice, and of Arnold, Withering, and more recently Dr. Brown (*Cyclopædia of Medicine*), forget that arsenic is a most active poison, determining its influence more particularly on the alimentary canal, heart, and nervous system; and that its use, even in small quantities, and especially its prolonged use, requires great circumspection, and is only justifiable after suitable trials have been made with safer and well ascertained remedies. Dr. Paris avers, from his own personal experience, that it accumulates in the system, and this in certain habits may predispose to serious diseases.

The dose of arsenious acid is from a sixteenth to an eighth of a grain, twice or three times a day; and it has been extended to a grain. The arsenic should be well rubbed in a mortar with some fine sugar, or a few drops of water added to dissolve it, so as to insure its complete division in its subsequent mixture with crumbs of bread to be made into pills. The preferable and more generally safe mode of exhibition, is arsenic in solution with potash, in the form of an arsenite, of which the dose is five to ten drops, three times a day. Both pill and solution are better given after a meal than on an empty stomach, and to both, in cases of an irritable or very sensitive state of this organ, opium is usefully added. The arsenite is best administered in some aromatic water.

Prussian blue (*ferro-cyanuret of iron*) has been recommended and used by Dr. Zollickoffer, of Maryland, as even more prompt and efficacious than bark and its preparations, in intermittent and remittent fevers, and particularly adapted to children on account of its insipidity and smallness of dose. Dr. Stokes, also, expresses himself in terms of decided commendation of this substance, which, "from its cheapness, is particularly adapted for dispensatories and institutions where the funds are limited." He has given it in doses of from a scruple to half a drachm, three times a day.

On one occasion, in Paris, when during the long war the supply of the bark was deficient, sulphate of iron was freely used, at the suggestion of Dr. Marc, and with entire success.

Sulphate of copper is represented by some writers and practitioners, viz., Dr. Donald Monro and Dr. Physick, to be a powerful remedy in obstinate quartan fevers. Dose, two grains with half a grain of opium, in pill, twice a day.

Narcotine, or narcotina, once thought to be the stimulant principle

of opium, but now regarded as a simple bitter of no great power, has, however, been used by Dr. O'Shaughnessy and his friends and pupils at Calcutta, in nearly 200 cases of periodical fever, with a success fully equal to, if not greater than, that which follows the sulphate of quinia.

Piperin is another vegetable principle which has obtained, on the recommendation of Mets and others, a reputation as a febrifuge in intermittent fevers. Dose, six to eight grains, in pills or powder. Two or three scruples have been considered sufficient to cure intermittent fever. A spirituous infusion of the black pepper itself had long been a popular remedy in this disease.

Alum with nutmeg; also, gentian with galls or tormentil, in equal parts, particularly the last combination, have the recommendation of Cullen in their favour, who represents them never to have failed him, as antiperiodics in intermittent fever.

All the vegetable astringents, in virtue of their tannin, have been used in intermittent fever. Tannin itself, in quantity of twenty to thirty grains, in water, and with some mucilage, taken during the interval, is stated to be competent to prevent the return of the paroxysm. More generally, however, they are given in union with some of the vegetable bitters. Of the indigenous productions, the bark of the Dogwood, Cornus florida and Cornus sericea, has long enjoyed considerable reputation, as a domestic prescription, in periodical fevers.

LECTURE CXXIX.

DR. BELL.

CONGESTIVE FEVER.—Change of nomenclature—True nature of this fever—Congestion, when occurring—Cases—Identity of our congestive fever with malignant or pernicious intermittents of Europe—Writers, Italian, English, and French, who describe this form of fever—Its numerous localities—Southern Europe, Africa, Bengal, Batavia—Bailly's and Maillot's experience very valuable—Their divisions of pernicious intermittents—Chief ones, *comatose*, *delirious*, and *algid*—Less common, the *gastralgic*, *choleric*, *dysenteric*, and *icteric*.

CONGESTIVE FEVER. — Is it a better pathology or a change in the character of the disease which has caused so generally of late years the substitution of *congestive* for bilious remittent fever by our physicians in the south and west? Both causes have probably operated in bringing about the change of nomenclature; — although as yet there is not, I fear, a due appreciation either of the circumstances under which congestive fever has become more common, or of the real nature of the precursory and distinctive symptoms of the disease. The vast extent of new country in the United States which has been occupied, of late years, with a view to agricultural improvement includes regions, the localities and climate of which furnish the atmospherical or remote causes, whilst the labour and personal exposure of the new tenants of the soil are so many direct and exciting ones of fever, the dominant type of which is designated by the term congestive. It will be my endeavour to show you that this much dreaded fever is an aggravation of intermittent fever, that it is identical with the

pernicious or malignant intermittents of European writers; and that, when it is associated with our remittent fever, its principal features are the same.

There is not, properly, any fever characterized by congestion in contrast with another which is without it. Congestion, simply an accumulation and temporary retention of fluids and chiefly blood in an organ, is often no disease at all; it occurs in the uterus prior to menstruation and during pregnancy, and in the mammæ prior to lactation, and, also, in the muscles and lungs, liver and spleen, during very active exercise, and probably in the brain during sleep.

Congestion of a morbid kind is common in nearly all fevers, intermittent, remittent, and continued: it will accompany winter epidemics, in which the thoracic organs are the chief sufferers, and summer and autumnal ones, in which the greatest lesions are in the abdominal viscera and brain: it is not limited to any organ,—sometimes being most manifest in the brain, sometimes in the lungs, and often in the liver and spleen, or even kidneys. Congestion may be created by an afflux of fluids to a part in consequence of a simple increase of sensibility; as in the skin after high heat, friction, or insolation, in the mucous membranes after nervous stimulants, &c. Strong innervation, in which the nervous centres are much excited, as under various emotions, will produce congestion at one time of the brain, at another of the lungs or liver. Certain nervous affections, as hysteria, will give rise to irregular determination and retardation of blood; in fact, congestion of an organ, which, like that of a physiological kind, often entirely disappears after the removal of the nervous disturbance. Under nervous derangement of this nature we sometimes meet with the phenomena of coma, catalepsy, somnambulism, paralysis, tetanus, and convulsions, and other diseases of animal life, and icy coldness or excessive heat, fulness and throbbing, dyspnœa, vomiting, hiccup, colic, hemorrhages, tympanites, ischuria, diarrhœa, &c., among the derangements of organic life. With many of these nervous affections congestion is associated; sometimes preceding, sometimes remaining after the disappearance of the more obvious and violent symptoms.

Congestion may precede or follow inflammation, but without acknowledging this latter as its cause. It may also be accompanied with a retention of muscular strength, or with extreme debility and prostration. I was much impressed with an evidence of the former combination in the case of a large muscular Scotchman, a deserter from the British fleet during the last war, who found his way to Winchester, Va., and was there seized with the epidemic which went by so many names—the chief of which were typhous pleurisy and typhous pneumonia. This man, whom I saw about ten o'clock in the morning after the earlier visit and prescription of my preceptor, could not be kept in bed; he paced up and down the room with a firm step, making every now and then allusions to his recent escape, and without any fear about his recovery. His voice was husky, and breathing somewhat laboured; pulse of some volume, but easily compressed; face deeply suffused, eyes watery. At my next visit, in less than two hours afterwards, the patient was a corpse.

The differences in the degree of muscular strength or in the activity of the circulation are seldom dependent on or explicable by the extent of the congestion; but rather on that of the prior and accompanying impression made on the nervous system. In the case just referred to, the congestion of the lungs was not accompanied by any notably sedative action on the nervous system — whereas, at the onset of certain fevers, this system, which had been commonly for some time before exposed to a slow but deleterious sedation, is now in a temporary palsy, and hence the languor and inability to move. Duration of the congestion will give a tolerable measure of its character, that is, of its dependence on simple nervous excitement, or on inflammation. If it depends merely on nervous disorder, it is irregular in its appearance, and commonly, indeed distinctly, periodical; as we see in all the disturbances of the circulation and accumulations in particular organs. But if the congestion be permanent, or if it have supervened on a permanent disorder of function, we may infer that it depends on an abiding cause, which is inflammation. These two kinds of congestion are often manifested, the first in the inception, and the second in the latter stage of fever. The drowsiness, the obtuseness of senses and bewilderment of intellect, are evidences of congested brain at the beginning of the fever; but, being simply the result of nervous depression, they soon disappear with the reaction. Similar disturbances of function at the conclusion of the disease are more generally brought on by the congestion, which is renewed and maintained by meningitis or encephalitis.

Congestion is commonly associated in the minds, I believe, of most physicians with symptoms of want of action at the surface of the body and extremities, and by a kind of collapse of the capillaries. Cholera, dysentery, and some other abdominal diseases, afford examples of this kind, as do some of the diseases of the lungs, in the winter season, which occur in the old and intemperate, who may have been long exposed to the inclemency of the weather. But there are other forms of congestion, as of that of the brain and lungs from sun-stroke, in which the external heat and morbid action of the capillaries are excessive. In pulmonary congestion, especially that which was so common in the winter epidemic already referred to, I was struck with the not unfrequent occurrence of a profuse watery and warm sweat in the very last and fatal stage of the disease. The boatswain who walked about his room until almost at the point of death had, I well remember, these symptoms. I was called early in the morning, some years ago, to visit a man whom I found in all the horrors of cerebral congestion and convulsions, which were ended in an hour afterwards by death. He had retired to rest the preceding night after a supper of mush and milk, and having used a pediluvium of cold water. Early in the morning he awoke some persons in the room beneath him by delirous efforts, as if he wished to bail out a boat. He had been a fisherman and of intemperate habits, much exposed to the sun during the preceding week, and on two different occasions had suffered from a sun-stroke On dissection, the arachnoid was found to be thickened and covered with fluid, which also filled the ventricles; the pia mater was in-

jected in patches, and its larger vessels turgid. The mucous membrane of the stomach and small intestines were deeply injected in different parts, and the liver was much engorged. Here is an instance of congestion of the brain supervening on prior inflammation of the arachnoid; and that of the liver, though this is less certain, following that of the gastro-enteric mucous membrane. But the point to which I wish more immediately to direct your attention is the high and diffused heat of the surface in this case, which remained many hours after death. I have seen, I think in the same summer, a person perish in nearly a similar manner from cerebral and pulmonary congestion, whose skin just before death was intensely hot, especially over the chest and abdomen. In the persons suffering from sunstroke, a common accompaniment of the mortal symptoms, and which I have noted at different times, is this acrid heat of the skin, which repeated cold affusion will sometimes hardly abate. Here, together with abdominal and cerebral congestion, there is an atony of the capillaries; not that of collapse, but that succeeding to inordinate excitement, caused by the sustained stimulus of high heat to the skin and lungs.

The physiological state of congestion is simply repletion in excess of the vessels, which may amount to plethora, and distension of the tissues of the part affected. Consequently, as you must by this time have inferred, it may exist without any organic lesion or deviation of parts from their normal state; although at the same time it may so interfere with a function as to obliterate it, and even cause death. Thus, apoplexy is sometimes the consequence of mere cerebral congestion, without any rupture of vessels or effusion of fluid beyond its proper limits. In the lungs, nearly a similar state of the vascular system is occasionally met with, constituting pulmonary apoplexy, which will of itself kill without any notable alteration, by laceration or otherwise, of the pulmonary tissue or vessels. We discover not unfrequently proofs of the truth of this position in an entire disappearance of all the evidences, as they would be termed, of congestion just before death. The accumulated blood has passed from the smaller arteries into the veins, leaving no sign of organic lesion. There is, for the same reason, no morbid product of congestion, if we except sometimes a sanguineous or serous exhalation, which does not, however, alter the intimate texture, or transparency even, of the tissues. This coincidence of hemorrhage and serous effusion with congestion, has induced some to believe, but erroneously, that the former morbid phenomena are necessary consequences of the latter state; the more so, because the congestion is often relieved by the discharge of blood or serum, as the case may be. But there may be hemorrhage without congestion, or still more frequently, there is congestion without hemorrhage. This remark will apply to the coincidences between congestion or local plethora in the liver, spleen, or stomach, and vomiting and increased biliary discharge and other disturbances of secretion. The mere accumulation of blood, or the material for secretion, in the liver or the mesenteric circle, or in the kidneys, will not necessarily cause a greater secretion of bile, or of sero-mucous discharge from the intestines, or of urine, unless there have been an augmentation of nervous excite-

ment in these organs, either by increase of general innervation, or by a new stimulus acting directly on the secreting surface of the organ, or of a surface with which, as in the case of the liver, it is in functional relation. How often do we not find the lungs dammed up with blood, but without any increase of pulmonary exhalation or of mucous secretion, and the liver gorged with blood, hardly giving out bile at all.

The congestive fever of this country, and especially that of the western and southern states, is identical with the malignant or pernicious remittents, or the intermittent ataxic fever of the writers of continental Europe, and has been more particularly described by those of Italy. In the great valley of the Po, in the hospitals of Milan, Pavia, Padua, Vicenza, and Venice, and in the adjoining country ; also, in the marshes from Pisa and Sienna to the sea, and in the *Campagna di Roma* and Pontine Marshes, numerous cases are met with yearly of malignant intermittent and remittent fevers, such as were long ago so accurately described by Torti, Ramazzini, Rivierus, Lancisi, in former times, and Rubini, Giannini, Folchi, Bailly, and others, in our own day. Morton and Cleghorn, the latter deriving his experience from observations in Minorca, have contributed valuable information to the same purport, which has been amplified and extended by Lind, Pringle, Clark, Jackson, Johnson, and numerous writers in medical journals. The list might be extended, but I refer to those now before me. I cannot, however, allow to pass, without special notice and commendation, the excellent work of Senac on Fever, translated by Dr. Caldwell, from the perusal of which, early in my medical studies, I derived so much profit, and also the more ambitious but yet useful Alibert in his treatise on Pernicious Fevers.

The suddenness of the attack, the extreme prostration and utter insensibility, in fact complete coma, the restoration to comparative health, and return, if possible, with aggravated symptoms, are some striking features of these malignant intermittent or congestive fevers. I have seen, when at Whampoa below Canton, a sailor fall down on the deck within a few feet of me senseless and motionless, as if apoplectic; it was the first paroxysm of an intermittent fever, the second of which I prevented by the liberal and timely administration of bark. On board of another vessel I was requested to visit incidentally a man, the steward, supposed to be under the influence of poison; he was in a state of insensibility, comatose, with occasional slight convulsions, and unable to swallow. He had been in this state since the preceding evening. It was then ten o'clock in the morning. External stimulants and an enema of turpentine had no effect. He died before noon.

There are other cases, again, of these congestive and masked intermittents, in which the reaction is slight and the remission hardly observable before another paroxysm of coma and its associated disorders return and carry off the patient. The dominant symptom is sometimes excessive coldness, as in the algid intermittent, sometimes extreme and uninterrupted sweating, at others syncope, and again delirium. Occasionally the part which most suffers is the pleura or the lungs, and the pain of which recurs at regular intervals. Cases have been seen in which the periodical return of the paroxysm was

marked by epilepsy or convulsions, or by acute and distracting headache. The type of the worst cases is double tertian — sometimes a mortal paroxysm with congestion would supervene on remittent fever. I have already mentioned the case of comatose tertian, when treating of intermittent fever, which occurred in my own practice in this city. Pinel relates the case of a comatose intermittent which was stopped by bark in an ounce dose, but in twelve days afterwards the disease showed itself in the form of a sweating fever, which was cured by the same remedy.

Senac gives an account of an epidemic remittent fever, which, if reproduced in one of our medical journals under the name of another author, would be readily received as highly descriptive of congestive fever in Illinois, or in Mississippi. Cleghorn, after describing the paroxysm of a true simple or double tertian, tells us of an aggravated and complicated disease in which, among other bad symptoms, there were cholera morbus, sopors, apoplectic fits, bleeding at the nose, &c. Lind gives two cases which will illustrate two of the varieties of intermittent described by Torti — viz., the *comatose*, which Cleghorn says are common in Minorca, and the *cardiac*. Congestion coming on in the progress of a remittent fever and proving fatal is a matter of frequent occurrence. Clark (*Observations on the Diseases which prevail on Long Voyages to Hot Countries, &c.*) gives one in point. This writer relates another case which, by mismanagement, was converted into a fever, in which the remissions were imperfect, and there ensued severe quotidian exacerbations and congestion.

In the endemic fever of Bengal, sometimes without any previous indisposition, the patients fall down in a *deliquium*, during which the countenance is very pale and gloomy: as they begin to recover from the fit, they express the pain they suffer by applying the hand to the stomach and head, and after vomiting a considerable quantity of bile they soon return to their senses. Sometimes the attack is so sudden and attended with such excruciating pain at the stomach, that I was obliged, says Dr. Clark, from whom this description is taken, to give an opiate immediately. Dr. Johnson states that in the bodies of those who died of this fever the liver was so engorged that it actually fell to pieces in handling. The gall-bladder contained a small quantity of bile, in colour and consistence resembling tar, and the *ductus communis* was so thickened in its coats and contracted in its diameter, that a probe could scarcely be passed in it. Much incipient inflammation was visible in some parts of the small intestines, and the internal surface of the stomach exhibited similar appearances. No sign of actual inflammation was seen in the cranium.

The endemic fever of Batavia is, also, highly congestive. Surgeon Shields has contributed a good account of it in Dr. Johnson's work on the *Diseases of Tropical Climates*. The patient on the first attack frequently falls down and is insensible during the paroxysm, his body covered with cold clammy sweats, except at the pit of the stomach, which always feels hot to the palm of the hand; the pulse is small and quick. The length of the paroxysm varies from six to eighteen hours, and it was generally succeeded by cold rigors, very often low delirium, preparatory to the next stage or pa-

roxysm of the fever. The intellectual functions now become impaired, the patient not being at all sensible of his situation or of any particular ailment. If the patient be asked how he is, he commonly answers, "Very well," and seems surprised at the question. This is a very dangerous symptom, few recovering in whom it appeared. A great proportion changed in a few days to a bright yellow, some to a leaden colour; other cases terminated fatally, in a very rapid manner too, without the slightest alteration in that respect. Generally, however, the change of colour indicated great danger. Vomiting of black bilious stuff, as Mr. Shields expresses it, like grounds of coffee, frequently commenced early and continued a most distressing symptom, too often baffling all attempts to relieve it. In some a purging of vitiated bile or matter, resembling that which was vomited, occurred; in a great many a torpor prevailed throughout the intestinal canal; rarely did any natural fæces appear spontaneously.

The most instructive writer on the subject, for many years past, is Doctor Bailly of Blois, who visited Rome and passed some time there (1820, 1821, and 1822), for the express purpose of seeing the congestive or malignant intermittents so commonly met with every year in the hospitals of that city. M. Bailly has given to the world his experience on this interesting topic, in a work entitled *Traité Anatomico-Pathologique des Fievres Intermittentes, Simples et Pernicieuses*, &c.: Paris, 1825. To the inquiring pathologist, who ought to be something more than a mere morbid anatomist, the *post-mortem* appearances of some of those who died from this fever will be interesting. These show, however, that which has been demonstrated at other times, that we cannot designate a fever by a distinctly ascertained anatomical character of the lesions which may occur in its course, although we often are called upon to note the organic changes which accompany and complicate it.

Doctor Bailly gives an account, some of them in detail, of upwards of sixty cases of pernicious or malignant intermittent fever, which he classes in this manner: — 1. Those fevers, the predominant symptom of which was furnished by the head; and are called comatose, delirious, and convulsive. 2. Those whose chief symptom is abdominal disorder, — epigastralgic and gastric fevers, &c., rupture and softening of the spleen, and putrilaginous softening of the liver. But we are not to suppose that dissection showed in the cases of either class a lesion solely of the organ chiefly affected. The very first observation recorded by M. Bailly of a case, which he designates as a comatose, convulsive, pernicious intermittent fever, showed after death *arachnitis*, *cephalitis*, and *gastro-enteritis*. The patient who was thirty years of age and of a strong constitution had laboured for some time under a tertian fever. He entered the hospital on the 2d of July, 1822; on the 3d he had a slight paroxysm of fever, after which he took two ounces of bark. On the 4th at noon he was walking about in the ward, felt very well, and was joking with the other patients. All at once he was seized with a violent chill, which was succeeded by a high fever, during which there was contraction and inflexion of the fore-arm on the arm and a profound coma; he died six hours from the accession of the fit.

More recently the subject of pernicious intermittents or congestive fevers has been discussed in a very excellent, because practical and observing spirit, by Dr. Maillot, who was for some time attached to the French army in Africa. He believes himself to be justified in regarding intermittent fever as intermittent cerebro-spinal irritation; a view expressed in different terms, but identical with that which I advocated both in my last and in the present lecture. The bad or pernicious intermittent he regards also in the light with that which I have for some years past inculcated, viz., as a complication with the nervous irritation of a lesion of the brain, or of the abdominal or thoracic viscera. The following summary of his division of these bad kind of fevers will add to your knowledge of the subject; I draw it from the *Brit. and For. Med. Rev.*, vol. viii.

Of the forms referrible to lesion of the cerebro-spinal apparatus, M. Maillot describes three, which are the most important; the comatose, the delirious, and the algide, or that icy-cold form for which we have no admitted English appellation.

In the *comatose* form, the stupor may vary in degree from simple oppression to profound carus. The pulse is full, large, without hardness, sometimes quickened, occasionally retarded: the respiration is slow, noisy, stertorous. The patient lies supine, and his limbs appear paralyzed; the jaw is firmly closed, and deglutition is difficult: sometimes there are epileptic spasms. These severe symptoms commonly occur with the second paroxysm, nothing taking place before to give warning of them, except it be some slowness of speech in the apyrexia. After an uncertain continuance of the comatose stage, the sweating stage follows, and the patient slowly recovers, wearing an extraordinary air of astonishment, and seeming to recover his senses one by one. Very full information concerning fevers of this kind is to be found in the excellent work of M. Bailly of Blois, published in 1825, and founded on observations chiefly made at the hospital of Saint Esprit at Rome, in 1820, 1821, and 1822, to which we cannot do better than refer the reader, who is particularly interested in the nature and treatment of these dangerous affections, rare, or almost unknown, in our climate, but highly destructive in many localities where British practitioners in the army and navy are called upon to contend with them.

The *delirious* form of pernicious intermittent is, like the comatose, very common. Its name indicates its chief peculiarity. Death often takes place suddenly, without the sepervention of coma: "life is broken by a single shock." If a salutary crisis ensues, the skin becomes moist and perspirable, the pulse looses its hardness, and the delirium gradually subsides.

The *algide* form is very peculiar. It is not, M. Maillot observes, at least generally, an indefinite prolongation of the cold stage. In the first stage of an intermittent, the sense of cold experienced by the patient is out of all proportion to the actual reduction of temperature; whereas in the algide fever, although the skin is icy-cold, the patient does not complain of coldness. And this cold state supervenes after reaction has commenced, and often suddenly. The circulation becomes disturbed, lowered, and the pulse can scarcely be felt, the

temperature of the body at the same time rapidly decreasing. The extremities, the face, the trunk, become cold in succession, the abdomen remaining longer warm. The skin has the coldness of marble. The tongue becomes pale, moist, and cold, the lips are without colour, and the breath is cold. There is no thirst, and attempts to drink often excite vomiting. The actions of the heart become feeble, and only appreciable by auscultation. The intellectual faculties are undisturbed, and there is a sense of repose which is agreeable to the patient. All facial expression is lost. With this state cholera may become conjoined, and the eyes then become hollow, glassy, and surrounded by a bluish circle. The approach of the algide form is so insidious as often to be mistaken for a remission produced by bloodletting, and the practitioner is only undeceived by the suddenness of the death of the patient. This deceitful calm is very strongly pointed out by M. Bailly, in his chapter on Diagnosis: he says that the patient may be walking about a few instants before his last attack; the accession is sudden, he lies down, and dies in a few hours. Even when the pain (of the abdomen) and the danger are both considerable, the face has an appearance of calmness, as if its expression was no longer associated with the sufferings of other parts. Whenever, says M. Maillot, a sudden retardation of the pulse succeeds to reaction, and there is paleness of the tongue and discoloration of the lips, we should not hesitate to pronounce the case algid. Temporizing measures will be followed by death in a few hours. The patient dies as by an arrest of the innervation. If death does not take place, the pulse rises, the skin reacquires its natural warmth, and sometimes irritation of the brain or intestinal canal succeeds. Even this dangerous affection sometimes yields to remedial measures. The resemblance between this condition and cholera is commented upon by M. Maillot; and as, when left to itself, the algide form of fever is perhaps as fatal as cholera, he is of opinion that death in the latter affection has been too exclusively attributed to the excessive fluid evacuations.

These are the most general forms of pernicious intermittent. But sometimes the fatal symptoms are localized in the abdomen, constituting the gastralgic, choleric, dysenteric, and other forms. The *gastralgic* form is signalized by the acute, burning, tearing pain of the stomach; and in this state the face is contracted, and expressive of the utmost anxiety; this form is, however, seldom fatal. The *choleric* form is attended with very violent symptoms, which follow the periods of the fever, according to the expression of Torti, as the shadow follows the body. The *dysenteric* form, M. Maillot remarks, cannot with propriety be classed as pernicious, as when it is fatal there is either chronic colitis, or the comatose, or delirious, or algide form of the disease has supervened. There are cases of intermittent fever in which jaundice takes place very suddenly, and disappears very slowly; this accident generally indicates a severe disease, to which the name of *icteric* fever has been applied.

To the forms in which sudden faintings occur during the attack, or palpitations, with pain at the heart and feeble pulse, the names of *syncopal* and *carditic* have been given. When the lungs have been affected, the fever has been called *hemoptoic*, or *pleuritic*, or *pneumonic*, according to the complication,

Of all these forms of pernicious intermittent, M. Maillot gives examples; and he concludes, that pernicious fevers only differ from ordinary intermittents by the violence of the congestions. They are most frequent in the hot seasons, when the visceral irritations which accompany the attacks are both more numerous and more intense.

LECTURE CXXX.

DR. BELL.

CONGESTIVE FEVER (*Continued*).—*Causes*—Persons most liable—Congestion of an organ may disappear with the paroxysm; is often permanent and becomes inflammation—Nervous coma—Paramount part performed by the nervous system—Inflammation of an organ with intermittent fever—Symptoms deduced from observation of the nervous system—Periodical inflammation—*Diagnosis*—Characteristics of our country fevers—Difficulty of ascertaining the presence of inflammation—Hour of the paroxysm—Morning paroxysms sometimes the most dangerous.—Expression of the face—Decubitus—*Chief symptoms*—Appearance of the tongue; not to be relied on—Pulse varies very much—Temperature of the skin—Gastro-intestinal symptoms—Suspension of the secretions and excretions—Serous discharges—State of the urine; sediment in.—*Modifications of Sensibility*—Pains of two kinds.—*Prognosis*, difficult—Death takes place in the period of reaction of the paroxysm—Danger estimated by violence of the paroxysm—Cleghorn's prognostics—Case—Different meaning of symptoms according to time—Duration, and natural or spontaneous termination.—*Post-mortem Appearances.*

THE *causes* of congestive are the same with those of intermittent and remittent fever. Of the two sexes, the males are, as might be inferred from their greater exposure to the causes, the chief sufferers. Children and very young persons are represented to be exempt; but this assertion must be received with some qualification. The persons most liable are those in the very prime and vigour of life, and many of them of a full and plethoric habit.

Astonishment is often expressed that, after the violence of seizure of particular organs in successive paroxysms of the fever, no evidence remains of a change in the relation or size of any of the parts of the organs to each other; as in the case, for instance, of apoplexy, or coma and lethargy, coming on with a paroxysm of the fever, and going off with it, and yet leaving no mark behind. But it is not always so; for careful observers, such as Dr. Bailly, point out almost uniformly the remains of some organic lesion; gastro-enteritis, or splenitis, or arachnitis, and often two or three of these combined. Still is the contradiction in this case more apparent than real. The series of symptoms of the fever now under consideration may be produced by simple irritation of the nervous system, which, in its reaction, gives rise to injection of tissues and accumulation and congestion of blood in the organs, and consequent derangement of function similar to those organic changes and the sympathetic disturbances and effects caused by inflammation. The brain, lungs, stomach, intestines, liver, and skin, are all in a state of temporary excitement by irradiation on their vessels, as the heart is from similarly augmented nervous power during the reaction of the paroxysm of intermittent

fever. All these organs may, after a longer or shorter time, part with the excess of blood which they had, and lose at the same time their morbid susceptibility; in fine, be restored to their pristine state; thus illustrating the remark of Senac: "that there may be great disorder in the functions of the body without either real inflammation or any fixed disease in the solid parts."

But whilst this explains the general reaction and febrile exacerbation, it is still inexplicable to many how an organ should have its functions so completely suspended, and in a manner which at other times is commonly if not necessarily fatal. A knowledge of the difference in predisposition of particular organs aids us in a solution of the difficulty. One organ is oppressed by a remora of blood in it which is hardly inconvenient to another. One person has the vessels of the brain habitually turgid, and the organ reduced to a state of indirect debility by severe and protracted intellectual labour. A change in the mode of innervation, such as occurs in the paroxysm of fever, is sufficient in this case to augment the vascular fulness in the meninges of the brain to an extent that brings on apoplexy. But as there is no rupture of vessel, nor lesion of the cerebral substance, the apoplectic seizure lasts no longer than the cause which produced it; and as this was but a congestion induced by the excitement of the nervous system, and temporary, its removal is followed by that of the apoplexy. A restoration of the vessels of the brain to their usual state, and of the nervous system to its medium excitement, suffice for the cure. But as an attack of this kind is quite harmless, the brain is less able to bear the same amount of pressure, and the vessels the same distension as before, and a renewal of the apoplectic paroxysm may be attended with much more serious consequences than before. The prevention of this event is brought about by acting on the nervous system, and indisposing it for the irritation and reaction which gave rise to the congestion. Bark or quinia, by preventing the return of the paroxysm, and altering the mode of innervation, has been said to cure the apoplexy: but, in fact, it has cured the morbid state of the nervous system, one of the symptoms of which was this apoplexy. A similar explanation is applicable to coma and lethargy, and arachnitis even, as well as other anomalous and alarming symptoms in congestive fever. Here, however, an important question occurs, whether the trouble in the nervous system itself, sufficiently great to simulate these maladies, may not be produced by impressions made on it, irrespective of phlogosis of its membranes and substance. Drowsiness and sleep are the consequence often, if not always, of transmitted impression from the nervous system of organic or nutritive life to the brain. But let the impression transcend the normal or physiological degree, as after excessive repletion, and the drowsiness will pass into a state of almost apoplectic stupor. The same result is obtained by the transmitted irritation of certain narcotics. In other cases again, indigestible matters of a cold nature, such as some of the *cucurbitaceæ* and *brassicæ*, produce a directly prostrating and really poisonous effect on the gastro-intestinal nervous expansion, which is transmitted to the brain, and is followed by insensibility, coldness of the surface, small and almost extinct pulse.

A pathological state of the digestive system and of its auxiliary organs is every now and then met with, in which the sensations are of an obscure yet unpleasant nature, just short of pain; and the abdominal nervous system, the larger part of that of organic life, transmits this irritation to the brain, in which it gives rise to coma. The patient is easily roused, seems to notice what is said, but lapses immediately into an apathy and stupor, as if oppressed by the deleterious influences just described. The nervous system is at this time in a perverted state; one, in fact, of irritation. The remedy should be such as to act directly on it, either by a sedative influence, like that of opium, or by a modifying one compounded of sedation and tone, as that of quinia. In another form of the disease, there is no doubt that coma is caused by the pressure of congested, of the excessive irritation of inflamed meninges, and is associated with different states of the vascular system from that of the first or simply nervous kind. To be able to determine the difference between the two is a matter of difficulty. There is, indeed, much more difficulty in symptomatology than we should suppose in reading the formal and dogmatical description of diseases based upon their so called differential diagnosis. The nervous system is capable of being excited and depressed, and of having its functions variously modified and perverted, by simple irritation or sedation acting on its own tissue, and in parts remote from that on which the morbid action seems to be concentrated. When treating of neuralgia I had occasion to state, that the violent pains referred to a particular nerve or spot in a limb were at times really caused by a morbid change in some part of the central mass; and we know full well, that the violent temporary disturbances in the cerebral functions, as in epilepsy and hysteria, are often caused by irritation of a remote nerve. Modifications and perturbations of the nervous system, including those which disturb, by depraving or abolishing the intellect and sentiments in fever, are, at times, undoubtedly the consequence of irritation of a phlogosed membrane; the gastro-enteric at a distance from, or the arachnoid in proximity to, the brain. There is nothing, therefore, specific or peculiar in inflammation which disturbs the nervous centres and their functional operations; nor is it essentially different, as an exciter, from those other material causes which act through the atmosphere, and by means of various ingesta and medicinal stimuli and sedatives.

It will be impossible for you either to obtain just notions of the circle of the phenomena which make up congestive fever, or to devise a proper curative course for its removal, unless you bear steadily in mind the paramount part which the nervous system performs. By its instrumentality the succession of paroxysm and of interval, constituting the disease one of intermission, are gone through: by the excitement of this system the various congestions are produced, and through it they are often removed. Frequently, all the alarming symptoms derived from the circulation, respiration, state of the animal heat, and from the secretions, are but effects of disturbance of the nervous system, a removal of which causes all the others to cease, and to cease all at once too, as if by enchantment. Inflammation may supervene to aggravate the fever, and confuse in a measure its type; but

whether the former is cured or remains, the latter will still exhibit its characteristics. You may have a case of phthisis and of intermittent fever, as M. Bailly relates his having seen at Rome — you will cure the fever by bark or quinia, but the organic disease of the lungs persists as before. You may have to treat a case of dysentery, conjoined with intermittent fever, like that which Torti records; and like him, you may cure the latter by the customary febrifuge, and yet the dysentery will end fatally, and you will find ulcerations along the whole course of the colon.

Without a constant observation of the nervous system you cannot appreciate the true character of many of the symptoms — the sudden and early stupor, the disinclination and at times the complete inability of motion. The feeling of sinking and the entire prostration of muscular power are not, as in most acute diseases, in any proportion to the extent and violence of the inflammation, or to the impediment to nutrition. A man who has been sick but a few days, and who still retains his fulness and muscular development, will find himself unable to rise from his bed or to stand up — such has been the strong and deteriorating impression made on the nervous system; an impression which lasts, too, sometimes after the periodicity of the fever is broken, and the morbid cause, whatever it may be, no longer acts. His appearance may indicate health, his pulse be full and slow, and yet for several days after the last paroxysm he lies, per force, on his back, powerless and nearly motionless. I have often been struck with the fact, and pointed it out at the time to some of my young friends who were present, of the torpor of faculties, the stupidity and bewilderment of patients who had suffered for a while from only the common intermittent fever. No real or presumed state of an organ in which inflammation or vascular change of any kind has taken place, is adequate to account for this state of things. It is seen in and through the intervention of the nervous system alone, and on it should our attention be fixed, in order that we may obtain a correct diagnosis of its disorders in the case.

But, on the other hand, let us not exaggerate the importance of the manifestations of the nervous system, to the exclusion of a notice of the phenomena of the associated inflammation of some important organ. The periodicity of the attacks of fever, and the interval of comparative exemption from pain, heat, and other evidences of inflammation, have induced some to deny the existence of this latter state, and to allege that a periodical phlegmasia is impossible. I have already anticipated this objection, by showing that, no matter what may be the kind of irritant which calls the nervous system into morbid action, no matter whether it be ever present or applied at stated intervals, the disorder of this system and the accompanying phenomena will not be the less periodical. Inflammation does not prevent or destroy periodicity; nor does periodicity preclude inflammation, although it will often greatly modify it. In the stage of reaction in fever, the already inflamed and weakened vessels being now more injected than before will be less able to pass on their contained blood, and hence congestion; the minute capillaries are excited more, and hence new formations or an increase of former

ones, which is in fact an increase of the inflammation. So that, although we are ever so fully persuaded of the fact of an organ being inflamed in periodical congestive fever, we must not on this account be the less anxious to break the periodicity, and to prevent the return of a paroxysm, which, in the manner just described, must necessarily increase the danger of the inflammation, both by an increase of the morbid sympathies and by the formation of new products. Here, again, there is danger of erroneous and hasty inference, by supposing that the remedies which prevent the recurrence of the paroxysm through their action on the nervous system are also remedies for the cure of inflammation. Quinia and opium will, by their operation in the first mentioned case, mitigate inflammation; but the organic lesion remains, and is not to be removed in this way. This remark is applicable not only to the coexistence of gastro-enteritis, but also of arachnitis, cephalitis, splenitis, and less rarely of peritonitis, pleurisy, and pericarditis, with intermittent or remittent fever. In a case of urgency, we should give quinia to prevent the recurrence of the febrile paroxysm which aggravates the inflammation, whilst at the same time we may find it requisite to bleed freely to subdue this latter and save the affected part from disorganization. Herein is a difference between the congestion which is brought on by the paroxysm and disappears with it and which may be cured by the same remedy used to prevent the latter, and the inflammation which is mitigated but not cured by the prevention of the paroxysm.

Diagnosis. — These general and, I hope, useful views of the relations which the nervous and the vascular systems bear to each other, and the manner in which the former is impressed by, and, in its turn, influences the congested and inflamed organs in fever, having been stated, I shall next proceed to make some remarks on the *diagnosis* and the value of symptoms in the disease. It will be readily believed that, as congestion is associated with such various forms of fever, the symptoms must vary greatly in a corresponding manner. In this part of our subject, an explanation of seeming anomalies must still be found in the extent to which the nervous system has been impressed, rather than in the degree of duration and of phlogosis and congestion of the organs and functional tissues. We are safe in saying at the outset — 1, that nearly all the country fevers, especially those met with during the summer and autumnal months, are ushered in with chill and other evidences of a morbid state of the nervous system, which are followed by reaction, making up the febrile paroxysm; 2, that this morbid excitement is followed by a remission or partial subsidence, and sometimes an entire absence of the fever; 3, that after a longer or shorter period there is a recurrence or exacerbation of the disease, manifested by nearly similar symptoms and in the same order with those of the first attack, the mode of recurrence commonly being of a double tertian type; 4, that the obscurity of the remission, or want of perfect intermission, is generally owing to the perturbation of the nervous system, caused by a congested or inflamed organ; 5, that the danger will be in proportion to the violence of the symptoms during the paroxysm, rather than to the appearance during the interval; 6, that the paroxysmal attack in inter-

mittent and remittent congestive fever commonly takes place in the morning or early part of the day.

There is hardly any question so easy of solution as the recognition of most intermittent fevers, — but, adds Dr. Bailly, who makes this remark, there is nothing more difficult than to make out a case in which the intermission is marked by symptoms indicating an acute inflammation which had existed anteriorly to the fever, and may still persist with it. Believing that we have still to deal with the same disease, inflammation, we are apt to regard each exacerbation as the signal for a repetition of the active antiphlogistic measures employed at the beginning.

The hour at which the paroxysm first comes on, and that of subsequent exacerbations, will influence us in forming our opinion as to the probable kind and origin of the fever. If the attack is in the morning, accompanied, as it may be, by delirium and convulsions, or stupor and coma, we shall refer it to congestive fever of a periodical type, and attach less danger to it than we would to a similar febrile attack in the evening, as in this latter case we may fear the symptoms depend more on fixed inflammation. But we are not to infer that a paroxysm in the morning implies safety — since, in the great majority of the cases recorded by Dr. Bailly, this was the time in which it came on. The worst cases of what is commonly called bilious remittent fever, but which were in fact congestive, that I ever saw, had their paroxysm ushered in very early in the morning, sometimes before daylight. When, therefore, you are aroused from your beds by an urgent call to visit a case of remittent fever at this hour, or are told by the nurse or friends in attendance that your patient has had a violent fit at this time, you must shape your measures so as to prevent its return the next morning. Certain it is you will not be allowed the same time for treatment under such circumstances as you might be if the exacerbation were to occur at noon, or in the afternoon.

The general *expression* of the patient in congestive fever less distinctively indicates the internal trouble than it does in continued or common inflammatory intermittent fever. A certain fulness of feature and limb in the former contrasts with the contracted and pinched features in the latter; or when we compare common gastro-enteritis with that associated with congestive intermittent fever. The sudden transition from the agonies almost of death to ease and comparative health, is another characteristic of the fever in question: but this transition, although pleasurable to the patient, must not mislead the physician, and make him blind to the probability of a renewal, on the next or the second day, of the worst symptoms and perhaps a fatal termination. If, however, a person ignorant of the type of the fever be unreasonably confident of entire restoration to health on account of the absence of every unpleasant symptom during the interval, he will, very likely, exaggerate beyond all measure the danger during the paroxysm. What, in fact, can be more alarming to a novice, and disquieting to even the most experienced observer, than to find a patient extended and prostrate, head resting wherever it is placed, but usually thrown back, and the pillow under the neck; the mouth half

open, the eyes either shut or wide open, and utterly deprived of expression: whilst there is entire immobility of every feature and limb, together with insensibility of both the trunk and limbs to the common means of irritation, by pinching or pricking the skin. But even at this moment, when the patient seems to be moribund, we notice a different expression of the face, which is relatively full, from that which is designated as the Hippocratic and precedes death in other diseases.

In a state of less prostration, the patients are generally restless in the extreme, tossing about and eager to inhale cool air and grasp at cool drinks.

In passing rapidly under review the chief symptoms, I shall begin with the *tongue*, and here we find confirmation of the negative position advanced by Dr. Stokes in one of his earlier lectures, viz., that the appearance of the tongue often fails as a measure of the state of the stomach and digestive organs. Thus, — Dr. Bailly very frankly admits that if he had not examined the bodies of those who died of pernicious fevers, and if he had, as heretofore, admitted it to be a maxim founded on observation — that inflammation of the stomach is always revealed by redness of the tongue, he would not have hesitated to assert, simply from an inspection of this organ, that there was no gastro-enteritis in intermittent fever. But as, in fact, he never, or hardly ever made a dissection without finding inflammation, he was compelled to alter his opinion, after having during the lifetime of the patient very seldom seen the tongue red. Not only was it not red, but it was often without the yellowish or whitish coat, which, as a matter of course, we expect to find in febrile cases, — whether we are believers in the gastro-enteric or in the hepatic pathology of the disease. So little importance do the Roman physicians attach to the appearance of the tongue in their fevers, that they seldom ask to look at it. I mention this fact as illustrative of the want of connexion often between the tongue and the stomach; but not as worthy of your imitation. Some of our own writers commonly speak of the tongue at the beginning of the fever being of a red colour at its tip and sides, and of a coated white or yellow, and sometimes a brownish hue, at its middle. In other more detailed descriptions, however, they tell us that this organ is often white and moist; and such is its state in a large number of cases.

An equal difficulty exists in forming our diagnosis from the *pulse* in congestive fever, — it being sometimes natural, sometimes full and frequent, or slow and full, and at other times small, frequent, and intermittent. Until the appearance of the cholera in an epidemic form amongst us, it was reserved for a stage of congestive intermittent or remittent fever, including an occasional case of yellow fever, to exhibit the singular phenomenon of a patient being entirely pulseless even up to the large arteries, and yet to preserve his intellect and sometimes power of locomotion. Contrasted with this picture of a particular stage or variety of the fever is that of another, in which there is an alteration of sensibility, thought, and motion, and yet a full, strong, and regular pulse, and a skin bathed with sweat. This last feature will enable us to distinguish the disease from apo-

plexy, in which the skin is neither hot nor moist, and the expression of the face is rather of a person sleeping than of a patient in the paroxysm of fever. As regards *temperature* of the skin, — if the physician find the surface, particularly that of the extremities, of an icy coldness, and yet a retention by the patient of intellect and motive power, he may be pretty sure that he has a case of algid congestive fever before him. The inflammation of a viscus which would produce similar coldness just before death, would also give rise to an extreme feebleness and approaching extinction of the other functions at the same time. In reference to the state of the skin on the inception of congestive fever, you will find that whilst the surface generally is cold, dry, and somewhat shrunk, the upper part of the chest and the neck and forehead are in a state of moisture. With the excessive coldness of the extremities there may be some warmth of the thorax and epigastrium.

Gastro-intestinal Symptoms. — We know that the invasion of most fevers is marked by gastro-intestinal distress, nausea, and vomiting, and often heat, and sometimes pain, of the epigastrium. The accession of congestive fever is frequently announced in a like manner, with great oppression and heat at the epigastrium. There is little proportion between the discharges from the alimentary canal and the intensity of the disease. The irritation of the stomach and duodenum may be extended to the liver, and bile be mixed with the ingesta and mucus thrown up by vomiting, or show itself in the stools. Commonly, however, there is a suspension of the natural secretions and excretions, and often in their stead a serous fluid is largely poured into the intestinal canal, and as largely discharged *per anum*. The quantity of fluid thus secreted is not an evidence of excessive congestion, or accumulation of blood by inflammation in the vessels of the intestines; for, often, these phenomena are very evident, although the secretion be small and almost arrested, and in cases in which it has been poured out, the mucous surface and glands were neither inflamed nor surcharged with blood. The sypmtom of inordinate serous discharge is to be regarded as proof of high irritation of the abdominal nervous system by which the function of the secretors is strongly excited: — and in the remedies for allaying this irritation we shall discover the means for arresting the excessive discharge. Its periodical return or exacerbation will be farther proof of the correctness of the nervous pathology now advocated.

Of the secretions which have most influenced the diagnosis in periodical fever, simple or congestive, the urine is chiefly entitled to notice. A reddish, brick-dust sediment has long been alleged to be a characteristic symptom. Sydenham, among others, speaks of "the colour of the urine, which in intermittents is mostly of a deep red (but not so red as in the jaundice), and likewise lets fall a lateritious sediment." Now, although we cannot receive this symptom in the unlimited sense in which it has been announced, still it is an important aid in forming a judgment, when we find disease of a mixed or complicated nature, sometimes without, but more commonly attended, with fever, and recurring or being aggravated at irregular intervals. A similar sediment is an index to an inflam

matory affection, or at least to its partial remission, although in this case there is a cloudy or thickened portion of urine, which affects its transparancy, rather than a dust-like precipitation at the bottom of the vessel, which mixes uniformly with the urine, as in intermittent fevers. The urine in these last affections is quite limpid; the sediment when at rest forms a very thin layer at the bottom of the vessel, whilst in most inflammatory affections the sediment, even when the urine is at rest, has some lines of thickness; and it is partially blended with the upper portions of urine, whose specific gravity seems to be same with it. It resembles, in fine, clay diffused in water, and not a colouring matter heavier than the urine, such as we find to be the case in intermittent fevers. In conclusion, we must not suppose that every disease in which this brick-dust sediment is manifested in the urine is a periodical fever; but, when we find ourselves in a country during a season in which these diseases are liable to occur, we may reasonably suspect that the one before us, even though masked, is of this character.

The symptoms depending on the *modifications of sensibility* in congestive fever are not uniform by occurrence or intensity, and in this respect differ from those furnished by simple inflammatory remittent fever. Pain of the stomach and in the abdominal region generally, either original or by pressure, is not complained of by the majority of patients in the disease now under consideration: — and yet it is worthy of notice, that in some of the cases recorded by Dr. Bailly, the person who was apparently insensible to all stimuli exhibited great distress when decided pressure was made on the abdomen. I have myself noticed the same thing in persons who were lying comatose in congestive fever. Some of our own writers, in describing the symptoms of congestive fever in the southern states, mention the extreme tenderness of the abdomen on pressure below the umbilicus. It has been said, and I believe truly, that, although the nervous system is impressed in warm countries, in a manner and with a display of aggravated symptoms of great excitement not generally seen in northern regions, yet it does not manifest in the former case, so uniformly as it does in the latter, the minute degrees of sensibility by its sympathising with an inflamed organ. Of this fact examples are furnished in the cases of Dr. Bailly; for, notwithstanding that arachnitis was so frequent, there was not by any means corresponding frequency of pain referrible to such a cause, nor disturbance of cerebral function which would naturally be thought to ensue. The changes of tissue in inflammation are modifications of secretion and nutrition, which may or may not be announced by pain or irritation of the nervous system; and hence an important inference, that the absence of pain is no proof of the absence of inflammation; and conversely, that a very slight change in organic life may be responded to by the nervous system in such a way as to give rise to violent pain.

The pains in congestive fever are of two kinds: 1, those in the period of chill or concentration; 2, those of the period of expansion or heat. A knowledge of these, as also of the pains during the apyrexia, is only to be acquired by experience, and not by induction

from pathological anatomy. Their recurrence after certain intervals, and their union with fever, in which we cannot see the usual indices of inflammation, may induce suspicion of the nature of the disease. Headache, the most frequent of the lesions of sensibility in periodical and congestive fever, is most severe in the hot stage, or that of reaction, in the majority of cases; but sometimes the cold stage is the one of greatest suffering in this respect.

Prognosis. — As regards the *prognosis* in congestive fever, you may readily infer that it is by no means easy. It is a common impression that, as the congestion is greatest during the cold stage, the danger is greatest; and that death, when it occurs, is most apt to take place at this time. But this is an error. Cleghorn says; "I have seen some expire in what may be called the first stage of the paroxysm; the skin being chilled and wet with cold sweats; their pulse small and irregular, and their senses entire to the very last; but the greatest numbers are hurried off in the height of the hot fit, stupified, senseless; the breathing short and laborious, and the skin covered with a burning fever sweat." And in another page he says; the most formidable paroxysm which I have seen broke out into a burning heat at the beginning without any previous cold. In looking over Bailly's numerous cases, I find that death in nearly all came on during the period of reaction, imperfect reaction indeed, but still in the stage succeeding to that of chill and first invasion. The accession was, as I have already stated, generally in the morning and the death occurred in the afternoon and night. Of thirty-one mortal cases, death took place in twenty between 2 P.M. and 10 P.M.; five in the morning; two at noon; four between midnight and 3 A.M. In the post meridian twelve hours, or rather from about 2 P.M. to 2 A.M., the deaths were twenty-three out of the thirty-one. In the cases which terminated fatally in the morning, the accession was on the preceding evening. In most of them the skin was warm and often bathed with sweat, sometimes of a viscous kind in the last and fatal stage.

It has been already stated that the danger in congestive fever is to be estimated more by the violence of the symptoms in the paroxysm, than by the length and tranquillity of the intermission. "Those fevers are most to be dreaded," says Cleghorn, "whose violence is greatest on the even days (counting the day of accession as one day); and if the paroxysm stops on the third, fifth, or seventh day, but continues on the fourth, sixth, or eighth day, we must be upon our guard, lest a sudden stand should succeed this treacherous intermission." I refer with more freedom to the history of tertian fevers and the reflections of authors on them, as I am convinced that the congestive fever in our southern and western states is but a masked or malignant tertian, commonly of a double kind, in which there is a daily paroxysm, — but with a sameness in the symptoms and hour of recurrence between the paroxysms of alternate days only. The shortness and obscurity of the interval, or rather the prolongation of the period of the paroxysm, make the fever approach to the continued type, or at any rate lead the physician to suppose that he has a case of remittent fever before him, while the symptoms of conges-

tion or inflammation of the organs, such as the brain, the stomach, and spleen, give origin to different names for the fever, and cause entire forgetfulness of its original type.

The following description by Cleghorn is a better guide for prognosis of a fatal result than can be found in more recent works. "But the utmost danger is to be apprehended, if a few drops of blood fall from the nose; if black matter like grounds of coffee is discharged upwards or downwards; if the urine is of a dark hue, or strong offensive smell; if the whole skin is tinged with a deep yellow, or anywhere discoloured with livid spots, or suffusion; if a cadaverous smell is perceptible about the patient's bed; if in the time of the fit he continues cold and chilly, without being able to recover heat; or if he become extremely hot, speechless, and stupid, has frequent sighs, groans, or hiccups, and lies constantly on his back, with a ghastly countenance, his eyes half shut, his mouth open, his belly swelled to an enormous size, with an obstinate costiveness, or an involuntary discharge of the excrements: which formidable symptoms, as they seldom appear before the third revolution of the disease, so they frequently come on, both in double and simple intermittents, during the fourth, fifth, or sixth period, even where the smallest danger was not foreseen: but at whatever time the greater part of them occur, they afford a melancholy prognostic; for notwithstanding they sometimes go entirely off with the paroxysm, and the patient seems to be left in a fair way of recovery, yet most commonly they return in the next period with double violence, and terminate in sudden death." On the same authority as the foregoing, we may say, that the stage of the paroxysm which the patient usually got over with most difficulty, will most probably in the end prove fatal. The following observation, confirmatory of some preceding remarks which I made on diagnosis, is worthy of being remembered: "that as in all acute diseases, so particularly in those fraudulent deceitful fevers, the presages either of death or recovery are not always certain and infallible; it frequently happening that those who have laid in the paroxysm for hours together with few or no signs of life, have at length recovered as it were from the jaws of death, and asked for some uncommon sort of food, to the great surprise of everybody about them; on the other hand the fit, anticipating sometimes, brings on death before the time it was indicated."

In proof of the uncertainty of prognosis in congestive fever, I may cite the case of a man which I attended in 1823, when the various forms of periodical fever were so common in the suburbs of this city, and in the adjoining country. My patient had a subintrant tertian, one paroxysm coming on in the evening, another in the following morning; the latter the more violent of the two: he had, towards the conclusion of the fever, involuntary discharges of fæces and urine, and exhausting or not critical sweats; but yet he recovered to the possession of entire health, and he is still living.

We shall attach different signification to a symptom according to our knowledge or belief of its organic origin. Thus, coma of a simply nervous character, or somnolency, is a state which may be compared to that of sleep in excess, and it will not inspire the same

alarm as that other kind which depends on organic lesion, — inflammation, for example, of the cerebral substance, or a congestion which presses this organ on all points, or, finally, a serous or sanguineous effusion. In the first or nervous coma the patient can be awakened if we call and shake or pinch him; thus evincing consciousness, although he relapses very soon into his former state. In the other kind of coma from organic lesion, the patient cannot be roused by all the efforts which are made; he neither sees nor hears anything, nor displays any sensibility to the strongest irritant, including fire itself. Coma in the onset of a fever constitutes the predominant symptom; it is of more unfavourable augury in the advanced stage of disease. That which persists during the apyrexia would seem to indicate a dangerous lesion of the brain, a result which may be brought about by the persistence of even the nervous coma. This latter may be accompanied with automatic and convulsive movements, *subsultus* and contraction of the limbs; all of which are less dangerous than a flaccid state of these parts. In general, coma is more dangerous in old persons and in adults in the vigour of life than in children, in whom nervous irritation is easily excited and who are more frequently attacked with nervous coma than with other varieties. The eyes in coma may be either closed or wide open, but I am not prepared to indicate with precision the different circumstances under which these symptoms are seen.

Forming part of the prognosis in congestive fevers of the malignant intermittent and remittent fôrm, is the question as to their *duration*, and whether they have not a *natural tendency* to terminate after a particular period. The weight of observation is decidedly in favour of there being such a limited duration. There is a passage in Cleghorn, to show the complications of the fever, which ends in the following terms: "Nevertheless, if death be not speedily the consequence of this confusion they commonly again put on a more simple or regular form, and after one or more slight paroxysms go away of their own accord." And again: "But it is much more common to meet with tertians which set out furiously; with subintrant double paroxysm, so that for some days they have little or no interval. On the third or fifth day a profuse sweat commonly brings on an intermission; and afterwards the disease assumes the type of a double intermitting tertian, or of a semi-tertian. Such fevers," continues Cleghorn, "I have frequently observed to terminate spontaneously on the seventh, ninth and eleventh days, and for the most part they are less to be feared. Bailly makes the average duration of the periodical fevers in Rome to be between fourteen and fifteen days, on a basis of no less than 64,443 febrile patients received into the hospitals of *San Spirito* and *St. John of Lateran* during five years. To the latter institution the convalescents are taken, and are allowed to remain in it three days after they are cured in the first. A similar tendency to a termination is manifested in our own congestive fevers on the fourteenth or fifteenth day, but in fatal cases they end in death on the third or fifth day; and when remedies prove effective, convalescence will begin on the fifth, seventh, or ninth day.

Post-mortem Appearances. — On looking over the histories of thirty-six cases of malignant intermittent recorded by Dr. Bailly which ended fatally, I find the proportion of structural alterations of tissue or organ to be as follows: Arachnitis, 25; Gastro-enteritis, 19; Splenitis, 18; Rupture of the spleen, 3; Diffluent spleen, 2; Cephalitis, 13; Gastritis, 7; Enteritis, 7; Alterations of the liver, 5 — of which 1 was by inflammation, 2 by congestion, and 2 by putrilaginous softening; Pneumonitis, 3; Pericarditis, 3; Peritonitis, 2; Parotiditis, 1; Œsophagitis, 1; Cystitis (biliary), 1. The tissue which suffered most frequently was the arachnoid, although not to the extent described by Dr. Bailly, since, as I have already mentioned, the symptoms of arachnitis are seldom if ever so distinctly declared as we should be led to infer from these cases. M. Louis thinks that arachnitis proper is a rare affection, and that the inflammation so commonly represented to be such is that of the subjacent cellular tissue. Commonly as the inflammation of the arachnoid is supposed to bring with it that of the brain, or at any rate functional derangements of this organ, there were cases in the preceding list in which the patient preserved his consciousness and intellect to the last, although dissection showed after death very evident arachnitis. If we were to add the 7 cases of gastritis to the 19 of gastro-enteritis, we should have 26 cases of gastric inflammation out of the entire number of 36; and in the same manner, if we add the 7 cases of enteritis to the 19 of gastro-enteritis, we find 26 cases of intestinal inflammation. The number of cases in which there was a union of arachnitis or cephalitis with gastritis, or with gastro-enteritis, was 25; and of arachnitis or cephalitis with enteritis, 7. We might say that there was inflammation of the brain, or of its arachnoid membrane, conjoined with some part of the digestive canal, and chiefly of the stomach, in 30 out of the 36 cases. There was inflammation in some part of the contents of the abdomen in every one of the whole number.

I wish to press these statistical results on your attention, and would ask you to bear them in mind when you read and hear of liver disease and hepatic derangement and congestion, as a great cause, indeed the chief cause, of congestive and autumnal remittent fevers. You will see from the above returns how poorly figures bear out this hypothesis. I was myself once, when a student, and for a while afterwards, under this hepatic delusion; so far indeed as to induce me to choose the liver and its diseases for the subject of my Inaugural Dissertation for the degree of Doctor of Medicine in the University of Pennsylvania. I remember very well being complimented by Dr. Chapman, then my teacher, and ever since my honoured friend, for the arrangement of the matter, and the style of the essay; but he added, as I also remember — "You are all wrong." I will repeat the expression, gentlemen, to you, and say you are all wrong, if you allow yourselves to believe that the organic origin and support, either of the acute or sub-acute febrile diseases, which you will meet with in the summer and autumnal months, is in the liver. You will be doubly wrong if, on the strength of this erroneous pathology, you prescribe calomel, in every kind of dose, and at all hours and seasons, to remove this imaginary hepatic disorder.

Even if the premises were real, and you had to deal with undoubted hepatitis and congested liver, the therapeutical inference, that mercury is the remedy which should be given early, freely and long, is a sad mistake.

If we look for the organ which showed most proofs of congestion we find it to be the spleen, which was affected either in this manner or with congestion and inflammation, or its tissue broken up, in 23 cases out of the 36 already referred to. Some writers are disposed to attribute the occurrence and repetition of intermittent fever either to congested spleen or to congested liver, but particularly to the former; and, in confirmation of their belief, they cite the frequency of the cases of enlarged and indurated spleen in persons residing in low and marshy districts of country, who are at the same time victims to periodical fever. But in this instance, and it is not a solitary one in medical inquiries and speculations, the effect is mistaken for the cause, and congestion, which is really the effect and product of nervous irritation acting on the circulation, is spoken of often as the cause of this abnormal state of the nervous system. The afflux of fluids and their retention for a while, constituting an orgasm of the part, is a consequence of nervous excitement, and what is more, it can follow from this cause alone. But if, in place of being simply a physiological phenomena of temporary duration, as in the normal congestion of the organs of generation *in coitu*, of the mucous membrane of the stomach in digestion, and of the liver during this same period, and of the brain under the influence of strong yet pleasing emotion, it should become pathological and fixed—then, like any new body or growth, the congested tissue is a foreign and unpleasant stimulus to the nervous system, on which it reacts and which it sometimes continues to disturb and irritate in various ways. Congestion of the spleen and chronic splenitis may, therefore, be admitted to be occasional causes of intermittent fever and to contribute to its obstinacy; but of the relatively small account which is to be made of them, and of the circumstances under which this fever is produced and maintained, the following facts will satisfy us. First: intermittent fever, both simple and congestive, will make its attacks and recur without any evidence of prior disease of the spleen. Secondly: in cases of enormously tumid abdomen, owing to enlarged spleen, there is often no periodical fever present, or if it occur we can temporarily remove it by bark or quinia, and yet the enlargement remains.

LECTURE CXXXI.

DR. BELL.

CONGESTIVE FEVER—*Treatment of the first or Forming Stage*—Symptoms—Preventive and curative measures—Different Stages—*Stage of depression*; to be treated by mild frictions, counter-irritants, and evacuants—Avoidance of direct irritants—Opium in the comatose stage or variety—Its use to prevent the paroxysm—Auxiliary remedies—*Stage of reaction*—Venesection or topical bloodletting—Advantages of cupping—Reaction after loss of blood—Removal of irritation from the stomach and bowels, by enemata—An emetic sometimes useful—Dry cupping and emetics—Cold affusion and cold drinks.

TREATMENT.—FIRST OR FORMING STAGE.—In picturing to you the

varieties of malignant intermittent or congestive fever, distinguished by such formidable features as coma, delirium, convulsions, and icy coldness of the extremities, and excessive heat and distress in the abdomen, you are not to expect to see all or even a majority of the cases of this fever which you may be called upon to relieve, thus distinguished. You will find, however, the same order of parts affected; you will meet with gastric disorder manifested by nausea, loss of appetite, and alternation of thirst and indifference for fluids; pains of the head, back, and limbs; turbidness of the conjunctiva, altered hue of the skin, and great inequality of temperature, although the extremities will generally be cold whilst there is additional heat of the epigastrium and temples, and moisture readily induced in the upper part of the trunk; the intellect is clouded; senses less susceptible of their customary impression; bowels sometimes costive, sometimes giving frequent watery stools. It may be, and the circumstance is unhappily too common, that these symptoms, indicating the first or forming stage of the disease, will not come under your notice—the sick person supposing that his disorder will soon pass off either with time, or by the assistance of some domestic prescription. Some from sheer obstinacy; some from avarice, by which they cannot forego the chance of a day's business-gains, at the risks of protracted sickness, perhaps even of loss of life itself; others, and they are to be pitied, from a fear of the deprivation of the wages for their daily toil, by which their families are supported: all of these several classes of persons are backward, both in abstaining from habitual occupations, which only bring the disease into complete development, and in procuring suitable professional counsel for the removal of existing symptoms. Hence, in, perhaps, a majority of cases, the most valuable time for checking the disease is allowed to pass away, and the physician is not sent for until the patient has had a chill, and suffers from the fever which marks reaction. It is greatly to be wished that people were fully aware of the often irreparable mischief which a man does to himself by his going about during the impending and forming stage of fever — at a time when the nervous system requires repose, at least to be abstracted from its habitual stimulants of mental occupation, light, and sounds. In health the heart is quickened, we know, many contractions, by the mere change from the recumbent to the erect posture, as evinced in the differential pulse: and hence the feeling of languor, amounting sometimes to syncope, in persons of a weak frame who are kept standing a long time. How illy, then, can the heart, irritated as it is by the excited nervous system in the inception of febrile disease, bear the additional strain upon it of an erect posture, and perhaps of muscular exercise superadded. Repose and a reclining posture are of the first necessity for an ailing person, whose instinct alone would lead him to seek them, were he not prevented by the suggestions of false reason and intense selfishness. Next to these, and as a necessary measure of comfort, tight clothes and ligatures of every description should be at once removed, and a covering for the body substituted, of such texture and amount as shall contribute to the restoration of an equable temperature. With this latter intention,

simple warm drinks should be taken; and if the rigors be frequent, a warm bath, or in its place a warm pediluvium. As the chief irritation at this time, and indeed, the chief functional disturbances, are in the series of organs contained in the abdominal cavity, and which are governed chiefly by the ganglionic or nutritive system of nerves, it is exceedingly desirable that no false step should be taken to increase the irritation and to complicate the disorder in this region. Hence, you will enjoin abstinence from all stimulants, and especially from nutritive ones; the excitement from which, beginning at the gastro-intestinal mucous surfaces, is continued through the absorbent, circulatory and secreting apparatus, as well as the lungs and nervous system, and lasts at least during an entire diurnal revolution, or twenty-four hours. He who should feel inclined, or be on the point of yielding to the persuasion of another, to eat any substantial food, after he feels some of the premonitory symptoms of fever, ought to be reminded of the strong probability of the disease being aggravated by this excitement of all the organs, whose functions are already impaired and which require repose, and that what he eats at a given hour to-day may tell against him at the same hour on the following day. It is of far greater importance for persons generally to be able to appreciate the signification of the first symptoms of fever, and when this is learned to abstain at once from all kinds of excitement, intellectual or bodily, sentimental or sensual, than for them to have learned how to use certain remedies with a view to check or cure the disease. But even this is not a fair statement of the proposition: the first point of knowledge would be of most unequivocal benefit, — the second is imperfectly acquired and commonly mischievous.

Separating the directions for the treatment of congestive fever from the inquiries into general therapeutics, which I presented on a former occasion in connection with this subject, you will learn that the former are applicable to — 1, the period of invasion, and before the disease has declared itself with its characteristic and violent symptoms; 2, the stage of depression, commonly of chill, and often disturbance of innervation, and consequent congestion of one or more organs; 3, the stage of reaction, in which the disease assumes a more expansive character, and approaches in its nature to the hot stage of a common intermittent or remittent fever, but still exhibits evidences of oppressed functions, and more particularly of imperfect innervation and laboured circulation.

In the first stage, or that of invasion, the treatment is simple, but if carried out fully, will be efficacious. Its outlines are, rest for the functions of the nervous and muscular systems, and best in bed, with an avoidance of all the stimulants of light, sound, and addresses to the feelings and intellect; simple diluent drinks; an enema to evacuate the lower bowels; and warm water, or a few grains of ipecacuanha if the stomach be obviously distressed by the remains of the last meal, or if there be nausea and retching. The addition, after the vomiting has ceased and the subsequent diaphoresis is over, of a mild laxative, if pain in the head and limbs and incipient febrile irritation are present, will often suffice for a complete removal of the disease. But time must be allowed after the cessation of apparent disease, in

order that the nervous system may go through its diurnal circle of functional and organic acts, and proof be afforded of its immunity from a recurrence of the primary symptoms, with perhaps aggravations. Hence, an invalid who subjects himself to domestic or formal medical treatment for twenty-four hours, ought to let a period of the like duration elapse before he encounters a renewal of his out-door or other active engagements, and returns to his customary food.

Stage of Depression and Congestion. — The remedies during the stage of depression with congestion — indicated by rigors, cold, small, and frequent or intermittent pulse, oppressed breathing, and feebleness of the intellect and senses, internal heat and thirst, are to be addressed primarily to the nervous system, and notably to its expansions on the skin and mucous membranes. To the first of these surfaces we apply assiduous and extended friction, the warm water bath, or warm air bath; to the latter tepid or cold water, according to the sensation, and opium either by the mouth or enema. If we know the state of the alimentary canal to be such that it is partly occupied by irritating matters; for, food in the stomach and fæces in the colon, in the now irritable state of the mucous surfaces, are irritants, these ought to be first removed by the means already indicated, and then, if reaction is tardy and imperfect, the opium may be given.

In all this stage, which, though one of depression, is also of irritation, and not seldom of congestion and inflammation combined, we must abstain from the stimulants whose action is chiefly on the nervous system. Mild counter-irritants to the skin, and sedative treatment for the mucous surfaces — after their material irritants are removed—will express the outlines of treatment; which does not therefore embrace either cauterization or disorganizing action on the skin, nor brandy or other analogous liquors internally. Of the counter-irritants, sinapisms kept applied, or dried mustard rubbed along the spine and on the inside of the legs, thighs, and arms, until a sensation of a positive but not painful kind is produced, are useful.

Remembering that the affusion of cold water, or the cold dash, as it is sometimes called, is one of our best remedies in the congestion of epidemic cholera, and in narcotic poisoning and the stupefaction of drunkenness in which the congestion is so manifest, the same means might seem to be allowable in the stage of prostration in congestive fever. Experience justifies the suggestion. Dr. Pallen (*West. Journ. Med. and Surg.*, June, 1843), among others, gives his testimony in favour of the practice. The water should be poured from some height on the neck and back of the patient; who is then to be carefully rubbed with a brush or coarse flannel steeped in mustard flour or oil of turpentine until a general warmth is produced.

I cannot but think *that in this first stage of congestive fever, the stronger the stimulus applied, the greater the probability of its producing an effect on the nervous system analogous to its then morbid state or one of painful irritation, the very excess of which had produced the numbness and torpor which impose on some for prostration and exhaustion.* But in speaking of numbness and torpor, I apply these terms to the condition of the encephalo-spinal portion

of the nervous system, or that of animal life. The centre of irritation, that from which it radiates, is the abdominal nervous system, which makes up so important a part of that of organic life. Here the irritation is persistent, and is manifested by the activity of abdominal circulation, the pulsation of the aorta and its cœliac and mesenteric branches, increased afflux of fluids, and even congestion in the mucous membranes, liver, and spleen, and increased and perverted secretions from the stomach, intestines, and liver. It is the continued irritation in this region, which, transmitted to the brain, slowly it is true, because circuitously and through the plexus and ganglions of the sympathetic, fatigues this organ, and finally produces the state of coma, or of coma alternating with delirium and convulsions, which marks the worst form of congestive fever in its early stage.

Opium. — If this be correct pathology, then are stimulants, except of the mildest kind, such as warm teas, inadmissible; and a still farther and more direct conclusion is, that opium, or some one or other of its preparations, is demanded by the nature of the case. What! it will be exclaimed by some, — give opium, a narcotic, in a state of apparent apoplexy, or stupor which may be said to resemble that of narcotism? If the visceral congestion and the distended vessels of the brain were primary phenomena, and were not in the beginning, at any rate, effects of a disturbed nervous system, it would be rashness to give anything which might augment such a condition of organs; but, as I have already more than once informed you, all these congestions and injections of tissue will often entirely disappear with the removal of the paroxysms, which, as far as we can see, is accomplished through the intervention and by the direction of the nervous system. If, therefore, we have any means of acting on it in a definite manner we control *quo ad hoc* the congestion, by either preventing its occurrence or carrying it off. In the circumstances now under consideration my pathology is in harmony with therapeutical experience, which points distinctly and emphatically to opium as one of the best, if not the very best and safest remedy prior to the coming on and actual supervention of the alarming state of congestion which distinguishes the paroxysm in malignant double tertians or the congestive fevers of our country.

Among the cases of the curative effects of opium in a comatose state of malignant tertian, is the following from Wirtenson quoted by Bailly: —

On the second attack of fever, which like the first of the preceding evening, came on at eleven o'clock, a lady who was the subject of it, fell into a profound coma, losing both speech and sensation — her eyes were open and fixed, her limbs stiff as in catalepsy; the pulse was small and intermittent, the respiration laborious. All the persons around expected death to close the scene in a short time. With a hope, however, of giving relief, some physicians recommended emetics, irritating enemata, or the application of blisters; in fine, recourse to stimulating remedies. But Dr. Hoffmann, who, happening to be on the spot, was called into consultation, had no confidence in the measures suggested, having in other cases as-

certained their inefficacy. Still as there seemed to be no room for temporizing, and as the necessity of the case was urgent, he determined to make trial of opium. He accordingly poured into the mouth of the patient ninety-five drops of laudanum, which he saw her swallow. After a few minutes the pulse was developed and the breathing more free; and in less than half an hour the danger was over, together with the lethargy the pulse became full, the limbs had regained their suppleness, and the patient recovered her consciousness and began to speak. Febrile heat was evolved, and sweat, which followed in a few hours afterwards, put an end to the paroxysm. Bark was prescribed for the following day, but owing to the nausea, similar to that which had distressed the patient between the first two attacks, this medicine was rejected after every time at which it was swallowed. Vinous decoction and the extract of the bark were also thrown up from the stomach. Enemata of bark had not the desired effect. On the following evening the paroxysm returned at the same hour and was marked by the same alarming symptoms as before. Laudanum was forthwith given, with the same results and with the same success as on the former occasion. During the next and succeeding days, the vomiting and disorder prevented the use of the bark by the mouth, and its only mode of administration was by enemata. Fears were naturally entertained that a third paroxysm would supervene; and the husband of the patient, who had been a witness to the efficacy of the laudanum on former occasions, asked if it would not answer to give this remedy an hour before the expected accession. The suggestion was adopted, and its success was most satisfactory. The paroxysm came on, but without any alarming symptoms. After it was over, the patient was able to take the infusion of bark in wine, and in a few days she was entirely cured.

Opium, on occasions so beneficial during the first and even second stage of the paroxysm of congestive fever, has been used, as in the above case, with good effects to prevent its accession at all. For this purpose it should be given some time before the fit, or if opportunity is not allowed for its administration thus early, it ought to be so soon as the wandering pains in the limbs and trunk, headache, some rigors and nausea, furnish premonition of the expected paroxysm. In this case a full dose, as of sixty drops of laudanum, or a grain of the sulphate of morphia, may be given at once to an adult. When the paroxysm has come on, and the coldness and stupor are great, the propriety of a large dose, though it might seem to be justified by the apparent insensibility of the system, is not so clear. The plan which I should prefer, would be to administer, under these circumstances, five drops of laudanum in a table-spoonful of camphor mixture every five minutes until evidences of producing an impression on the system by a slight reaction, and some little abatement of the symptoms were seen; — then we might give a fuller dose, say thirty drops at once, and wait the result, as far as relates to internal medicines, for this period. Moderate, but continued and extensive friction with a warm hand or warm cloth, and a soft brush dipped in warm salt and water, should be had recourse to at the same time, in order to encourage the expansive action of both the nervous and vascular

systems. The dry vapour bath, as of alcohol and simple warm air, are sometimes preferable to the warm water bath. In cases in which the individual is unable to swallow, the laudanum or solution of sulphate of morphia may be given by the rectum, in a small quantity of simple water rather than of mucilage, the more readily to insure its action on and absorption by the mucous surface of the rectum. If we admit the propriety of divided doses, twenty drops of laudanum may be given every half hour until a hundred are used in this way. The union of assafœtida mixture will add to the good effects of the laudanum on the brain.

Stage of Reaction. — *Bloodletting.* — Fulness of habit, previous plethora, the probable prior existence of inflammation of the gastro-intestinal surface, or of the liver and spleen, or brain and its meninges, and incipient reaction yet still remaining oppression, will, severally, justify the opening of a vein and allowing a small quantity of blood to flow out. The diminution of the oppression and the persistence or development of fixed pain in an organ previously disordered, will indicate the advantage of taking away more blood at this time. But if doubts are entertained of the powers of reaction, or of the tolerance of the system under the sudden abstraction of blood, which may still be called for by other circumstances, then must recourse be had to leeching, or what is still better, to cupping.

Whilst I have little faith in the efficacy of venesection for the removal of congestion merely, I would not deny the utility, and often the necessity of bloodletting in cases in which there is inflammation associated with fever. That this is a common occurrence we have every reason to believe, as well after an attentive study of the symptoms as of the appearances of the organs revealed by *post-mortem* examination. So soon, therefore, as febrile reaction is fairly established, or there are symptoms of its having begun, and we find evidences of more than high nervous irritation of an organ or organs, our endeavour should be to arrest their supposed phlogosis by bloodletting. If opium have been previously administered, in the manner and for the purposes already indicated, the reaction will be of a simple nature; and as the nervous symptoms will have been removed or suspended by this medicine, the distress which remains may fairly be attributed to another or an inflammatory condition of tissue or of organs. In common, however, we cannot expect that full and entire expansive reaction so usual in the phlegmasiæ and in the exacerbation of regular intermittent and remittent fevers. Still, the vascular system is measurably brought into activity in conjunction with the nervous, and we are required to shape our measures in such a way as to act on and relieve both, and in the belief, also, that we have inflammation to combat. The manner in which blood is to be abstracted as well as its amount are matters of weighty consideration. If the operation is intended to be tentative, and as a means of trying the extent of the latent powers of the system and its capability of reaction, a small bleeding is to be first practised; and the safer mode of doing so will be by cupping or leeching. More especially is this selection to be insisted on if the circulation is yet sluggish, the chylopoietic viscera are congested, and

the torpor of the cold stage measurably remains. By cupping or leeching, we not only abstract blood from the circulation and thus relieve the suffering organ as we would by venesection, but we give the heart more time to accommodate itself to the altered quantity of blood than after a large vein is opened; at the same time that we procure the benefits of revulsion or counter-irritation, in making the scarified or leech openings on the skin so many points of afflux: in fine, there ensues temporary external congestion which we oppose to the more enduring internal congestion. Under the pathological view indicated respecting intermittent fever, the cups or leeches might be applied to the back with advantage.

The reaction which follows venesection in cases of extreme depression in the cold stage of congestive fever, is indeed a sequence, but not so often, if at all, an effect of the operation, as is commonly supposed. It is an evidence of the recuperative powers of the nervous and other systems which were merely suspended or perverted in their manifestations; but it does not depend on venesection for its occurrence. When we row with the tide our boat goes bravely onwards, and we regard with complacency the effects of our strength and skill in the use of the oars: but let the tide be adverse, and the same strength and skill which were thought equal to any exigency of this nature are not enough even to give our boat headway. So it is with bleeding: if there is vitality enough and the circle of action tends to revival, we congratulate ourselves on what we have accomplished by the use of the lancet; but if the tendency is the other way, or towards an extinction of the powers of life, our boasted instrument will be of no service in aiding us to prevent the fatal termination.

Enemata. — But of the real quality and cause of this reaction after bloodletting, and of its duration, we can have only very imperfect ideas, so long as there is foreign and irritating matter or undigested remains in the stomach and small intestines, and fecal accumulations in the large. Even if these matters were not the primary cause of the fever, they become, in the state of altered sensibility and organic action of the gastro-enteric mucous membrane, a cause of irritation and of aggravation of the original ills. To the means, therefore, for their removal ought we now to direct our attention. Cognisant as we are of the diversified sympathies of the colon with the rest of the abdominal organs, and of the great relief to oppressed respiration and circulation brought about by an evacuation of its contents, one of the very first steps in the treatment of congestive fever must be the administration of a purgative enema, and its repetition until a free operation is procured. As the digestive mucous surface is in a state of active irritation in this fever, and is inflamed in places, we can use agents of more reduced power than those which at first would seem to be required by the depression of the system. Simple tepid water, or salt and water of the same temperature, thrown up in full quantity and at short intervals until there are free evacuations of fecal matter, will often suffice. In more torpid states of the system, oil of turpentine, in a dose of half an ounce, mixed with castor oil or common suet and mucilage, has an excellent effect.

After the full operation of these enemata, if the internal abdominal heat still persists and the skin and extremities are cold, simple injections of cold water will greatly contribute to equalize temperature and vascular and nervous excitement. The retention of the fluid in the colon tends to allay heat and thirst, and by its absorption will probably exert a salutary operation on the blood. If there be too great a crasis of this vital fluid, and slowness of circulation, a minute quantity of common salt in the water will enable us to meet the indication furnished by this state of things. But if the general torpor continues after the first free evacuation of the lower bowels, it will be advisable to try the opium practice at once, by your giving an enema of laudanum, or sulphate of morphia, in the manner already directed. This course procures, in addition to the advantages before detailed, tranquillity of the stomach, and prevents an excuse for the administration of various effervescent and other draughts intended to allay its irritability and to check vomiting, but which in fact are themselves often troublesome irritants, and fail to accomplish the ends proposed. Still more called for are measures of this kind if there have been previous diarrhœa or dysenteric irritation.

Emetics. — Should there be, from the beginning, nausea and imperfect vomiting of glairy mucosities and of particles of undigested food, it will be your duty to make the expulsive efforts more complete by the administration of a few grains of ipecacuanha, and subsequently of tepid water or warm camomile tea. Not only will the stomach be freed from irritating matter by this means, but the entire nervous system of organic life will be roused to a series of efforts which will tend greatly to substitute expansion for morbid concentration, and to incite these secretors, mucous and glandular, to a fuller and more harmonious effort. But it must be remembered, that the general perturbation, the sickness, nausea, and depression, which precede vomiting, and the increased capillary action and secretions, including perspiration, which accompany and follow the act itself, simulate a paroxysm of fever, and like it require a regular period for its progress and completion. The administration of an emetic is not, therefore, a mere incident, which is to be hurried through as rapidly as possible, in order to pour down enormous doses of calomel, or worse again, drastic purgatives, or to bleed, blister, &c. Time, as I have said, is required for the series of effects which follow to be completed ; and it is only after their completion that you can take proper cognisance of the condition of the system, and of the necessity which exists for other measures, or for allowing rest. An emetic will precede the use of the lancet, or local depletion, where the gastric distress is the predominant symptom, and the depression of the nervous system and concomitant congestion, with rigors, cold extremities, &c., well marked; or it may establish such relations among the organs as to render bloodletting unnecessary.

In cases of extreme concentration of vital action, dry cupping and emetics will be consistent practice ; a little more action, and a belief that the internal viscera are suffering from inflammation, will recommend sacrification and cupping, or leeches, with an emetic. Purgatives are not of indispensable necessity in the first fit or the depression

of fever. When reaction is established and quinia has been given, calomel may be used in full doses or given with quinia.

Febrile Reaction with Great Prostration. — Sometimes it happens in the worst form of intermittents in hot countries, as Lempriere tells us was the case with those of Jamaica, that the chill is very short and the hot stage is exceedingly violent, often accompanied by delirium; and that after lasting from twelve to sixteen hours, it leaves, finally, the patient in a state of extreme and alarming debility. Now, in a case like this, unless there were evident complication of phlegmasia of an important organ, it would not seem wise to try to abate the violence of the paroxysm by blood-letting; and if we have recourse to the remedy, preference ought to be given to topical depletion. It is on such occasions that cold affusion, or at least a sponging of the surface with cold water, is both soothing and useful. Contributing to the same end, are the administration of cold water enemata and the use of cold water for drink, or of a small piece of ice allowed gradually to dissolve in the mouth. If acid be agreeable to the patient, or a slight bitter, the water may be flavoured accordingly; the only restriction being on the score of the quantity of the fluid, which ought not to be so great as to distend the stomach, and in this way prove a source of irritation. There is hardly a medicine which can be given during this stage without irritating the stomach and increasing the general restlessness, unless, indeed, it be opium, and it only when we are sure of the ascendency of irritation of the nervous system. A full dose, as of ten to fifteen grains of calomel, will be found to soothe irritation at this time, when, however, drastic purgatives would do harm. Most of the febrifuges, so called, are more than equivocally hurtful. Some of the saline preparations might advantageously insinuate themselves into the mucous absorbents, and enter the circulation with the aid of a liberal supply of a watery vehicle in the way just mentioned. The neutral mixture, the acetate of potassa, sesquicarbonate of soda and nitre, might be given; but, I repeat it rather as part of the drink of the patient, of course in large dilution, than in separate and at all strong doses. There is greater probability of a more perfect remission by these simple means and of an approach to a crisis, indicated by more copious perspiration and renal secretion, than if purgatives, calomel, antimony, and nitre, had been given during the first period of febrile exacerbation. Even the pet organ, the liver, will be more apt to recover from its irritative congestion, and secrete bile by this aqueous and saline regimen, than if it had been appealed to by means of the alleged specific and never forgotten calomel. If this period of febrile excitement has been reached without evacuations from the stomach and bowels — and there are nausea and efforts to vomit, it will not be amiss, nor in contravention to the opinions which I advocate on this subject, to give a draught of tepid water, or one in which a table-spoonful of salt has been dissolved, in order to evacuate the stomach of its contents, and even to break the bad habit which it had acquired for some hours previously. With a similar view, the lower bowels might be emptied by a simple laxative enema, as of salt and water, molasses and lard

and water, or gruel. But by far the most grateful and the best refrigerant and febrifuge at this time will be, in addition to cold affusion, cold or iced water in small quantities at a time for drink, and if the abdominal heat be intense, cold enemata also.

If, after violent febrile reaction, the stage, of which I am now treating, is not well defined, nor readily assumes a distinct remission, it will be safer, in view of the great debility of the patient and the danger from another paroxysm, to give at once a full dose of sulphate of quinia combined with calomel or blue mass and a minute proportion or about half a grain of opium, both to insure the better reception of the quinia by the stomach and to aid in bringing about diffused and equable excitement.

LECTURE CXXXII.

DR. BELL.

PERIOD OF REMISSION OR INTERMISSION.—Early and free use of the sulphate of quinia—Real nature of this medicine—It is not a tonic or a stimulant, but rather a sedative—Dose—Experience in favour of large doses of it in different countries—Mercury and sulphate of quinia—Summary of treatment.

PERIOD OF REMISSION AND INTERMISSION.—A remission or intermission having been established, a question then arises, which requires prompt solution preparatory to decisive action, as to the measures by which this may be prolonged, and the recurrence of another febrile paroxysm prevented. He who, forgetting the violence of the first paroxysm and the manner in which the chill was ushered in, should now think his patient out of danger, and either leave him to himself, or recommend merely light or perhaps animal food, commits a perilous mistake, of which he will be painfully reminded on the supervention of the next, and it may be the fatal paroxysm. Nor will it be prudent, even if a continuation of active remedies be determined on, for you to rely on purgatives with a view of cleansing out the bowels, and of restoring the secretions from them and the liver, or on blisters as counter-irritants, in order to prevent the coming on of the next exacerbation. Purgatives in congestive fever, especially those of the saline class, often play us false, and bring on choleric, or serous and exhausting discharges, followed soon by extreme and dangerous prostration and collapse. Blisters have little efficacy in preventing the recurrence of irritation of the nervous system in periodical fevers, as I the more readily believe from personal and painful experience. I have had five blisters on my own person at one time without their preventing the return of a chill, although I had no reason to believe that there was an inflammation of any organ at the time.

Sulphate of Quinia.—What then remains to be done in the emergency before you? Appealing to an experience which extends through centuries, and is the result of the observations of many physicians in different countries, you will lose no time, after a remission is clearly evident, or even just begun, in giving quinia now as a few years ago you would have given bark. But you will not be induced

to give it as early and as freely as you ought, unless you regard its therapeutical agency in a different light from that in which it is ordinarily presented. If, as is commonly done, you look upon it as a tonic, you will wait for debility to furnish a requisition for its use: if as a stimulant, you will fear to administer it in cases in which there is obvious excitement, or less evident but yet real phlogosis. Now, it is neither a tonic nor a stimulant; nor, although it sometimes arrests fever in the middle of its course, is it entitled to be called an antiphlogistic. The effects of bark on the animal economy are not identical with those of either bitters or astringents, any more than its chief alkaloid principle, quinia or quinine, is identical with the alkaline principles of these latter, as far as they have been discovered. Unlike stimulants proper, it has little or no immediate action on the vascular system; nor does it seem to modify nutritive life by action on the capillary tissue so much as tonics proper. If we would ascertain the real effects of bark or of quinia on the animal economy, we must do so by watching its operation on the nervous system; and by the extent of its impression on this system can we measure its influence generally on the other organic systems and apparatus. If its effects extend to these, it is through the intervention of the nervous system; and if it cure fever by preventing a return of a paroxysm, or by modifying organic acts in the midst even of one, it is in virtue of the peculiar manner with which it impresses this system.

But if quinine be neither a tonic nor a stimulant, by what term shall we designate its mode of action. Admitting that the pathology of congestive fever of the double tertian or remittent kind, which I have endeavoured to explain is correct, — and that the circle of morbid phenomena, on which the type and its peculiar character chiefly depend, originates in, as it is kept up by irritation of the nervous system, then ought bark, or its representative, quinine, which arrests and subdues this irritation, to be called a sedative. But it will be alleged, in reply, that in various conditions of exalted and perverted sensibility, this medicine displays no such sedative influence. As applicable to the nervous system of animal life or the encephalo-spinal apparatus, the remark is just. But in fevers, particularly those of which I now speak, the irritation, the sustaining cause of the periodical disturbances in the brain, spinal marrow, and their dependencies, radiates from the abdominal nervous system belonging to organic life. Opium is capable of allaying this irritation and of bringing the paroxysm to a close, and, on competent authority it may be added, of preventing its return; but opium exerts, independently of its effects on the nervous system, a strong action also on the capillaries: it is apt, if repeated, to cause narcotism and complicated symptoms transcending the degree of simple sedation. Quinia limits its action very much to the nervous system, producing neither narcotism on the one hand nor vascular excitement on the other; but as near as may be a sedative operation, which, like all the sedations caused by other medicines of the least mixed nature in this respect, will, however, at times be blended with some unpleasant sensations. Of these, a humming sound in the ears, slight deafness, and a feeling of tightness or stricture across the breast, are the most usual. So,

also, dryness of the mouth and fauces, and sometimes slight febrile excitement, may be expected after taking quinia; but as in the case of other sedatives, these bear no proportion to the subsequent ease and soothing effects.

If we are desirous of making an impression at all decided on the nervous system, and through its sedation of allaying the febrile disturbance of the functions generally, five grains of sulphate of quinia is the smallest dose which we should think of prescribing for an adult, whose idiosyncrasy is not such as to forbid the use of the medicine beyond minute doses. Nor should we rest content here; we ought to direct a repetition of the dose once or twice more, at an interval of two hours. The preferable mode of administration, with a view to obtain its earliest effects, is in solution and in such a medium as will prove most palatable to the patient, and be most likely to insure its retention by the stomach. Contributing to the latter end, and harmonising well with the quinia, is a dose of about twenty-five drops of laudanum with camphor water; and for the former, cinnamon water, or lemon or ginger syrup. When convinced of the propriety of the union of quinia and opium, a neater formula, and one in the administration of which there will be less liability of mistake by the nurse or other attendant, is a solution of the two sulphates, as follows:— ℞. Sulphat. quin. ℈i., Mist. camphor. ℥ij., Sulphat. morphiæ, gr. ss., Acid. sulphuric, gtt. vi. M. ft. solutio. Dose, a table-spoonful in any fluid most agreeable to the patient. You are, of course, aware that the sulphate of quinia, as an imperfect salt, is not entirely soluble in water, and hence the addition of a few drops of sulphuric acid is necessary. If a mild cordial stimulus be deemed advisable, peppermint water (*Aquæ menthæ piperitæ*) may be substituted for the camphor mixture. With the same view capsicum is combined with the quinine in the form of pill.

In cases of more intensity, and in which it is of the utmost importance to produce a full and strong impression on the nervous system, so as to prevent, if possible, a renewal of the fever, or rather a recurrence of the paroxysm which might end fatally, a still larger dose of quinia is not only admissible but required. Dr. Bailly, on this point, says, that physicians need not be under any apprehension from the effects of large doses of this medicine. "If fifteen grains, divided into three or four doses, suffice in common cases of intermittent fevers during the day of apyrexia, we must give twenty, thirty, forty grains, and even more than this, in a few hours, if we are in dread of the effects of a paroxysm, the first accession of which placed the patient in peril." In some of the cases in the hospital of *San Spirito*, twenty grains of the sulphate of quinia were prescribed in the morning, and taken before the afternoon paroxysm. Dr. Bailly himself took a hundred grains of the sulphate of quinia in five days for a slight febrile disorder when he was at Rome; and he declares, after an attentive analysis of his own feelings, that he was unable to detect any evidence of irritation, which this quantity of the medicine would certainly have produced if it had been of an irritating or stimulating nature. In one of the hospital cases recorded by this gentleman, he mentions seven ounces of bark to have been taken in one day by the

patient, — which would be equal to nearly sixty grains of quinine. Dr. J. K. Mitchell, of the Jefferson Medical College, in conversation on this subject, stated to me that he gave to a patient, who was in the last and apparently fatal stage of remittent fever, sixteen grains of quinia, and with such good effect, that from that time the violence of the disease was subdued and convalescence soon established. He felt the more confidence in so large a dose, from having known a man to take in the course of a day, by a misapprehension of advice for the manner of using them, a box of pills consisting of sixty grains of quinine, and with no other inconvenience than a singing in the ears. But let us avoid an inference, which is sometimes hastily and erroneously drawn from a knowledge of the toleration of the system to large doses of a medicine, that it has not the activity commonly attributed to it. Even if we were not apprised of the fact in various instances, one under Dr. Mitchell's own notice shows by how small a dose some persons are affected. His patient, an aged adult, cannot take an eighth of a grain without being troubled with a singing in the ears and other nervous symptoms.

Still more decided testimony in favour of the efficacy of large, or, as the writer calls them, mammoth doses of quinia, is borne by Dr. J. E. May, of Madison county, Alabama (*Transylvania Journal*, vol. x.), who cites the corroborative experience of Dr. Thomas Fearn. Dr. May, on the occasion of his having been attacked with a quotidian remittent, the paroxysm of which came on about ten o'clock in the forenoon, and the remission at one or two at night, took, on the fourth evening of his disease, ere the fever had yet left him, fifteen grains of quinine, which he repeated every two hours until a drachm had been thus used. He had himself copiously bled just before he began to take this medicine. The effects are thus narrated; "Instead of the usual remission I had a complete intermission. The fever left me while I was taking 15 gr. doses of quinine. I passed the day without the recurrence of the fever; was affected with some degree of stupor, ringing in my ears, and deafness; but with no other uncomfortable sensation. A dose of calomel taken about eight o'clock, forenoon, brought off evacuations of the consistence of black clotted blood. The quinine was continued for ten days, in smaller quantities, and my bowels kept open with calomel, rhubarb, and aloes, and my recovery was rapid." Dr. May states, that "when under the full and proper influence of quinine, healthy biliary secretions are readily set up, and by means, too, which under other circumstances had failed." In another case of fever "of a malignant character," of three weeks' duration, the patient was "in a state of extreme prostration; pulse one hundred and eight in a minute, and exceedingly small and compressible; copious watery discharges passing from his bowels six or seven times a day, as he lay, without the power to control them: and by no means the least unfavourable symptoms were colliquative sweats, parched lips, an utter inability to sleep which had lasted for several days, with delirium during the night." The quinine in two-grain doses had been administered, but it was thought to have produced irritation. "It was now concluded to give the quinine a trial in ten-grain doses; his

case being considered at best a desperate one. I," says Dr. May, "was entrusted with the administering of the medicine, with liberty to increase the dose to fifteen grains if the first ten should not produce the effect anticipated. This was manifestly done; and I accordingly gave him fifteen grains in each of two succeeding doses, making in all forty grains in two hours. The effects were such that in one hour after the patient had taken the third portion his pulse was reduced to eighty-eight in the minute, with a more than corresponding increase of volume. All the unfavourable symptoms in a great measure subsided. The patient slept several times during the evening, and had a better night than he had passed for many previous. A blue pill given at night, produced in the following morning fetid discharges; and a favourable crisis in the case was manifest. On this day, three fifteen-grain doses were administered at intervals of an hour; he had no return of fever; rested well at night; a mercurial cathartic produced evidence that the proper secretions from the liver were excited; the patient was treated with smaller portions of quinine in the forenoon, and purgatives at night, for two or three days after; and in two weeks was up —" Cases are given of complication of pulmonary disorder with gastro-hepatic derangement and delirium sustained by intemperance, and reducing the patient to the lowest state, but which were cured by large doses of quinine. Dr. May very properly remarks, in coincidence of opinion with the older writers already quoted, that when the affections of the chest "are evidently regulated by the remittent, aggravated in the exacerbation of the fever, and moderated in the remission, they may be set down as symptomatic, and so treated." Dr. Drake (*Western Journal*, vol. xi.), after noticing Dr. May's paper, adds, —"We are pleased to meet with this new testimony to the safety and value of large doses of the sulphate. Dr. M. seems to regard them as without precedent, but in this he is mistaken; at least ten years ago Dr. Perrine, of the state of Mississippi, administered this medicine in such quantities as to amount to a drachm in a single intermission, and we ourselves, for many years past, have been accustomed to give it in doses of ten or fifteen grains. We have also been in the habit of combining it with calomel, a practice which is general among the physicians of this quarter. Of the harmlessness of large doses we some time since had conclusive evidence, by being called to see a man the next day after he had, by mistake, taken a drachm at one portion. He still had a roaring in his ears, but was walking about the house, and had not experienced any formidable symptoms. They, who limit themselves to small doses at short intervals, are not aware how much, *in many* cases, they sacrifice to their timidity. To a patient who laboured under a neuralgic affection, apparently of miasmatic origin, we lately, in conjunction with a medical friend, administered a scruple daily for five or six weeks, without any other sinister effect than a noise in the head and a slight degree of deafness. It was given in five-grain doses, combined with ten grains of nitrate of potash."

Dr. Perrine, to whose practice in the free use of the sulphate of quinia, Dr. Drake refers, tells us (*Amer. Jour. Med. Scien.*, vol. xi.,

p. 250), that he used and recommended large doses of the Peruvian bark frequently repeated during the paroxysms of fever. "The medium dose of the sulphate of quinine at any period of fever, from its incipient to its terminating symptoms, is ten grains, to be repeated every two hours whatever be the state of the pulse and skin." He believes it to possess sedative powers.

General Coincidence of Practice. — It is pleasant to find on this important question of how a disease of so much violence and danger as our congestive fever should be treated with such a general accordance among practitioners in different and remote countries and times. Thus, the practice of giving large doses of bark adopted by Torti in the pernicious remittents of his day is carried out fully by the Roman physicians of the present time, as we learn from Dr. Bailly and other sources of information. It is that adopted in our own country, and it is that, also, which has been found most successful by the French physicians in Northern Africa. I was not aware, when I inculcated some years ago that which I believed to be the correct pathology of congestive fever, and the treatment adapted to its removal, that Dr. Maillot had carried out precisely similar views by the same practice. In violent intermittents inclining to the pernicious, his course was identical with that which I have prescribed for upwards of twenty years. He bled the patient when first seen either in the apyrexia or in any stage of reaction. If there remained headache in the interval, at least fifteen ounces of blood were taken away; and if the intestinal canal was irritated, leeches were applied to the epigastrium. If these symptoms were violent during the paroxysm, and still severe in the interval, twenty or twenty-five, or thirty ounces of blood were taken at once. These free bleedings were not, M. Maillot states, as well borne after the spring and in the great heats of July. It will, I believe, be generally found, that in the warmer latitudes, even in Southern Europe, the use of the lancet is not borne, is not in fact required in fevers, as it is farther north; and hence, in my preceding advice for the treatment of our congestive fevers, as they are met with in the Southern and South-western States, I suggest the occasional and cautious use, but do not recommend it as a matter of course. With our home experience of late years in the virtues of the quinia, we are not disposed to accuse M. Maillot of exaggeration, when he assures us that after the bleeding he gave immediately the sulphate in doses of from twenty-four to forty grains in a few ounces of water; and that the symptoms were found to disappear in a few hours "as if by enchantment." Writers in the north of Europe, or in our own Northern States, might be disinclined to credit the astonishing results of this kind of treatment, by the disappearance of symptoms, from which recovery would seem almost impossible. In one of M. Maillot's cases, it was of the *comatose* pernicious form of fever, a hundred and twenty-eight grains of sulphate of quinia were given in a few hours. On the third day from the admission of this patient into the hospital there was complete apyrexia, and on the fourth he was convalescent. The patient was also bled twice; and the importance of bleeding from the arm, followed by opening the temporal artery, was found to be extremely efficacious, and most

so in the comatose form. Persons newly arrived from the north, with a retention of their fulness of habit, and as yet abundant and rich blood, and who are seized with this fever for the first time, ought to be bled freely; but in those who have been enfeebled by long residence in a sickly country, or by previous disease, the latter was the case with my comatose febrile patient, we ought to be more reserved in the use of the lancet, and not mistake toleration of the remedy for positive benefit from its use.

It appears, also, that blisters and sinapisms were applied in many of M. Maillot's cases; the first preparatory to the introduction of the sulphate of quinia by the blistered surface, when, as in the cholera form, the medicine could neither be swallowed nor given by the rectum. It would be advisable to apply either blister or sinapism to the spine, under the view of the pathology of intermittent fever already detailed. Opium was combined with the quinia in the African fever. I have already advised this combination, which is used by some of our practitioners at home. M. Maillot has given it to the extent of ten grains in the course of the day.

The *algide* form is, as may be supposed from the description which has already been given of it, that in which the danger is the most imminent, and the necessity for vigorous practice the most urgent. M. Maillot gives a case in which forty grains of sulphate of quinia and two drachms of ether were administered in four ounces of water, at two doses, in the course of an hour: a starch-opiate injection, with sixty grains of the sulphate and two drachms of ether, was ordered at the same time; sinapisms to the legs, and a blister to each thigh. Under this sharp practice the patient began in a few hours to recover warmth, and the heart to act more forcibly; but the next morning the amendment was so slight, that a sinapism was applied to the whole length of the spinal column, and a lavement given with sixty grains of sulphate of quinine and three drachms of ether: strong reaction then took place, and recovery commenced. (*Op. cit.*)

Mercury and Sulphate of Quinia. — Before concluding, I have yet a few words to say on the employment of calomel alone and in conjunction with sulphate of quinia, in congestive fevers. Regarding it as a depressing medicine of no small power, you will give calomel in the exacerbation of fever as a simple febrifuge, without measuring its effects by its incidental purgative operation, and certainly without blindly urging its repetition until it produces ptyalism. As the best febrifuge effects of tartar emetic are not obtained when it vomits or even nauseates, so neither are those of calomel to be sought for from its purging. If you are persuaded that there is still irritation in the remission, calomel may be given, and if its action be of the nature which I have explained, this medicine will be of service. Annesley claims it as an antiperiodic in the fevers of the East Indies; and although not at all comparable to bark or quinia in this respect, both on account of its inferior effects on the nervous system and its tendency to interrupt the nutritive process, it is at times worthy of trial. It is now several years since I noticed the harmony of action, in intermittent fever, between mercury and bark, and prescribed the two medicines accordingly, in the manner mentioned in my remarks on

intermittent fever. I have said in another place, "Not unfrequently, when the disease prevailed so extensively in this city [Philadelphia] and its vicinity a few years ago, I gave a five-grain pill of the blue mass at night and the cinchonic preparations during the following morning, with the effect of promptly arresting quotidian fevers, which had not yielded to the bark alone. The practice is equally applicable to tertian fever." I find that many physicians in the south and west are in the habit of prescribing calomel and quinia in combination, in the congestive or malignant double tertian fevers of those regions. Dr. Drake, in a passage which I quoted from his journal, adverts to it in terms of approval. Dr. Hogg, in his account of the epidemic fevers of Natchez in the years 1837–'8–'9 (*Western Journal*), takes brief notice of the malignant double tertian, and mentions the calomel and quinine practice in the following terms: —

"Whenever the action began to decline, full doses of quinine every second or third hour, alternated with ten-grain doses of calomel, with sinapisms of mustard to the extremities, prevented a return of the chill and torpor. The medicines were then continued in small quantities, and at long intervals, until the secretions became natural and the patients convalescent. The following is my mode of administering the quinine: — R. Sulph. quin. grs. x., Pip. nig. ol. gtt. i. M. ft. pil.: one to be taken every hour, or once in two hours.

"When the patient was not seen before the second chill, the extremities were dry and cold, stomach very irritable, contents of the bowels liquid; a warm mustard, pepper, or salt bath, or mustard sinapisms to the stomach and extremities, blisters, quinine, as above prescribed, alternated with calomel twenty grains, sulph. morph. 1-6 grain, together with warm stimulating drinks, seemed to snatch the patient from the jaws of death, and relieved him, contrary to the expectations of friends, or physician. Injections of strong salt water were used to empty the bowels when necessary."

Summary of Treatment. — In recapitulation of the treatment of congestive fever I would entreat you, while you endeavour to obviate immediate disturbances of function by appropriate and for the most familiar means, never to lose sight of the important facts: 1, that the chief seat of the disease, or rather the source of nearly all the alarming and often fatal symptoms, is in the nervous system: 2, that the remedies should be administered with reference to a soothing and tonic rather than irritative action on this system: 3, that the latter indication is best, and for the purpose of permanent cure only carried out by the early and free administration of the sulphate of quinia or some other product or analogous preparation of the bark.

When the prostration is great and the extremities and skin generally of an icy coldness, the nervous system may be advantageously roused by the shock of a cold douche or dash on the spine and shoulders. The tendency to reaction will be encouraged by immediate and persevering friction, particularly along the spine and on the inside of the extremities with warm cloths or brush dipped in mustard flour or oil of turpentine. If these prove inefficient the warm or even hot bath should be tried, or cloths wrung out of hot water are to be applied to the back and insides of the limbs; or, better still,

the entire body except the head is to be enveloped in a blanket hastily wrung out of hot water and vinegar, while the patient takes camphor mixture or some herb tea with a few drops of laudanum every half hour until reaction is complete and free perspiration is induced.

Efforts to vomit, or nausea and distress of stomach, will indicate the propriety of giving an emetic of salt and water, or mustard flour and water, or ipecacuanha, or warm camomile tea. Heat of the epigastrium, intense thirst, and very laboured respiration with great restlessness may indicate the advantage of cups over the epigastrium or on each side the dorsal spine. After either the emetic or the cupping, camphor mixture with small doses of laudanum as before. At this time an enema of oil of turpentine and castor oil should be given to act on the lower bowels, or if diarrhœa have previously existed the turpentine and laudanum are administered *per anum*.

If the reaction be imperfect, or the hot stage of short duration or not well defined, we must not wait for a complete crisis by sweat or other evacuation; but lose no time in giving at once a full dose of the sulphate of quinia, and if the patient is prevented from taking it into the stomach, it should be thrown up the rectum or applied to a skin vesicated by ammonia or hot water: but, if possible, the medicine should always be given in preference by the mouth. If ignorant of the precise history of the case and the stage be of a mixed nature, we must not wait for a complete exhibition of its features, but give the sulphate of quinia. Neither the stupor of coma nor the ravings of delirium, not the icy coldness nor the burning heat of the body, should divert our attention from this, the *febrifugum magnum*, the true curative agent in congestive fever.

LECTURE CXXXIII.

DR. BELL.

REMITTENT FEVER.—Resemblance between this fever and intermittent and congestive fevers—Causes of remittent fever—Modes of termination—Varieties of—Progress and conversions of one into another—Modifying circumstances—Remitting continued or inflammatory fever—Hillary's description of—*Treatment.*—Bilio-inflammatory remittent—Described by different authors—*Treatment.*—Congestive remittent—Clark's description of—Treatment analogous to that of congestive intermittent—Nervous variety or complication—Symptoms—Treatment—Remittent fever complicated with liver disease and with bronchitis and pneumonia—Organic lesions—Great mortality from remittent fever.

THE resemblance in many respects between simple and congestive intermittents and remittent fever, is sufficiently manifest to allow of my referring you to what has been already said respecting the causes and visceral complications of the two first varieties as applicable in a great measure to the last. If I refuse assent to the miasmatic origin of intermittents, *à fortiori*, I feel myself disinclined to admit it of remittent fever. This latter, the more violent and dangerous of the two, ought, according to the miasmatic doctrine, to be the product of

a larger evolution and larger quantity of the alleged poison than its kindred fever: but how does its earlier appearance in the season and before vegetable decay has made much progress, or indeed hardly begun, comport with this hypothesis? Remittent precedes intermittent fever in the annual circle of diseases of endemic origin: it follows the high heats of summer in temperate climates, and is ever the most frequent as it is nearly the most unmanageable disease in tropical latitudes. Alternations of great solar heat and relative coolness and moisture are the prime conditions for the appearance of the remittent fever, whether it occur in Flanders, in Hungary or in Italy, in Europe; or Bengal or Java, in Asia; or in Virginia and the Carolinas or in the West Indies, in our own hemisphere. "The great sickness," says Pringle, in his work (*Observations on the Diseases of the Army*), "commonly begins about the middle or end of August, whilst the days are still hot, but the nights cool and damp, with fogs and dews; then, if not sooner, the dysentery prevails, and though its violence abates by the beginning of October, yet the remitting fever gaining ground continues throughout the rest of the campaign, and never entirely ceases, even in quarters, till the frosts begin." Home, in his Dissertation on the Remittent Fever of Flanders, makes similar observations on the extremes of temperature, and of dryness and moisture (*Bell on Miasm, op. cit.*). But if we pursue our inquiries, we find that these alternations of temperature with moisture are powerfully aided by other deteriorating agents in operation at the same time. Labourers in the field, soldiers in a campaign, and newly arrived emigrants, are the greatest sufferers from remittent fever. The continued action of high solar heat from day to day is itself a powerful exciter, not only of the nervous but of the bloodvessel system, and cannot fail, after a time, to produce an effect on the blood as well as on the capillary tissue, which latter becomes less able in consequence to resist the sudden impression of cold and moisture. These are made much more effectual causes of disease if acting on the system of men who have been marching or working all day, and who are greatly fatigued in consequence. How much more prone will such persons be to fever if they are weakened by the over-excitement of ardent spirits or other intoxicating drink, or by the want of excitement of proper food. Dr. Clark, who is an advocate for the miasmatic origin of remittent fever, admits, however, very distinctly, that it may occur at any time in hot climates, at sea as well as on shore. He gives a history of its symptoms "as it appears at sea, where it is not affected by exhalations from the land." (*Observations, &c.*) Besides "moist air after long continued heat and exhalations from marshes or damp grounds," which he regards as "the most common remote causes of the remittent fever," Dr. Clark mentions some others which predisposed to the disease, and seemed to have a powerful effect in rendering it more dangerous. "These are principally too great inanition; too great repletion from a diet of animal food; fatigue in the heat of the sun; and the dejecting passions of the mind." When speaking of the powerful influence of fear in bringing on an attack of fever, this author very frankly admits, in explanation of the sudden deaths of those who had attended the funeral of deceased friends at

Bengal, "for if the sickness, as some have imagined, had been merely occasioned by exhalations from the marshy burial grounds, or putrid *miasmata* from the adjoining graves, the grave diggers would have been more subject to an attack than the attendants at the funeral. This, however, was not the case; for it generally happened that the timorous and humane suffered, whilst the hard-hearted and callous escaped."

The dependence of remittent fever on atmospherical distemperature is manifested in its approach to a continued fever in the height of the summer, and to an intermittent in the decline of the season; and from the circumstance alone of the time of its appearance will our prognosis of its duration and intensity and unmixed nature be greatly influenced? In the former case authors have applied the term remittent continued to the fever, which, a little later in the season, is called remittent. To causes of a similar nature, as the predominance of particular winds, the continuance of moisture with heat during the day, and perhaps still more, the personal predisposition growing out, mainly, of particular habits of regimen, must we look for an explanation of the varieties of remittent fever laid down by systematic writers, — such as the *mucous*, the *gastric*, the *bilious*, the *inflammatory*, and the *putrid*. Pringle describes it under the term bilious autumnal intermitting and remitting fevers; and distinguishes these as they appeared either in the camp or in low and marshy places. Needless refinements and attempts at distinction have been made in describing remitting fever, the chief phenomena of which, whether we may choose to designate it as the *Hungarian Fever*, the *Walcheren Fever*, the *Mediterranean Fever*, the *Carolina Fever*, or the *African Fever*, are nearly the same in all cases. The causes of difference are more personal than local. Thus we may see two persons in a district of country subject to this disease, one of whom just arrived from a northern climate, is young and robust, and hitherto healthy; the other, also, healthy after a fashion, has had his system gradually reduced by climatic influences. Now the fever in the first will exhibit more of an inflammatory character than in the second. The disease of the first will perhaps be called the climatorial bilious or the seasoning remittent fever; that of the last, the country or common endemic fever. The one will assume more the appearance of a continued, the other incline to that of an intermittent type. Between the labourer, continually tasked to his utmost strength, and his employer, whose duty has been hardly anything more than active exercise, there will be a difference in symptoms; the fever in the former becoming much more readily congestive than in the latter. So, also, the drunkard's case will be more complicated than that of the sober man.

Remittent fever, as it is commonly met with in our country, particularly in the south and south-west, has four modes of termination: — 1. In early and complete convalescence. 2. In low continued or typhoid fever, from which the patient may, however, ultimately recover, after a long and tedious convalescence. 3. In intermittent fever. 4. In death. The disease presents itself under three chief aspects: — In the first the symptoms of febrile excitement deducible from, or at any rate closely associated with the lesion of some

one of the chylopoietic viscera, are met with. This is often inflammatory and runs its course without many mutations, until either a favourable crisis takes place or the disease ends in death. In the second variety, there is congestion of some one organ or congestion in all the chief cavities with symptoms of oppression, inequality of temperature and chills without much morbid heat of the surface. In the third, the nervous system is much affected, — there are obscure rigors for days before the paroxysm, which is sometimes ushered in with syncope and followed by delirium with incoherency, dreams, struggles to escape from bed, alternately with stupor or indifference: there is often in this variety great and permanent heat of the skin. But although these varieties should be met with separately in any one year or place, they also represent differences which you must be prepared to see in the same season; and hence no description, however accurately made out, of one patient or even class of patients, will give you all the details, or even in some important ones an accurate idea of other cases. We may, indeed, sometimes see one variety in the ascendant in the early part of the season, and another variety in the latter part. So, also, in high plains and hills the simple or inflammatory variety will occur, and in alluvial soils on the banks or embouchures of rivers the congestive; but a change in the character of the seasons, as of rain with heat in the uplands, — and an unusually prolonged dry summer in the low grounds, will cause a corresponding change in the fever; the inflammatory or remittent continued occurring in the latter and the congestive variety in the former situation. Even in the same house at the same time, a physician may be required to prescribe for three men, whose cases will exhibit examples respectively of the inflammatory, the congestive, and the nervous, — the differences depending on age, temperament, constitution, prior habits of life and of bodily or mental exercise. Without a knowledge of these circumstances you will be frequently puzzled at the apparently contradictory histories of the symptoms and march of remittent fever, as well as of the remedies employed for its cure; instead of learning from each writer hints and directions which will be applicable to cases that may afterwards come under your own care. Of all the writers on the Fevers of Hot Climates, Dr. Robert Jackson best prepares us, by his description of the varieties and the circumstances under which they occur, for a due appreciation of the difficulties we may be expected to encounter in actual practice among this numerous and formidable class of diseases. Works like his, and the remark may be extended to several others whose names I introduced to you when treating of congestive fever, furnish more copious and available knowledge than will be found in the more elaborate but at the same time speculative at any rate disquisitional compositions of city teachers and practitioners, whose personal experience in the variety of fevers now under notice is very slight, and who illy make up for this poverty by exuberant details of pathological anatomy, not always in strict relation to the subject matter at hand. In fact, just now there is some danger of our forgetting that it is the living not the dead body that we are called upon to study, and that the practice of medicine is something more than the

natural history of the disease. In our zeal for counting symptoms is there not a danger of our forgetting to devise the appropriate means of obviating and removing them? Ridicule may attach to more calculators than the celebrated Welsh arithmetician, whose criticisms on the acting of Garrick in the part of Hamlet consisted in telling just the exact number of words which the actor spoke. The pathognomy of disease cannot be reduced to a part of the science of numbers, any more than physiognomy can be taught through geometry, nor physiology through chemistry.

The highest grade of remittent fever is that which, by a contradiction of terms, Hillary and some others call remitting continued fever, or *synochus*. It is ushered in by chilliness rather than rigors, which is soon succeeded by great and diffused heat, pain in the head and back, and sickness at stomach, manifested in frequent retching and vomiting, so that neither drinks nor medicines can be retained. The pulse is usually frequent and full, in some hard and tense. The patient is restless, almost continually tossing and tumbling about, and procuring little or no sleep; or when this comes on it is disturbed and unrefreshing. In some the heat of the skin would yield to a moisture and a fine breathing sweat: others again had cold clammy sweats, especially at the limbs, although there was great heat about the precordia. The tongue is furred and yellow, thirst intense. This form of fever usually abates once in twenty-four hours, at a particular time, but there is no distinct remission. After a certain period it is renewed with its former violence, accompanied as before with vomiting and headache. About the fourth or fifth day it begins to abate, and generally, says Hillary, disappears at the ninth day. I have had cases of this variety of fever in Canton, had seen them frequently in Virginia, and occasionally have met with them in persons arriving in this city from the country. It is not always, however, that we are so fortunate as to procure a cessation of the disease in the time mentioned by Hillary. In some cases the fever scarcely abates, nor is the pulse diminished in volume and frequency for two or three days, after which time, however, there is a distinct remission, which may end in complete apyrexia but more commonly is succeeded by fever. The disease now assumes a more evidently remitting character, and maintains it to the close. Often, after a week's duration, an obvious difference is felt and noticed by the patient himself in his feelings and in the violence of the fever on alternate days.

The chief subjects of this variety of fever are the young and the robust, those of a full habit and athletic frame or of a sanguine temperament, and who are new comers from a healthier and warmer climate. The *treatment* of such cases is generally simple, and consists in a full venesection, to be repeated if the symptoms of disorder in the head and stomach are still considerable; laxatives and saline draughts, or neutral mixture with a minute proportion of antimony. If during the first day of the disease the efforts at vomiting be great and some bile be discharged, warm water or warm camomile tea, or a little warm salt and water, may be drunk to encourage farther evacuation, and also to procure what a mild emetic of ipecacuanha

so often does, an entire cessation of the retching and vomiting. Calomel alone, to be followed by salts and senna, or if the stomach can retain it, combined with rhubarb, will procure large fecal evacuations, and give great relief. But from frequent purging we cannot expect much benefit. Determination to the head, stomach, or liver, will be better obviated by local bloodletting and cold to the part externally, and the use of small doses of tartar emetic with some saline by the mouth. Cold drinks slightly acidulated, cold to the epigastrium and enemata of cold water, will contribute more to the reduction of the febrile heat and to settle the stomach than the various anti-emetic and febrifuge mixtures so commonly recommended.

Under the influence of prolonged heat and unfavourable situation, remittent fever, while it still retains its inflammatory character, assumes the appearances often of derangement of the biliary apparatus, with a yellowness, or discoloration approaching to yellow colour, of the skin, constituting the *bilious* or *bilio-inflammatory* variety of remittent fever. The chief seat of the disease is in the stomach and duodenum, with the inflammation of which the brain greatly sympathises; and hence, in addition to the vomiting, violent pain in the stomach and back, there is often excruciating headache, most felt in the supra-orbitar region, and delirium. Here the more obvious stage of high excitement soon runs into one of debility and great prostration. This variety sometimes becomes epidemic in unhealthy situations, and attacks all classes: it is that kind to which Europeans, who have not been long enough in tropical regions to be acclimated, are most subject; it is also met with in armies during a campaign or when encamped in unhealthy situations in the latter part of summer. The fever described by Bartholinus, which occurred at Copenhagen in 1632, in the autumn after an unusually hot and dry summer, was of this nature. It was accompanied either with quotidian or tertian paroxysms, with bilious vomitings, or burning heat, violent headaches, often with a delirium, and with petechial spots which came out in the fits and disappeared in the remissions. (*Pringle, op. cit.*) In many of its symptoms, and in the lesions observed after death, such as inflammation and mortification of the stomach and duodenum, as described by Bartholinus, we recognize a resemblance of this fever to the American yellow fever. Of the same nature as this bilious remittent were, it has been supposed, the plagues, mentioned by Livy, which committed such devastation at different times in the Roman territory during the earlier period of the republic. The bilious remittent noticed by Pringle and other army surgeons at the time among the British troops in Flanders was of the variety now under notice. The remissions usually appear from the beginning, and especially, according to this writer, if the patient is bled in the first attack; sometimes they are little perceptible for the first two or three days. Costiveness not only often precedes but accompanies the disease, and when that happens the abdomen is hard and the patient suffers from flatulency.

The *treatment* of bilious remittent or bilio-inflammatory fever is analogous to that of the simple inflammatory already described,

with this important reservation, that we cannot bleed with the same freedom nor frequency in the latter as in the former. In general, venesection to an extent short of syncope, when had recourse to early in the disease, will precede other remedies; but if we look for a solution or even material curtailment of the disease by this means, we shall be greatly disappointed. The pulse is readily reduced by venesection, but it soon recovers its morbid character, and shows that it does not represent simple vascular excitement. Were we even assured that gastro-enteritis and associated disease of the brain and meninges were present in every case of the fever, we could not hope to remove them by copious general bloodlettings. To prevent disorganising inflammation, and allow time for the tissues to recover gradually their normal state, and the nervous and vascular systems to be correspondingly tranquillized, is all that we can expect by any mode of treatment in this fever — may I not add of all fevers, however strong may be the evidences of inflammation associated with them. Accordingly, after a tolerably full venesection we must rely on topical depletion, by cups or leeches, for the relief of the head and stomach; cold to the head; sinapisms and other counter-irritants to the lower extremities; cold drinks, if craved by the patient, and purgative enemata. The stomach and upper bowels ought to be spared the irritation of either emetics or drastic purgatives; but we are not on this account to deprive ourselves of the soothing and sedative effects of calomel in doses of five grains with a little gum arabic every four hours. If sickness of stomach or nausea follow its use, we need not worry and irritate the stomach with the aromatics, or cordials, or even effervescing draught, but give merely a few spoonsful at a time of tolerably thick gum water. If the patient feels some inclination to go to stool or movements in his lower bowels, showing that the calomel has passed downwards, a simple enema of salt and water will suffice to procure a bilious evacuation; which is an evidence, not a cause, of relief. I repeat that active purgation should be avoided; but yet, and as part of sedation, that calomel may be administered in the manner already directed. Nor would I recommend salivation, but on the contrary that it should be deprecated. Calomel performs often its best services without causing either purging or ptyalism. It abates vascular excitement and febrile heat, causes a cool and soft skin, and moist tongue, no unimportant indexes assuredly of the relief to the gastro-intestinal canal and chylopoietic viscera generally. Opium, withheld until venesection or cupping and leeching and calomel have reduced inflammation and febrile excitement, and brought about longer and more distinct remissions, will now display its proper soothing and hypnotic effects, by inducing sound and refreshing sleep, and completing the beneficial operation on the skin and capillary tissue in general which was begun by the calomel. This last medicine is safe and proper, and usefully given during all that period of fever in which the system is said not to be affected by it; that is, during the time when it fails to salivate. So soon as we have the slightest evidence of incipient ptyalism, then ought we to desist from its use. We have now procured its appropriate sedative and counter-stimulating effects, and a reaction, owing to inflammation of the sali-

vary glands, cannot but be injurious, and more or less subversive of the good already accomplished.

The *congestive* form of remittent fever to which I next direct your attention, is the most common and least manageable of all the varieties of this disease. In a more intense degree it constitutes the *malignant* remittent of authors, and bears a close affinity to congestive or malignant intermittents. Proceeding in fact from similar external causes, and internal visceral congestions, the two fevers cannot well be separated for all practical purposes. Thus, we have congestive remittents ushered in at times by syncope, or sopor and insensibility, or violent delirium, as you have learned was the case in congestive intermittents. You see the same febrile reaction more or less complete and violent, and terminating in a similar crisis; and, I may now add, that you can obtain the same salutary restoration of the patient from the very jaws of death to health, by the liberal and early use of quinia, that has been so often procured in cases of congestive intermittent. A good picture of congestive remittent is given by Clark, in "A Description of the Marsh Fever which raged at Bengal in the year 1768." (*op. cit.*) I transcribe it for your use in preference to some more recent accounts.

"This fever attacked in various ways; but commonly began with rigors; pain and sickness at stomach; vomiting; headache; oppression on the præcordia; and great dejection of spirits. Sometimes, without any previous indisposition, the patients fell down in a deliquium; during the continuance of which the countenance was very pale, and gloomy. As they began to recover from the fit, they expressed the pain they suffered by applying their hands to the stomach, or head: and, after vomiting a considerable quantity of bile, they soon returned to their senses. Sometimes the attack was so sudden, and attended with such excruciating pain at the stomach, and so great a degree of timidity and faintness, that I have been obliged to give an opiate immediately.

"In whatever form the disease appeared at first, the pulse was small, feeble, and quick; the pain of the stomach increased; and the vomiting continued. As the paroxysm advanced, the countenance became flushed, and the pulse very quick and full. The eyes were red, the tongue furred, the thirst intense, and the headache exceedingly violent. A continuance of these symptoms soon brought on a delirium, in which the patients were very unmanageable; but a profuse sweat breaking out in twelve or thirteen hours generally mitigated all the symptoms.

"In the remissions, the pulse, which before was frequently 130, fell to 90: the patient returned to his senses; but complained of great debility; sickness at the stomach; and a bitter taste in the mouth. This interval, which was very short, was succeeded by another paroxysm, in which all the former symptoms were much aggravated, particularly the thirst; delirium; pain at the stomach, and vomiting of bile. The breath and sweat, even so early as this, sometimes began to be offensive.

"If the disease was neglected, in the beginning, the remissions now totally disappeared; and the skin became moist and clammy.

The pulse was small and irregular; the tongue black, and crusted; and the pain at the stomach and vomiting of bile became more violent.

"When matters arrived to this pass, all the excretions, but especially the stools, were very offensive, and ran off involuntarily: and the patients now, instead of being highly delirious, laboured under a coma, with interrupted ravings. Convulsive twitching of the tendons, tremors, and hiccup, were added; the extremities grew cold and were covered with livid vibices; and the body, for several hours before death, very frequently emitted a cadaverous smell.

"The appearance of the urine, in fevers of warm climates, is not much to be depended upon. In the beginning of the paroxysm, it is pale; at the height, of a higher colour; but seldom or never deposits any sediment.

"If the fever was neglected at first, it generally proved fatal betwixt the third* and seventh days. In some cases, indeed, where the exacerbations were not severe, it was protracted to the fifteenth, and sometimes to the twentieth day. But consequential diseases of the liver, terminating in suppuration, and the dysentery, attacking patients in the convalescent state, proved more fatal than the original disease."

More will not be required of me in this lecture, nor is more necessary, than to sum up the leading points of treatment, as they have been already presented to you, for the cure of congestive or malignant intermittents. These are, moderate but assiduous friction, mild counter-irritation, and the warm bath during the stage of depression; a mild emetic if the state of the stomach seems to call for it, or a stimulating purgative enema. After reaction — to relieve the organs, which are oppressed, by small venesections, or, preferably, by local depletion, and the administration as a sedative and febrifuge of tartar emetic, in doses as large as the stomach will tolerate without nausea combined with opium. If the temperature of the skin be greater than natural, and especially if the heat be of an acrid kind, the cold dash or cold affusion is refreshing and salutary. A common and alarming symptom is a burning heat of the abdomen, with extreme thirst and dry and furred tongue, and yet the extremities cold and the skin clammy. Under such circumstances cold to the abdomen and enemata of cold water will be one of the best means of equalizing warmth and excitement, and of reviving the patient from the stupor which is often present at the same time.

But the remedy to which we must look for enabling us to save our patient so soon as there is a remission, is the sulphate of quinia. We need not, indeed must not, wait for all the commonly prescribed conditions previous to administering this medicine, such as moist tongue,

* "I was informed by a surgeon, who resided at Calcutta, that there were many instances of patients being carried off highly delirious in the first fit; but that he still lost more in the third paroxysm. His practice was to exhibit an emetic at first; and afterwards to endeavour to bring the fever to remit by antimonials and saline draughts. Here, the danger, in the first paroxysm, seems to have been too great to admit of a cure by the most powerful medicines; but the fatality, in the third, might certainly have been obviated by an early exhibition of the bark."

soft skin, and pulse approaching to its natural frequency. So far from waiting for a perfect remission, you will be often required, if, when you see your patient for the first time, he has already had several paroxysms of the disease, and is greatly and dangerously reduced by preceding attacks, to direct or give yourself the sulphate of quinia, at once, whether there be remission of the paroxysm, delirium or stupor, a frequent pulse or a slow pulse. The operation of the quinia will be quickened and strengthened also by uniting with it a portion of opium; so that the patient shall take ten grains of sulphate of quinia and a third of a grain of opium, or better still, ten drops of laudanum every hour until four doses are taken. Safety may sometimes require the administration, at once, of twenty grains of sulphate of quinia and thirty drops of laudanum. If circumstances call for the use of the quinia during the time of febrile excitement, calomel will be a useful adjunct, more especially in that state which Dr. Rush used to call one of suffocated excitement, in which the system was oppressed by slow inflammation of one or more organs. By this combination we abate both the irritation of the digestive mucous surfaces and of the nervous system at the same time. Clark, Lind, and others, had no hesitation in giving bark during the exacerbation of the fever in hot climates; and certainly the practice is safer, and we may go farther and say more salutary, in those climates than in colder and northern ones. Much, however, of the decided and positive evils which attended the administration of the bark grew out of the use of spirits or wine at the same time. These latter were regarded as possessing similar properties in a more active degree; whereas, their operation as diffusible and often irritating stimulants was the very reverse of that of bark and of its salt the sulphate of quinia. Having so recently discussed this point I shall not now return to it, but would recommend you to make it your study, as involving considerations of great practical moment.

The *nervous* variety of remittent fever is rather a sequence to one of the preceding varieties, or a complication in which the brain is the organ that chiefly suffers. Sometimes the stupor and nervous debility manifested at the beginning continue throughout, but in by far the larger number of cases these supervene on a stage of reaction and imperfect remissions. Masking as they do the excitement of the vascular system, and making the patient insensible in a great measure to lesions of the gastro-intestinal mucous membrane, or of the liver and spleen, they render the diagnosis much more difficult. Hence, in such cases our investigations by every means must be made with unusual care, so that we may ascertain, if possible, the precise condition of the brain and its meninges, and how far there is abdominal disease coexistent. Any suspicion of encephalitis or arachnitis will suggest the application of cups or leeches to the temples and nucha, and according to the effects or degree of reaction shall we be induced to repeat them. Knowing how often the brain is affected secondarily by intestinal accumulation and some congestion even in the portal circulation, it will be our aim to empty freely and completely the bowels and to abate vascular excitement of the mucous membranes by leeches over the epigastrium or the iliac regions.

But while thus engaged in watching and removing morbid inflammation let us not be blind to the state of the nervous system as measured by its own symptoms, nor be backward on the appearance of the remission, however indistinct, to administer full doses of sulphate of quinia in conjunction with opium. The great depression of mind and despair of living which accompanies this variety of remittent fever, have been noticed by most writers of the disease. Unhappily the augury in these cases is too generally fulfilled.

The other and more common variety of nervous complication is met with after the fever has lasted for two or three weeks, and no distinct and lengthened remission has been procured, or if it supervened it was neglected, and the patient falls into a state of half stupor and muttering delirium. The eyes are muddy, the face is of a murky-red or bronzed hue; the tongue dry, parched, and chapped, and either red and shining, or loaded with a yellow-brown, dried mucus and saliva, which also coat the lips and teeth. The pulse is very frequent, the skin, particularly over the abdomen and head, of an acrid heat; the bowels either loose or obstinately constipated, urine in small quantity, high coloured, and, at times, of an offensive smell. This nervous is quite a common termination of bilious remittent fever both in white and black subjects, as I often witnessed it in Virginia, and in this city during the prevalence of intermittent and remittents in the suburbs and country around in the years 1822 and 1823.

The treatment of this stage of the fever, usually designated as *typhoid*, whether in the country it has since acquired another name I cannot say, ought to be a good deal expectant. The common routine practice consists in the use of camphorated mixture with sweet spirits of nitre and carbonate of ammonia; bark, now sulphate of quinia in its place, an occasional laxative, or a laxative enema. Commonly also blisters to the nucha, and to the lower extremities, and the free use of wine or warm spirits and water, were prescribed with the view of rousing the system from its state of torpor and stupor. I never saw a case shortened in its period by this treatment, nor do I think that it materially mitigated the state of any suffering organ: but, on the other hand, it often, I know, aggravated the disease. On one occasion in Virginia, I remember, in the case of a little black girl who had been three weeks sick with fever, and during the greater part of the time in this low typhoid state, I took away a few ounces of blood. The effect was immediate and most salutary; from that moment convalescence began and soon ended in entire restoration to health. I gave also laxatives of calomel and rhubarb, and of rhubarb and magnesia. In some cases which I have had to treat in this city I have relied most on cold affusion of the epigastrium, frictions, sinapisms to the extremities when they are cold, enemata of tepid water to regulate the bowels, gum water or barley water acidulated with elixor of vitrol for drink, arrow-root or panada flavoured sometimes with wine, for food; occasionally a few grains of calomel, and so soon as any remission could be perceived, full doses of the sulphate of quinia. I ought to have said that I sometimes directed leeches to the temples or the epigastrium, or the iliac regions, according as there were evidences of undue determination or vascu-

lar excitement in the brain, the stomach, or the ileo-cœcal portion of the intestinal canal. Among the most frequent and embarrassing complications of remittent fever, in our climate, is bronchitis. Its treatment has been laid down when the modifications of this latter disease were under notice.

The liver is greatly and often implicated in remittent fever. Mr. Twining makes frequent mention of the fact in describing the fever as it shows itself in Bengal. Dr. Davis, in his account of the morbid appearances found in the bodies of those who died subsequently to their return to England from the Walcheren expedition of 1809, states that the liver was generally loaded with blood, and the portal system obstructed. In some instances the liver was of a gelatinous consistence. Portions of it taken between the fingers could be squeezed to a substance resembling in appearance grumous blood. A similar state of this organ is met with in the congestive remittents and intermittents of Italy, as I have noticed in a preceding lecture. Dr. Stewardson, in two papers on "*Remittent Fever*" in the *Amer. Jour. of Med. Sciences*, 1840 and 1841, whilst tracing with care and judgment the phenomena of this disease, as it was presented to him during his attendance on the Pennsylvania Hospital, takes occasion to point out, in a very particular manner, the morbid condition of the liver in those dead of the fever. This organ was found to be constantly diseased, exhibiting a bronze colour bordering upon olive, and internally a cut surface of the same colour: the two substances, cellular and vascular, of the liver were merged into one.

The spleen is also organically diseased in nearly all cases of remittent fever. The observations on this head are constant and uniform, in whatever region the disease may have prevailed, — Bengal in the East, or the region of the Chesapeake in the West. The tumefaction of the spleen occasionally comes on very suddenly, as we learn from Mr. Twining, in the course of remittent fevers in Bengal; in a few days the enlargement can be seen as well as felt, extending far between the cartilages of the left false ribs. The engorgement of the spleen Dr. Stewardson noticed to be constant in the cases of remittent fever in the Pennsylvania Hospital, "and not altogether similar to the engorgement of the organ met with in other diseases."

The stomach, as might be expected from the frequency and persistence often of gastric irritability during the progress of remittent fever, is frequently, we may say generally, inflamed in this disease. Mr. Boyle (*A Practical Medico-Historical account of the Western Coast of Africa, &c.*) tells us that the stomach is generally the principal seat of diseased action in the local or endemic fever of Western Africa, whether gastric derangement be evidently present or not. The inflammatory appearance he describes to be chiefly confined to the lower portion of the stomach; and in the generality of cases extending through the pyloric orifice, and rarely failing to occupy a small portion of the duodenum immediately around the entrance of the *ductus communis choledochus* into the intestines, — that duct being ordinarily nearly impervious, or choked, as it were, by dark-looking, thick, viscid bile. How closely resembling is this description of the morbid appearances of remittent fever in Africa to that by Bartholinus

of a fever nearly two centuries before in Denmark. It would seem, after all, as if we might still venture to rely on descriptive details of diseases and the lesions of organs produced by or accompanying them, made by our old-fashioned observers, even although they did not talk so largely of numerals nor claim or insinuate a superior knowledge of disease on the strength of having counted, but without repelling or mitigating its ravages. Dr. Stewardson reached similar conclusions with his predecessors in this matter, when he found the stomach so much more frequently presenting the ordinary characters of inflammation than in other fevers, if we except yellow fever. He gives more anatomical precision, when noticing the morbid state of the duodenum, by his pointing out a remarkable development of the glands of Brunner in this intestine. Dr. Richardson, reporter of some cases of remittent fever in the New York Hospital, under the care of Drs. Smith and Johnson, carries us a step farther in our intestinal pathology, by showing, as the results of *post-mortem* examination, an enlargement and, in some cases, ulceration of *Peyer's glands.*

The special pathology of remittent fever may be summed up in the following language of Dr. Clark, already so often quoted, and who wrote about eighty years ago. "And no person can visit patients under remittent fevers, especially in hot climates, but must be convinced, from the burning heat, and the constant pain and vomiting, that some degree of inflammation in the stomach, duodenum and liver, often appears early in the disease, which, if not speedily removed, too frequently proves fatal." Next to the abdominal viscera, the state of the brain in remittent fever merits our attention, and we cannot understand or properly remove the entire series of morbid phenomena caused by its disorder, without a study of this nature.

Putting aside, then, the varieties of remittent fever, and fixing our attention on the most constant symptoms, as evidences of the organs primarily and chiefly diseased, we are led to the antiphlogistic practice consistently carried out in the first stage, and opium and quinia in the second. By consistent antiphlogistic practice I understand venesection at first, then cups or leeches over the epigastrium or the right or left hypochondrium, or to the head, according as the stomach, or the liver, or spleen, or brain, is believed to be especially the seat of inflammation; and afterwards calomel and castor oil, laxative enemata, cold drinks and cold water otherwise used as already prescribed, to the avoidance of resinous or other purgatives, or any especial purging at all, with a view of emulging an inflamed liver and amending the quality of the bile. Opium, following depletion, in the shape of Dover's powder, in five-grain doses, repeated every four hours, or if the stomach be very irritable, laudanum injection, will allay the pain and distress of the head, and procure tranquillity and sleep; after which sulphate of quinia, early and freely administered, will complete the control of the irritation of the nervous system, by preventing paroxysmal returns and their concomitant congestions. I conclude the series of medical testimony in favour of the early and full doses of quinia in periodical fevers, whether simple or congestive, by adducing the opinion of Mr. Martin (*Topography and Climate of Calcutta*), who believes that if he arrests the paroxysm he does

"greatly more towards the cure at large, than quinia can possibly do harm to the local affection — the treatment of which by local depletion and counter-irritants is not interfered with by this means: again, all tenderness on pressure or local pain does not, in the case here stated, necessarily constitute inflammation."

The *mortality* from remittent fever in tropical and adjoining regions is very great. In the West India Islands, during a period of nineteen years, and among the English troops, whose aggregate strength during that period was 86,661, the deaths from remittent fever were 1966. The cases of admission into the hospitals of this disease were 17,799, or more than 1 out of every 5 men; the deaths were about 1 in 9. In British Guiana the deaths from remittent fever were 762, in an aggregate strength of 17,689, during a period of nineteen years (*Report of the Sickness, Mortality, and Invaliding among the Troops in the West Indies*). The reporter says, in speaking of the probable cause of sickness in the West Indies — "The tables illustrating the influence of the seasons on the health of the troops, in each station, show that the greatest number of admissions into hospitals and deaths has in the average of a series of years, (though not uniformly or equally in each year), taken place in those months when the greatest degree of heat was combined with the greatest degree of moisture." The unhealthy character of the period of the year in which the greatest degree of heat and moisture is combined, is not confined to the West Indies, but extends also to the east as well as over a large portion of the northern temperate zone. If we take particular statistics we find, however, that the mortality is still greater than in the preceding estimates. Thus, in Up Park Camp in Jamaica, during a period of nineteen years and in an aggregate strength of 14,520, the deaths from remittent fever were 1727. In Great Brtain and Ireland, for a period of seven years, in an aggregate strength of 44,611, the cases from remittent fever were 11, the deaths 1. But in Sierra Leone, in an aggregate command of 1843, the admissions of cases of remittent fever were 1601, and the deaths 739, or nearly 1 death for 2 cases of fever, or 1 death for every 2·4 men of the whole strength. The proportion of cases of remittent fever in the United States army is 1 in 9. (*Forry, op. cit.*) The deaths are not stated.

LECTURE CXXXIV.

DR. BELL.

CONTINUED FEVERS—Comparatively less important than periodical fevers to the American physician—Discrepancy of opinion among European writers on continued fevers—Different varieties stand for models—Cullen's division not natural—European accounts, how to be received—American observations necessary to a doctrine of continued fevers—Etiology of these fevers—A double cause often assigned; first the common and then the peculiar one—Alleged distinction between periodical and continued fevers—Paludal origin of typhous fever suggested by Armstrong and others—Mode of impression of morbific cause; through the nervous system and the blood—Are fevers primary and idiopathic, or secondary and sympathetic—Idiopathic fever complicated with inflammation of an organ—Chief types of continued fever—SIMPLE CONTINUED—INFLAMMATORY AND

TYPHOUS—Outlines of simple continued fever—its treatment—Inflammatory fever; its organic complications—Resemblance to the continued remittent in the United States—*Synocha*, an inflammatory fever—associated with local inflammation—*Synochus*, its successive stages: from synocha to typhus—TYPHOUS and TYPHOID FEVERS—Their alleged specific differences investigated—Specific characters of typhus—More features of resemblance than of difference between the two.

THE fevers which so far have engaged our attention exhibit a general community of origin and character; and include those which are most prevalent in the United States, and in the nature and treatment of which our practitioners have a deep and paramount interest. They are more or less of a periodical type, and with different degrees of intensity; and those to which the rural inhabitants and of consequence the larger part of the population of this country are chiefly liable. If to the periodical fevers we add the exanthemata, or eruptive fevers, which, though not constant, are of frequent recurrence and of grave import, there remains the continued fever of nosologists for study and comment. Now, it happens that this last, comparatively the least important to us, are those on which most has been said and written. In Great Britain and Ireland, in France and in Germany, works without number have been issued on the subject of continued fevers; but, after all the time and labour, and talent and honest zeal devoted to their elucidation, the parties still find themselves embarrassed with doubts and difficulties. Unfortunately for us on this side of the Atlantic, without our having the same interest in the question or the same materials for its investigation, the discussions are renewed here, and attempts have been made to give a European colouring to the pathology of our fever, and to attach exaggerated importance to features which are of comparatively rare occurrence, and which, however familiar in Dublin, Edinburgh, London, Paris, and Vienna, are not those for recognition here at home.

Even in its generic sense, European writers are far from attaching uniform ideas to continued fever; — some taking one of its types, some another, from which to draw a description. Continued fever in Dublin does not convey the same idea as continued fever in Edinburgh, nor is it in exact harmony with that entertained in London, nor certainly with that attached to the expression in Paris; and I may add, that until a definite idea is affixed to the term and is proved to be the expression of certain well recognised phenomena, we in Philadelphia, New York, or New Orleans, are not required to perplex ourselves with their disputes, still less to call off attention from an independent and separate course of inquiry of our own into the fevers which by their frequency and wide range most interest us.

It is obviously more correct, therefore, to speak of fevers than of fever with the prefix continued, although the latter is generally adopted by English writers. It is not very long since the division by Cullen of continued fever into three genera or types, viz.—synocha, typhus, and synochus, was of almost universal adoption among English physicians, although more frank and independent observers of their number confessed the embarrassment under which they

laboured, in their attempt to make the descriptions of actual disease harmonise with the abstract definition of the school. Of late the language of discontent is more distinct and more generally expressed, and now the nicest question is, how to distinguish the types of continued fever by symptoms in connection with organic lesions; or in other words, to base a division of continued fevers on organology. Small progress has yet been made in this line of march, as we ascertain by the language of writers in different places. Continued fever in Dublin, for example, will mean chiefly *typhus maculata*, or cerebral fever with an exanthematous eruption; in Paris, typhoid fever with intestinal ulceration; and in Vienna, *typhus abdominalis*, or fever with organic changes in the tissues supplied by the ganglionic nervous system. Some of the English writers connect the idea of continued fever with simple nervous fever, some with simple inflammatory fever, according to the variety which is most frequently presented to their notice.

The inference that should, it seems to me, be drawn from these discrepancies and contradictions is, that, while we receive with readiness, as contributions to the history of fevers, every clearly written and faithfully described visitation of febrile disease in any city or urban district of Europe, we should reject them as parts of a body or dogmatical doctrine of fever, and as inapplicable to our guidance here at home, before we have ascertained, by something more than plausible analogies and constructive evidence, their actual resemblance to the fevers which prevail in our own country or in any one part of it. In place of straining our attention to detect, in a case of continued fever, the features of a synocha or a synochus, which even in their native land are continually changing, or of a typhus, which is furnished by a population and in crowded hospitals, happily seldom found among us, or of a typhoid fever or affection, the result of a Parisian acclimation which has seldom its parallel in American cities, it would be more philosophical, or, to use a less ambiguous word, more consonant with the common sense that distinguishes the truly great observers in our profession, to note without prepossession or mental preoccupation all the particulars of the case before us, from its inception to its termination, and until a sufficient number similarly observed were put on record for some general inferences for future instruction might be drawn. Let us see what our own trees bring forth without attempting to ingraft on their stems exotic buds and branches. It is very proper, indeed an indispensable duty for us to imitate European observers in borrowing microscopes to aid our vision and in availing of all the means which advanced science offers for prosecuting pathological investigations; but let us never forget that it is home subjects for observation, not borrowed facts, still less imported doctrines, that we require to relieve us of the difficult problem which we had proposed to ourselves for solution.

I do not make these remarks in a tone of disparagement of honest intention industriously carried out. Every fact has its value: it is a truth, which we are bound to receive with respect, although its valuable application is not at first evident. But I deprecate the looking at one object alone and through one kind of medium, because such is a

prevalent fashion in some European school. Still more, do I deprecate the dogmatism which either directly or by implication asserts that there is no use in looking elsewhere nor through any other medium, and that he who does so, sees useless objects and false lights. In what I have said I do not mean to be critical but rather apologetical; for, the following lectures on continued fever, without some prefatory explanation, must seem to be deficient in that variety and detail, so common and so easy too, when this division of pyrexia is brought up for narrative, description, and commentary. With the understanding, therefore, that the history of continued fever in its usual as well as epidemic forms in the United States remains yet to be written, I proceed to give a slight sketch of its elsewhere recognised forms.

As respects the *etiology* of continued fevers we meet with the same embarrassments as in the case of periodical ones. The common causes are easily ascertained; but the peculiar or specific are less obvious and by some denied to exist. Medical writers, when they give us their theories of causation, are often in contradiction with the principles that ought to govern in questions of this nature; as when they admit the force of epidemic or endemic influences to give rise to a disease, but yet insist on its subsequent extension by means of contagion. A particular atmospherical distemperature corresponding with privation or inadequacy of food has, it is admitted, given origin to cholera in India; but a similar combination in parts remote from its first location in the peninsula, and still more in other and distant lands, is not admitted by a number of observers and writers on this disease, who can only conceive of its being diffused by personal contact or by fomites. So, again, famine and its concomitants of mental anguish have avowedly at different times originated typhous fever; but in a short period and before any change in the external material cause, and, in fact, during the period of prevalence of the endemic, another kind of agency, contagion, is evoked and made to act the chief part. This fever has been met with under the conditions of crowded habitation, deficient ventilation, and filth, as common causes — to which some change of customary atmospheric states or deficiency of food will serve as the peculiar or determining cause.

For a while a distinction was admitted between periodical and continued fevers, not only in their symptoms but in their assumed causes; the first being supposed to originate from poison (miasm), the result of vegetable decay; the second from poisons also, but generated either by animal decomposition of dead matter or eliminated from the living body by a morbid secretion and a perversion of the organic functions generally. Within a relatively recent period, however, Dr. Armstrong and some others have contended that if we regard the localities in which typhous fever has extensively prevailed it will be found to have had a malarious origin, the same which produces periodical fever; the difference in the two, intermittent and typhus, being found in the other common causes, such as of ventilation, better food and exercise for the rural inhabitants who are afflicted with the former disease, and close impure air and stinted food for the urban population who are carried off by the latter. Whatever importance may be attached

to this opinion in Great Britain, and I believe that it does not find much favour there, it comes nearer an explanation of the typhoid form of fever, by which I mean that resembling typhus, that we meet with in the United States, than the commoner one of contagion by specific virus or animal poison. But I shall recur to this topic very soon.

The question has been discussed with great animation and ability, whether fever be idiopathic, primary or essential, and affecting the system at once, or symptomatic and secondary, the result of prior irritation or more commonly phlogosis of a particular organ. For a while, under the influence of Broussais, the latter was the prevalent, or at any rate the popular doctrine. Dr. Stokes, in his lectures on fever generally, has adverted to the general argument as well as to the theory of the eminent French teacher just named, and I shall not enlarge on it at this time. One point, however, is worthy of your holding very distinctly in remembrance, viz., that the greatest functional disturbance in fever is far from being a measure or a result of organic lesion or textural change. Proof of this is found in the symptoms furnished by two important organs — the brain and the stomach. Cephalalgia may be intense and delirium even considerable, and yet no notable lesion detected in the brain; and often gastric distress, nausea and vomiting, are not associated with phlogosis or any noticeable change in the mucous coat of the stomach.

If we give our assent to the doctrine of fevers being idiopathic, this does not imply that, in some and not unfrequent cases, the violence of the symptoms, difficulty of treatment and danger of life are caused by the inflammation of some organ at the same time with the fever, either immediately succeeding the latter or occurring primarily under circumstances calculated to develop it very early. Bronchitis and pneumonia are examples in point.

Even although there may be a general accordance of opinion among pathologists on the correctness of the view taken by Fordyce of the extent to which the whole organism is affected in fever, yet when an attempt is made to specify the mode in which the morbid impression is first made and through what channel it is diffused, we find opposite views maintained. These may be fairly represented by two doctrines; one in which the nervous system is said to be the first recipient, and through it the blood and secretions become suddenly affected; the other in which the blood is alleged to be altered or to undergo some taint by the absorption into it through the lungs of the particular poison or emanation floating in the air. Physiology, which for a time furnished the most plausible facts and analogies in favour of the nervous doctrine, has, of late years, given greater probability to the other or humoral, since the rapidity and other phenomena of absorption are better known. The admission of the blood being the part first lesed in fever does not, however, necessarily imply a belief in the absorption of a specific poison or miasm, for the fluid will soon be affected by modifications in respiration depending on recognised and appreciably deteriorated states of the air, and in absorption depending on a defective and vitiated diet.

After this slight outline of the general etiology of continued fever, you will perhaps be able to deduce the chief types, viz., 1, that in

which, after the application of the common causes already adverted to, there ensues disturbance of the nervous system or a lesion of the blood, which will keep up for a longer or shorter period that disorder of the functions termed fever, and which, when not associated with any dominant organic change, should be called simple continued fever; 2, that type in which the forementioned causes operating and the preliminary morbid phenomena evinced, there follows, as complication, a phlegmasia of some one organ, constituting inflammatory fever, designated after the suffering organ; and hence we may meet with cerebral fever, gastric fever, bronchitic fever, &c.; 3, that type in which, in addition to the common causes, there is a peculiar or specific cause poisoning for a time the blood or the nervous system, it may be both, constituting primary typhous fever, with its numerous complications, including, as a prominent variety, the modern typhoid fever of Louis and others. Secondary typhus belongs to the second type, and on occasions may present itself in the first.

Simple Continued Fever. — This is the ephemera of some writers and approaches nearest to the synocha of Cullen, but without the alleged tendency of this latter to run into a typhoid state. It seldom shows itself in an epidemic form. More commonly it ensues after some irritation of the nervous system acting on a susceptible constitution. Children and sanguineo-nervous persons are liable to its attacks; the former during dentition, or after undue repletion or the ingestion of some unusual article into the stomach; the latter from protracted vigils, unusual exposure to fatigue in a hot sun, &c.

This form of fever is preceded by languor of the functions generally, and is manifested by a frequent pulse, hurried respiration, hot and dry skin, a whitish but not loaded tongue, headache and anorexia; but without any great derangement of the secretions, although the renal discharge is sometimes large, coloured, and deposits a reddish sediment. The patient is rather drowsy, but does not enjoy sound sleep; his mind is in a state of hardly unpleasing excitement; ideas chasing each other with great rapidity. The senses are severally more susceptible to their usual stimuli, and the muscular system is enfeebled. The fever may last from one day to five or seven days, or even two weeks, without undergoing any notable change by exacerbation or remission. Its natural termination is in sweat or some increase of urine with greater deposit.

The *prognosis*, where insolation has not been the cause, or where the fever is not kept up by cardiac irritation, is favourable. The treatment is directed rather against possible injury to an organ than with a prospect of its cutting short the disease; for even when recourse is had to active remedies, such as venesection and free purging, there is not generally a marked suspension or remission of the symptoms. The pulse still preserves its frequency, the respiration is hurried, and the skin, which may for a very short period have been moist, recovers its former dryness.

In selecting our remedies we shall therefore be content with those of a moderately antiphlogistic and reducing nature, and for the most part content ourselves with being careful observers rather than busy meddlers — withholding what is mischievous, when we cannot with any

confidence recommend the positively curative and beneficial. A simple mercurial purge at first and afterwards enemata or an occasional laxative to regulate the bowels; antimonials in small doses so as not to offend the stomach by causing nausea, citrate and the nitrate of potassa, largely diluted, the tepid bath or sponging the surface with cool water, and acidulous drinks, will constitute the outlines of treatment. If the fever last beyond two or three days and the patient is very restless and deprived of sound sleep, Dover's powder, or opium or morphia in a small quantity, with the addition of camphorated mixture and ipecacuanha or of antimonial wine, will answer a good purpose. The effect of narcotics with a view to their soporific operation, is better procured by their administration in divided doses during the day and continued until the common hour of sleep. Light farinaceous food may be allowed after the first three days of this fever.

The most strongly characterised illustration, I will not say example, of simple continued fever, is that which, after a slight rigor or anorexia, with perhaps some vomiting, precedes an eruption of some one of the exanthemata. The skin is usually of a somewhat more acrid heat than in the pure cases of continued fever; but in other respects the symptoms are generally the same. Witnesses to the great relief of all the febrile disturbances by the coming out of even a slight eruption, we should be more inclined to bring common continued fever to a crisis by similar means, and hence the utility of the warm bath or warm pediluvia, stimulating frictions of the lower limbs or on the chest and abdomen, or vesicular eruption induced by croton oil. The vapour bath, by causing free perspiration, has, at times, proved eminently serviceable.

The *second* form of continued fever, or the inflammatory, corresponds more closely with the synochus of English writers, the angiotenic of Pinel, than any other. After rigors of varying duration and violence, the patient complains of headache and pains of the limbs and evinces the other phenomena of the febrile state. The pulse is full and offers some resistance in the more robust and younger class of subjects, they who are the most readily attacked by the disease in its uncomplicated form; but, in a majority of cases, our attention is soon directed to the disturbance of some one function, such as of the brain, or lungs, or stomach, or liver, which calls for a more decided treatment than is necessary in the pure continued form already described; and what increases our embarrassment is the occurrence of the visceral complications in those whose constitutions had previously suffered from antecedent phlegmasiæ, and at the same time had chronic inflammation of some important organ. In the United States, fever occurring under such circumstances and with evident inflammatory origin, is of the remittent type, or the continued remittent described in a former place, although, in its progress and if it run into a second stage, it is apt to assume the appearance of secondary typhus or a typhoid character. There are not unfrequent examples, however, of its being continued, or at any rate of its being marked by exacerbations followed by slight remissions. For all practical purposes the two varieties of fever might be included under one head and treated in a similar manner.

I shall now devote a few words to *Synocha*, as described in one of the latest works emanating from a responsible source in Great Britain. It is Dr. Christison, who speaks in the *Library of Practical Medicine*.

Synocha, he tells us, is both of primary and separate and of epidemical and mixed occurrence; that is, it may appear in solitary or individual cases, or at the same time with other fevers epidemic at the time. It occurred in a considerable proportion of cases of epidemic fever, especially among young adults, both in Edinburgh and in other parts of Great Britain and in Ireland, between the years 1817–20, and likewise, though to a less extent, in the succeeding epidemic of 1826–9. In many instances, however, the disease was not altogether pure. More generally it was attended, in one part or another of its course, with symptoms of local inflammation—most frequently in the chest, occasionally in the peritoneum, more rarely in the larynx, often in the tonsils, seldom in the parotid gland, and very seldom in the head. Such local affections, of which catarrh, pneumonia, and pleurisy, were the most common, did not show themselves till the fever had lasted for a few days; they frequently disappeared some time before the cessation of the febrile symptoms; and they were, for the most part, very easily removed by general or even local depletion. In a few rare cases the local inflammation went on where the fever was checked. Rheumatic attacks were common during convalescence; but they were seldom attended with any febrile disturbance of the circulation. Cases of pure fever were most frequent in young persons of the better ranks, who were not exposed to the ordinary co-operating causes of local inflammation.

Without pretending to describe its counterpart in the United States, I shall again borrow from Dr. Christison's treatment of *Synochus* :— This is probably the most frequent of all types and forms of continued fever. It is essentially characterised by the disease commencing as synocha and terminating as typhus. There are scarcely any cases of primary continued fever which do not present an inflammatory stage of longer or shorter duration and of more or less violence at the commencement; so that, perhaps, all continued fevers not falling under the purely inflammatory type, might be considered as synochus. But in nosological arrangements, as well as in practice, the term is usually and in reference to treatment conveniently, restricted to such primary fevers as begin with a distinctly marked inflammatory stage like synocha, lasting for at least a few days, and not giving way to adynamic or typhoid symptoms till the beginning of the second week at soonest. Such, in Dr. C.'s opinion, was the general nature of the epidemic fever which raged in the United Kingdom from 1817 till eight or ten years ago; and such too seems to have been the *febris bellica* of the Continent, which broke out in the large towns of Germany and other continental countries of Europe in 1814, subsequently to the French war; and of which, indeed, the British epidemic was probably a propagation. Under the same head may be classed most of the fevers described by English authors of the last century, under the name of nervous fever. The most remarkable examples of it which have perhaps been ever seen, occurred in the British epidemics of 1817–20 and 1826–9. For

the inflammatory stage was often so well marked, that it was impossible to tell for some days whether the disease was to terminate as synocha, or pass on to the typhoid stage of synochus; while, on the other hand, the typhoid characters of the advanced stage were often in those very cases so well developed, that no one seeing the disease, for the first time at this period, would have known from the symptoms that it had ever been any thing else than true typhus. In later years the inflammatory stage had become much less prominent; and in the generality of cases, at least in Edinburgh, as well as in other great towns, it has at present almost disappeared, and given place to typhoid symptoms from a very early period of attack.

In describing synochus it see is unnecessary to enter into particulars. The details of the typhoid stage are exactly the same with those which will presently be given under the head of typhus. Those of the inflammatory stage are analogous to what we see in synocha. In synochus, as in synocha, the fever is sometimes simple, but much more frequently complicated, as in the latter, with local inflammation in the early stage. Later in the disease, when typhoid symptoms are formed, local inflammations and local congestions frequently appear, as in typhus, and more frequently than these secondary disorders are observed to show themselves in the early stage. Yet even in the latter stage, secondary affections are sometimes absent, so that we have a pure, uncomplicated, primary synochus from first to last. Cases of this nature were clearly observed during the British epidemics above referred to. The most common secondary affections in this, as in the inflammatory form of continued fever, are, in Britain at all events, inflammatory diseases of the lungs — pleurisy, pneumonia, but especially catarrh, often passing into bronchitis.

The passage of synocha into typhus usually takes place, as already remarked, in the course of the second week. It is indicated by the pulse opening up as it were, becoming fuller, more compressible, though still often equally jarring, and falling at the same time somewhat in frequency. The tongue also acquires a brown, dry streak down the centre; the heat is less pungent, while the skin is equally dry; but in particular, the muscular exhaustion increases greatly; the senses from being irritable become more obtuse than natural, especially the sight and hearing; the integuments, from presenting a bright red flush, acquire a dingy, reddish-brown tint, of the nature of congestive redness; and there is a marked tendency to doze, sometimes intermingled with slight muttering delirium. These changes gradually lead on to the state of true typhus in its characteristic form, which will now be described, after I shall have instituted a comparison between the two.

Typhous and Typhoid Fevers. — Great pains have been taken of late years to establish specific differences between the prevalent continued fever of Paris and other parts of France, and that which is generally met with in Great Britain and Ireland; but by no one has the question been so thoroughly investigated, at least as regards the characteristics of the French disease, as by M. Louis. He contends for their specific separate and distinct nature; in his qualifying the French fever as typhoid and the British as typhus. At the outset, we must,

however, protest against the advocacy of this view in relation to the word typhoid, which can only mean resembling or like unto typhus; and as it has been continually found necessary to designate a stage of other fevers, and of many of the phlegmasiæ, by the term typhoid, on account of their resemblance to typhus, we cannot forego its future use; and hence continual misunderstanding; the Louis school asserting that our typhoid is not the regular typhoid, and we alleging that his typhoid is only one of the many typhoids or modifications of typhus that one meets with.

The question in dispute is briefly put. M. Louis and most of the young French physicians and some of his former pupils in England and the United States, tell us, that the fever, by them termed typhoid, has specific anatomical traits, in alterations of the agminated glands of the ileum, or those of Peyer, and corresponding changes in the mesenteric glands; and they add that typhus has no such traits, and that it is a different disease from the typhoid fever although it may occur simultaneously with this latter. The differences used to be stated in the terms which I have heretofore made use, and which I shall here repeat. The Louis school tells us that typhous fever is an exanthematous disease, is contagious, and does not leave behind it any uniform anatomical lesion or altered structure of organs: typhoid fever, on the other hand, is not contagious, does not uniformly or characteristically exhibit an eruption, but has, as a constant character, an anatomical lesion, which consists in an alteration, by inflammation and ulceration of the glands of Peyer and Brunner, and inflammation of the mesenteric glands. The initial symptoms of the two diseases differ in the earlier and greater stupor and suffusion of the eyes in typhus. Some of the French pathologists have proposed to designate typhoid fever by its anatomical character, and it is by some called *dothinenteric or follicular enteritis.* But, a little inquiry will make us backward in assenting to the accuracy of this division, and of the distinctions on which it rests. Thus, it is known that typhoid fever has commonly an eruption, which is stated expressly by M. Chomel to be one of its peculiarities, and to appear between the seventh and ninth day of the disease. *Petechiæ and sudamina* are clearly understood by M. Andral to be diagnostic symptoms. It is true that the petechiæ of typhoid are chiefly confined to the abdomen and anterior parts of the chest, and they are of a rose colour: those of typhus are somewhat more general, and are of a slightly purple or even darker tint.

As regards the anatomical characters of typhoid fever, we learn from the same excellent and impartial authority, M. Andral, that patients have perished under this fever with all its symptoms well marked; yet still there was no exanthema, certainly no ulcerations nor appreciable alteration in any part of the digestive tube. Can the proposition be inverted, and shall we be told that as there is typhoid fever without dothinenteritis, so there may be dothinenteritis without typhoid fever? This is the fact, since follicular enteritis has been found in other diseases, such as phthisis, scarlatina, remittent and yellow fevers, diarrhœa, and cholera. It were superfluous after this, to say that this variety of enteritis may go through its stages without

giving rise to the phenomena of the fever called typhoid. Indeed M. Louis himself, the strongest advocate for the anatomical lesion of the intestines, as constituting the fixed character of the fever, tells us that headache, which occurs in forty-nine out of fifty cases of fever, is not met with in two out of the same number of enteritis. The rose-lenticular spots, the sudamina, epistaxis, tympanites, so common in typhoid fever, are rare in enteritis. This last disease may occur in infancy; may be repeated several times, and may complicate other diseases; whereas typhoid fever less seldom attacks very young or very old individuals, and does not often appear a second time on the same person.

A few words more on the specific characters of typhus before a fresh comparison between it and typhoid fever is instituted. A belief that typhous fever is contagious and is accompanied by a petechial eruption has been entertained and expressed by most of the writers on the subject, since the beginning of the sixteenth century. The disease has often been designated by the term petechial fever and petechial typhus, although this latter would imply that there are other forms of the fever in which petechiæ are not seen. This was the case in the jail fever of Winchester, described by Dr. C. Smith, to whom reference is made by Wilson (now Philip) in his work on Fevers. The petechial character is more constantly seen in typhous fever when it prevails over a great extent of country, or as it is termed epidemically. A memorable example of this form of disease occurred in Italy in the year 1817, a history of which I transmitted in the latter part of that year to Dr. Wistar, and which was published subsequently in the first volume of Dr. Chapman's *Medical and Physical Journal*. In this paper I stated that some writers, among whom was Palloni (a distinguished physician of Leghorn), with Hildebrand and others, considered the petechial typhus to be a distinct eruptive disease, arising from a contagion *sui generis*, like small-pox or measles. Opposed to this opinion were Professors Franceschi of Lucca, and Valentini of Rome, who view the eruption as by no means an essential feature of the disease; in proof of which it has been remarked, that the eruption is sometimes absent, sometimes papular, &c. Franceschi observed the eruptions only on the inside of the arms and thighs, on the breast and lateral parts of the neck, but never on the face. He says, that petechiæ do not terminate as other exanthematous or acute diseases of the skin, for no desquamation succeeds their appearance, nor do any traces of their presence remain. The eruption is neither critical nor symptomatic; as is shown by the uniform shape of the spots, and by their affording no relief, and causing no detriment when they appear.

There are, it is admitted, no fixed anatomical lesions in typhous fever; although some one organ or other commonly suffers much during the disease, and manifests structural changes after death. I have, already, adverted to the resemblance between the symptoms of *ramollissement* of the brain and those of typhous fever; and I find it stated in a report of cases by Mr. Curling occurring in the *clinique* of M. Louis, that the latter twice mistook this fever for the

former disease. Dr. Armstrong states, in his *Lectures*, that he has invariably found the brain and its membranes affected in more than one hundred cases without a single exception.

If we were to institute a comparison between the two fevers, typhus and typhoid, we should find many more features of resemblance than of difference. Both diseases have commonly an eruption, and both may prevail without any; both are attended by frequent anatomical lesions; the typhoid more generally with one kind; but both may run their course without any such organic change. In both fevers the digestive and the nervous systems are the most deranged; and in both there occur complications of bronchial and pulmonary disease, and a morbid state of the heart. Typhus shows more frequently the brain, and typhoid fever the intestines, to be the suffering organ. Softening of the left ventricle is one of the lesions noticed by M. Louis in persons dead of typhoid fever. Now, much stress is laid by Dr. Stokes on feebleness of this organ in typhus, and he is greatly guided by the symptoms which it furnishes, in his recommendation of the use of wine by patients labouring under this fever. There still remains one point of reputed contrast between the two; and that is the contagiousness of typhus and the alleged absence generally of this property in typhoid fever. But here, again, there is a nearer approximation than might at first appear. Writers are not at all agreed respecting the non-contagiousness of typhoid fever; M. Louis now inclining to a belief in its being contagious, and some of the warmest advocates of the contagiousness of typhus admit its occasionally spontaneous origin. Dr. Stokes, both by the tenor of his lectures and by his observation in a note to his paper on the use of wine in typhus, obviously regards as lesions in typhous fever the ulcerations of the intestines, which have been assumed by some of the French pathologists to be characteristic of typhoid fever.

LECTURE CXXXV.

DR. BELL.

TYPHOID FEVER—Question of its relation to typhous fever, a national one—Dr. Lombard's predictions erroneous—He fails to show two different continued fevers in Great Britain and Ireland—Great varieties of names of typhoid fever—Follicular enteritis—Part of the intestine diseased—Nature and progress of the organic lesions—Fever may exist without these lesions—They may be present without fever—Lesions of other parts not diagnostic; except those of mesenteric glands—Frequent alterations of the spleen.—*Causes*—Disease not restricted to the early period of adult life; prevails in children; is met with in old persons—Strangers in Paris from the country most susceptible—Males more liable than females.—*Symptoms*—Chief ones: eruption, diarrhœa, gurgling, meteorism, and cephalalgia.—*Prognosis*—*Treatment*.—the milder the preferable one—Opium in cases of perforations.

THE question of the relations of typhus to typhoid has almost become a national one between France and Great Britain, perhaps I ought to say between Paris and the great towns in Great Britain and Ireland. The Parisian physicians have described, very minutely and very accu-

rately, the form of continued fever with which they are most familiar, and have called it the *typhoid affection*, or *typhoid fever*, regarding it as a general or constitutional disease; the chief, and, as they allege, characteristic lesion of which is a marked alteration in the agminated glands of Peyer, and the mesenteric glands. Having thus well and faithfully pictured the state of things at home, they looked to the other side of the channel, and intimated, that if their brethren in England would carry their investigations equally far, they would meet with the same internal features, or not to be figurative, the same internal anatomical lesions. Accordingly, Dr. Lombard, a very intelligent and painstaking gentleman, who had become familiar with typhoid fever, and the anatomical lesions in the small intestines, during his hospital and other experience at Geneva, visited Ireland; and he was so struck with the identity between the symptoms of Irish typhus and the French typhoid, that he had no hesitation in assuring his Dublin friends that they would find the intestinal lesions in the former disease as readily as he had been accustomed to see them at home in the latter. But great was his surprise, as you may readily imagine, when he discovered that there was no uniformity between the phenomena of the Irish typhus and the intestinal lesions — disease of the glands of Peyer. Abandoning his first opinion, and with it his numerical method, he all at once discovered that typhus is quite a different disease from typhoid fever, that it is an Irish disease, and that it is identical with the jail and camp typhus of French writers. That this brief summary of Dr. Lombard's anticipations of what he expected to see in British typhus, contrasted with what he did actually see, is critically correct, will appear by reference to the *Dublin Journal of Medical Science*, vol. x., now before me. He says, in his first letter to Dr. Graves, in that journal, "I affirm, without fear of contradiction, that the symptoms which in Paris and Geneva I have almost always seen in fever, are exactly those which I have seen in this country in the different fever hospitals that I have visited both in Dublin and Glasgow.

"The external appearances are most undoubtedly the same; there is the same headache, pain in the loins, prostration of strength, the same pulse, hot, burning skin, the same depressed expression of countenance, the same furred, dry, parched tongue, and in the latter stages of this disease the same tendency to the formation of bed-sores, and to involuntary discharges of stools. The same pulmonary and cerebral complications take place in both fevers, and bronchitis, pneumonia, determination of blood to the head, and arachnitis, or at least engorgement of the meninges, occur in both."

One inference from this clear declaration by a physician, who, as he tells us in another part of his letter, had been engaged six years in close attention to this subject, of the exact identity of the symptoms of fever which he had seen in Paris and Geneva with those which he saw in the different fever hospitals, cannot be evaded. It is, that no lesion which is not met with in all the subjects of fever in both countries can be distinctive; and if it is found only in one country it cannot give rise to diagnostic symptoms which are common to the fevers in both countries. It is true that, after having said wherein consists

"the general similarity," he next points out some of the most obvious differences. The chief of these are the eruptions on the skin, the restriction of typhoid fever to a certain age, or young and middle-aged adults: the extension of typhus to all ages, and the highly contagious nature of this latter, contrasted with the less frequency of this character in typhoid. But as respects the first difference, or eruptions, observers are not by any means agreed; and touching the second, or age, it is now admitted by the Parisian physicians that this fever attacks young children as it has been known to do also old persons. On the score of contagion, it is only the degree that is insisted on by Dr. Lombard, for he says that he "can bring forward undeniable proofs" of "transmission by contagion of the continued fever of France and Geneva."

At Liverpool, Dr. Lombard, as he informs Dr. Graves in a second letter (*Journal, ut supra*), found on dissection that the morbid appearances bear the same character as those described in Dublin: "viz., serous effusion in the brain, meningitis, pneumonia, and occasionally some injection of the mucous coats of the intestines; as for ulcerations of the ileum and cæcum, they are occasionally, but by no means constantly met with; their frequency varies with the different seasons." But all the typhus in Great Britain Dr. Lombard regards as of Irish origin and spread by Irish labourers. He now discovers also, that "the sporadic continued fever found in all parts of Europe is also to be found in the different towns of the British empire," and that "this fever is characterised by the follicular intestinal eruptions and by consequent ulcerations," and forms one-third of the total number of cases in Glasgow, a much less proportion in Dublin; one-fourth in London, but varying in different proportions. Dr. Lombard does not give us the *numerals* which serve as the basis of the proportions which he thus summarily creates of the cases of typhoid fever in Great Britain. But the most complete refutation of the not enviable febrile distinction which Dr. Lombard was thus willing to confer on the poor Irish, is to be found in some remarks by the author of a "Twelvemonth's Campaign with the British Legion" in the civil war in Spain. In describing the fatal effects of the epidemic typhus which attacked that body in January, 1836, he states that "the English and Scotch suffered extremely, while the Irish brigade, composed of the 7th, 9th, and 10th regiments, enjoyed a perfect immunity;" and he adds, "had the whole been composed of Irish, instead of losing nearly 1000 men at Vittoria, we might not have lost 100. In spite of all the hardships, the severity of the weather, the badness of rations, and total want of pay, the Irish lived, throve, and grew fat, as if in the midst of clover: such are the advantages of misery and starvation at home:" and again, "the Irish brigade suffered little or nothing from disease, although it was not better off for provisions or quarters than the rest of the force." (Dr. W. J. Geary's *Report of St. John's Fever and Lock Hospital, Limerick — Dub. Jour.*, vol. xi., p. 383.)

Dr. Cowan, also, in his *Vital Statistics of Glasgow*, fully exonerates the Irish from the grave charge of being the originators and chief causers of fever in Great Britain.

Dr. Lombard speaks of the identity of English typhus with camp or

jail fever; whilst M. Louis regards, as matter of demonstration, the identity of this latter disease with continued or typhoid fever or the *dothinenterie* of Paris. But yet he maintains the differences between typhoid fever and the common English continued fever or typhus. English writers themselves speak familiarly of the sameness of their typhus with jail fever. They admit, also, that the intestinal lesion described by Louis is sometimes seen, but not with uniformity in their typhous or common continued contagious fever.

Dr. Gerhard grounds his opinion of typhus and typhoid fevers being two distinct fevers, on the differences in anatomical lesions, and because "it is very clearly proved that the typhoid fever or dothinenteritis is not contagious." (*Am. Journ. Med. Science*, Feb. 1835.) In reply to this last declaration we need only state, that M. Louis is persuaded that typhoid fever does spread by contagion; an opinion maintained also, as we have seen, by Dr. Lombard, and by MM. Bretonneau, Gendrin, Chomel, and Gautier de Claubry.

In New England attention has been awakened to the subject of the pathology of continued fever in relation to the Parisian creed. Dr. J. Jackson, of Boston, declares that, since the work of M. Louis has been known to him, he has found that the continued fever so well known in that quarter, is, there at least, the same with that which he (M. Louis) has described. In every case, where an examination has been made, the morbid changes have been found to be the same as those described by M. Louis. Among different sources of information going to show a sameness in the disease in neighbouring places, Dr. Jackson specifies a report of two cases in Lowell made by Dr. Bartlett, now of the Maryland University. Dr. Bartlett, in a work on the subject (*Typhoid and Typhus Fever*), has adduced these and statements published by other New England physicians, and by Drs. Gerhard and Stewardson of Philadelphia, which have, he asserts, demonstrated the entire identity of the typhoid fevers of Paris and of the United States. Dr. B. knows of only two kinds of continued fever in the United States, viz., the typhoid and the typhus. I see a reference to the opinions held by the late Dr. Nathan Smith on the subject of continued fever. The views of Dr. Smith must be enforced by constructive commentary if they can be made to bear on typhoid fever, the distinctive traits of which under the present designation have only been attempted to be drawn within these few years past. I remember very well Dr. Smith's explicit declaration of creed on the subject of typhus fever, contained in a note to his edition of Dr. Wilson's (now Wilson Philip) work on Fevers; in which I do not see that Dr. S. indicates any difference between the typhus which he had seen and that described by Dr. Wilson from European writers. In the essay of Dr. Smith on Typhus, first published in 1825, and subsequently, in connexion with other papers, in a volume (*Med. and Surg. Memoirs*, 1831) now before me, no attempt is made to distinguish the fever which he describes from the common English typhus, and yet some of the symptoms in his essay might be designated as those which the differential school would claim for typhoid fever. He very distinctly contends that, during thirty-five years, he has never seen continued fever in New England which is not caused by

specific contagion, such as small-pox, measles, &c., or evidently connected with local inflammation, except typhus. "The latter stage of all severe cases of typhus is attended with diarrhœa, the stools are frequent, copious, liquid, and extremely fetid. The bowels are often tympanitic, the flatus not passing off with the liquid stools." Again, he says:—"I have never lost a patient whose bowels continued constipated through the whole course of the disease, and have never known a fatal case of typhus unattended by diarrhœa." Here are evident symptoms of typhoid or dothinenteritis, some may exclaim; and Dr. Smith has shown that the disease prevailed in former times in New England, as Dr. Jackson and Dr. Bartlett show that it does still. But herein is the dilemma. If we admit the author to know what disease he is describing, can we deny that Dr. Smith meant in the present case the old-fashioned typhus or jail or camp fever; and if so, then must we admit its identity with the typhoid fever, since the symptoms of the latter are identical with those he describes.

Typhoid fever enjoys a wonderful variety of names. *Ileitis,* as examined and explained by Dr. Stokes, is the same disease as the *dothinenteritis* of Bretonneau, the *follicular enteritis* of Andral, the *mucous fever* of Rœderer and Wagler, the *adynamic gastro-enteritis* of Broussais, and the *typhoid fever or affection* of Louis, Chomel, and others. In England and in the United States, it has been commonly regarded as a mere modification of, itself on occasions soon becoming, *typhous fever.* Dr. Stokes does not think that the inflammation and organic change are confined to the mucous follicles or muciparous glands; and I believe that he is right, in supposing that the intermediate mucous surface participates in the lesion. In tracing the analogy of typhus to small-pox he does not attempt to separate under two heads this fever and typhoid.

Follicular enteritis is a term which designates the seat of the inflammation, as regards the several component parts of the intestinal mucous membrane; but it does not specify with equal distinctness the region of which it is mainly the seat. This last is the lower portion of the jejunum, the whole of the ileum, and sometimes the upper portion of the large intestine or colon adjoining. The point at which the follicular alterations begin, is the end of the ileum and at the ileo-cœcal valve. From this the lesions advance upwards and towards the jejunum. The anatomical name given to the follicles or crypts in the digestive mucous membrane is, the glands of Brunner and of Peyer. The first serves to designate the scattered follicles in the stomach and duodenum; the second, the glands of Peyer, are in clusters, and arrayed in rounded and elliptical patches in the lower portion of the free surface of the small intestine opposite the mesentery. In the colon they are found united two and two, and four and four, on both its free and adherent surface. Coincident with alteration of structure of the follicles is that of the corresponding *mesenteric glands.*

The first change in the mucous membrane and follicles noticed, is an exanthema, which is soon followed by an increased opacity of these bodies, seen and readily felt through the distended and almost transparent intestine at various parts along its course: the succeeding stages are, partial, then entire ulceration, and when convales-

cence takes place, cicatrisation. Ulceration is common in the glands of Peyer; more rare in those of Brunner. The number of affected Peyerian patches varies from one to twenty or thirty. Another, and more fatal termination, is by perforation of the mucous membrane, and consequent partial exposure of the peritoneum: resolution may occur, and is of course favourable. There is not any positive relation, in regard to time, of these stages, one to another. Sometimes ulcerations of the follicles have been seen in the bodies of those who have died a few days after the invasion of the disease. In other cases, again, a simple exanthema, only, has been found in persons who had died at a more advanced period. In ninety-two cases closely observed by MM. Louis and Chomel, the ulceration commenced at from the eighth to the twelfth or fifteenth day from the first attack. In some cases, during the second period of the disease, the mucous membrane covering the patches becomes of a dark colour, is separated from the subjacent tissues, and observed to be perforated with a large number of holes, giving it a reticulated appearance; these holes are the orifices of the enlarged follicles. If death occurs at a later period, there is sometimes no trace either of the ulcerated or reticulated patches, but merely ulcers. M. Chomel thinks that, in the present state of our knowledge, the ulcers which are formed in the intestines after an acute disease must be regarded as the result of lesion of the follicles, and not a primary affection of the mucous membrane.

The peculiar interest which at the present time attaches to these anatomical lesions, arises from the fact of their being those which coexist almost uniformly with *typhoid fever*. We are not justified in affirming that this fever never exists without alteration of the mucous follicles of the ileum or the glands of Peyer; for M. Andral has clearly shown, in his *Clinique Médicale*, that patients have perished under fever marked with all the symptoms of typhoid, and yet there was neither exanthema, certainly no ulcerations, nor any appreciable alteration in any part of the digestive tube which would explain the cause of death. On the other hand, there are other diseases, such as cholera, scarlatina, yellow fever and phthisis, in which the intestinal mucous follicles are altered. After all, however, it appears from the observations of MM. Louis and Chomel, and Dr. Gerhard and others, that, in a very large majority of the cases of deaths from typhoid fever, the glands in question were affected. M. Andral makes the proportion as ninety to a hundred. Of the forty-two subjects examined by M. Chomel, he found the follicles more or less diseased in all of them. M. Littré (*Dict de Med.*, Art. *Dothinenterie*) tells us that as small-pox has its characteristic pustules on the skin, and measles and scarlatina the exanthema by which they are recognised, so has dothinenteritis for anatomical character a peculiar affection of the glands of Brunner and Peyer. There is, however, no uniform relation between the violence of even the abdominal lesions, still less of the disease and the extent of the Peyerian lesion.

If we inquire into the alterations of structure of other parts, associated with follicular enteritis, we shall find that there is no con-

stancy in this respect in any one of them, even in the spleen, save of the mesenteric glands. The liver is softened in half of the cases. Sometimes the mucous membrane of the pharynx and œsophagus is ulcerated; and the stomach exhibits various alterations in colour, degrees of injection, ecchymosis and softening; but none of these are peculiar; they are met with in other diseases. Rarely is there any lesion in the duodenum, or the upper four-fifths of the jejunum. Among the lesions occasionally met with in the circulatory apparatus, M. Louis notices softening of the left ventricle of the heart. When this lesion is present it may serve to explain the weakness of the pulse, which we find in some cases of typhoid fever. In the respiratory apparatus, ulcerations of the larynx have been found, and the lungs affected in a majority of the cases, — their tissue being engorged or hepatised in different degrees, and reduced to a hard fleshy mass. The usual change in the lungs in this fever is a livid redness of tissue, which is impermeable to air, and breaks down under the finger. The bronchia are deeply injected. The secretory organs and the cellular and serous systems are rarely affected to any extent, — if, in the former, we except the parotid gland.

As regards the lesions of the nervous system, we should suppose them to be very frequent were we to infer the fact from the frequency of disorder of the senses and of the mental faculties in typhoid fever; but careful observation does not justify such a conclusion. Lesions of the nervous centres are rare, and of small moment in general. The blood loses its fibrin to a greater extent in typhoid fever than in any other disease; but it often acquires at the same time an increase of red globules.

Of the *causes* of follicular enteritis or typhoid fever, we are not prepared to speak with any degree of confidence. In Paris it has been found that the most efficacious cause in the production of the disease is the recency of arrival in the capital from the country. I well remember the uniform question asked by Lerminier at the Charité Hospital, of a patient with this fever, whom he saw for the first time. "How long since you arrived in Paris?" Farther observations, however, have proved that this disease is seen, also, in other town and villages, and, in fact, throughout France. In reference to the predisposition induced by age, it has been found that this disease attacks chiefly those between twenty and thirty years of age; but it is met with also in children (Barthez and Rilliet, *op. cit.*) and in old persons. The greater number of cases in young subjects occur between nine and fourteen years of age. It has been seen as early as two years from birth. Male children are more liable to the disease than females. In some of the epidemic visitations of typhoid fever, children alone were the sufferers (Barthez and Rilliet, *op cit.*); but they all recovered. Whereas, in a neighbouring village, the adults were decimated by an ataxo-adynamic dothinenteritis.

When it prevails epidemically, follicular enteritis may be greatly modified by the extent to which other organs take on associated disease with the ileum. Hence, we have the varieties severally of inflammatory, bilious, mucous, ataxic, slow nervous, and adynamic ty-

phoid fever. The Germans only know the disease as abdominal typhus. It corresponds with the *typhus mitior* of systematic writers, the *febris lens et nervosa* of Huxham, who has left an excellent description of the disease. (*Opera Omnia*, Leipsic.)

Symptoms.—I shall not give, in detail, all the symptoms of this disease, the *duration* of which is commonly from twenty to thirty days. The diagnostic ones are thus summed up by M. Andral (*Cours de Pathologie Interne*). Youth; headache, diarrhœa, stupor, delirium, somnolency, *petechiæ*, *sudamina*, epistaxis, intestinal hemorrhage, cough, eschars, particularly on the parts subjected to pressure in lying, fuliginosities of the mouth, meteorism or tympanites. The entire prostration and loss of strength at the onset of the disease are common, almost diagnostic symptoms, in typhoid fever. The papulæ commonly show themselves not sooner than the eighth nor later than the fifteenth day: they are chiefly confined to the abdomen and anterior part of the chest; and, besides their being more circumscribed in extent than the petechiæ of typhus, they are of a rose colour. In addition, there are also rose-coloured lenticular spots, or papulæ, sensibly projecting from the skin. They are seen in most of the cases. The petechiæ are only seen in some of the varieties of dothinenteritis. The *sudamina* are small vesicles, commonly in the region of the neck, armpits, loins, and groins, and formed by a transparent serum which raises the epidermis: they are only occasionally seen.

In addition to the loss of appetite, nausea, and foul tongue, which indicate at the beginning a disease of the digestive functions, there is commonly diarrhœa, sometimes constipation, and a distended abdomen—meteorism. The duration and intensity of the diarrhœa correspond with that of the disease. Pressure on the belly causes a gurgling or rumbling sound, especially in the right iliac region. The pulse is small, feeble, and easily compressible, sometimes voluminous; the skin, at first of an acrid heat, is, after a time, moistened with a viscous sweat. Allusion has already been made to the frequent disorder of the senses and of the intellect: the countenance has a wild and haggard expression, which subsequently is converted into one of stupidity. Among other symptoms of the disturbance of the nervous system are, delirium, singing in the ears, and diminished hearing, sometimes convulsions, and often *subsultus tendinum*. The time at which the symptoms are aggravated and complicated is usually about the eighth day, when the petechiæ or typhoid spots appear. It is then that there is such a marked expression of stupor in the countenance, red and injected conjunctivæ, and mouth and tongue dry and hard, and covered and lined with a brownish coat (fuliginosity).

As regards *prognosis*, much will depend upon the prevailing epidemic character of the fever. The strong and robust are most apt to perish. The convalescence is generally long and tedious, and relapses are of ready occurrence after any error of regimen or other imprudence.

Amidst the conflicting opinions on the proper *treatment* in this disease, we are left to infer that the safer course, and it is that which I have myself had most reason to be satisfied with, will be to have recourse to venesection in the early period, when the fever is high and

pulse full, and the intestinal exanthema only beginning. If the pain and distress in the abdomen be considerable, leeches to the anus, or over the iliac region followed by cataplasms frequently renewed, and, if the head suffer much, leeches behind the ears will do good. Cold applications to the head and warm pediluvia or sinapisms to the lower extremities should not be omitted. Of the preference to be given to enemata over purging, although not of course to the exclusion of the latter, and of the means of treating the diarrhœa, and the light in which it ought to be regarded, I need not say anything additional to the excellent admonitions on these points given by Dr. Stokes in his lecture on Ileitis. With the subsidence of the inflammation of the mucous follicles after the first period of the disease may come indications for the use of purgatives more freely than at the beginning. Castor oil, and turpentine alternately with small doses of calomel, are remedies entitled to our confidence at this period. After these, or such other analogous means as may have been employed, we shall find the sulphate of quinia a most valuable auxiliary; nor should we be prevented from having recourse to it a second time, because our first trials, made somewhat too early, may not have agreed with the patient. The dose at first ought to be small and gradually increased. I deem it needless to occupy your time with the various trials of exclusive modes of treatment made by French practitioners of late years in typhoid fever, as no decidedly beneficial result has been obtained. We have not sufficient evidence to show that the disease is materially abbreviated by treatment.

When perforations of the mucous coat occur, of which increased tenderness of the abdomen and other symptoms of incipient peritonitis may induce suspicion, a fatal result is to be anticipated. Drs. Stokes and Graves, in these cases, have put into execution a practice originally suggested by the latter, viz., of giving large and repeated doses of opium, so as to preserve the intestines in a complete state of rest, in order to prevent the escape of fecal matter into the peritoneum, and to allow nature to close the opening by adhesive inflammation. These gentlemen have had some cases to justify the utility of the practice, and although it has not often succeeded, yet it has never wholly failed to alleviate this distressing accident.

LECTURE CXXXVI.

DR. BELL.

TYPHOUS FEVER.—Its importance to British practitioners—By them said to be the only continued fever—Attends on war—Its ravages—Sameness of jail and hospital fevers pointed out by Pringle—Synonyms of typhous fever—Typhoid the generic designation by Dr. Copland—Its varieties, including typhus fever, or the typhus gravior, and true exanthematous typhus—*Symptoms*—Suddenness of invasion and great prostration at times—First stage of depression followed by reaction—Successive stages—Analysis of symptoms, displayed by the digestive, respiratory, and nervous systems—State of the Peyerian glands and of the mesenteric glands—Difference in different places—Intestinal perforations—Bronchitis and pneumonia associated with typhus—Great prostration and delirium—derangements of muscular system—Lesions of the brain and spinal column not

numerous—Circulation ; state of the heart, especially the left ventricle—Lungs and intestinal mucous membrane most affected in typhous fever—Difference in extent of lesion of intestinal glands—Exanthematous eruption the most characteristic symptom of typhus—Its appearance ; different from petechiæ—Changes in the blood—*Causes ;* common and specific—Pringle, Cullen, Hildebrand, Copland, and others, believe in common causes and other diseases—Primary and secondary typhus—Contagion the chief cause of typhus—Hypothesis of its diffusion and perennial activity—*Prognosis*—*Treatment.*

Typhous Fever. — The importance which English writers and physicians may very properly be supposed to attach to this form of fever, we can well imagine, when we read the annunciation, "that all simple continued fevers in this country, by whatever name distinguished, as jail fever, hospital fever, low fever, nervous fever, brain, putrid or bilious fever, are mere varieties of the same continued and contagious disease — typhus fever. This summary opinion of Dr. Robert Williams (*Elements of Medicine*), is responded to in the same sense by a large majority of his countrymen. Typhus, if we take into consideration the causes that produce it, and which must have been the same in all ages of the world, is, Hildebrand thinks, as ancient as the first traces of civilization or the formation of society. Be this as it may, there is good reason for believing that many of the contagious diseases which have desolated the human race and which have been described under the name of the plague were nothing else than contagious typhous. Of this nature, certainly, were the camp fevers, which have on so many occasions arrested the march of armies and brought campaigns to a more disastrous close than pitched battles or the most skilful strategy. One of the calamities of war is pestilence, which often does not cease its ravages even after peace between the belligerent parties, nor restrict them to the combatants, but includes in its destructive range the staid citizen and the simple-minded peasant, the benevolent physician and the pious priest. During the whole period of the wars of the French revolution typhus followed in the march of the armies on either side and spread along their route. In the campaigns of 1804 and 1809 typhus did not spare a single village on the route from Strasburgh to Vienna. After the campaign of 1805, a destructive contagious disease ravaged all Gallicia, Moravia, Bohemia, Hungary, and Austria, and penetrated into Germany and Russia. In the Peninsular war it made great havoc in all the general hospitals of the English army. In 1812, at Ciudad Rodrigo, typhus seized on all the ward masters, nurses, orderlies, and, with one exception, upon every one of the medical officers attending the hospital, and many of them died of it. Would that they who prate of glory and the tented field, and whose sensitiveness to national dishonour makes them cry out war, at every little misunderstanding between governments, could see a fever hospital filled with the sick and the dying, and be made for a while to minister to the cravings for relief of these their countrymen thus sacrificed to insane ambition, or, more contemptible still, to the piques and heartburnings of cabinet councils or angry resolves of bucchanalian debaters.

Famine, akin to war, and often following in its train, is, also, a

frequent predisposing cause of typhus. In the year 1740, a year of great distress, typhus broke out in Ireland, and it is calculated that upwards of 80,000 persons died of it. In 1816, a year also of great scarcity, 50,000 persons laboured under it in Dublin alone: it also raged in Dublin in that year and many died of it. In Edinburgh, Glasgow, and other great towns of Great Britain, the mortality from this cause at different times has been excessive.

Contagious fever of a fatal kind was recorded to have appeared in the sixteenth century at Cambridge and at Exeter during the assizes held in those towns, and in 1750 at the sessions of the Old Bailey, London; but each of these and other visitations was supposed to be a fever of a distinct type, which of course must have been exceedingly multifarious. Sir John Pringle was the first to show that the fever which prevailed when the military hospitals were crowded with the sick was the same with that which often broke out in crowded jails. This identity and the character of the fever were enlarged upon in Pringle's "Observations on the Jail or Hospital Fever." We may regard, then, as the same disease, that which has by different writers been designated and described under the various titles of *hospital, camp, and jail fever, typhus castrensis, typhus gravior, contagious typhus, febris nervosa petechialis, typhus contagiosus exanthematicus, pestis bellica, typhus exanthematicus, putrid fever, malignant fever*, the *adynamo-ataxic* fever of Pinel, &c. In a milder type, typhus represents the *febris continua putrida* of Rivierus, the *petechial fever* (*febbre petechiale*) of Rossi, and the *adynamic* of Pinel, &c.

Dr. Copland uses the term typhoid in a general sense, and under this head he includes several varieties, viz.: 1, fever, the mild typhoid fever, Huxham's slow nervous fever, the typhus mitior of Cullen, and the simple adynamic of some French writers; 2, complicated typhoid or nervous fever, including the predominant affections of important organs; 3, typhoid fever with putro-adynamic characters, the adynamic of Pinel, and most of the titles already given as synonymous with typhous fever; 4, typhus, the true typhus, nervous fever with exanthematous eruption, and all the other designations already introduced of typhous fever. Dr. Copland alleges that true or contagious typhus has been confounded with *synochial* and *nervous fevers* on the one hand, and with *putrid* or *malignant fever* on the other. Dr. Williams employs the word typhoid as adjective or quality of typhus, as when he speaks of the typhoid poison among the animal poisons.

The *symptoms* of typhous fever need not occupy us long, as you will find them detailed in any work on the Practice of Medicine. That which I would most direct your attention to at this time is the variableness in the manner of attack as well as the successive and somewhat sudden changes from one stage to another of the disease. I shall, also, speak of the diagnostic value of the chief symptoms. In some cases the typhoid poison seems to act with such concentrated violence as at once to depress the powers of life beyond reaction and recovery. Mr. Bacot, quoted by Dr. Williams, states, that when typhus broke out in the guards, during the war in Spain, "the patients usually came into the hospital complaining of chilliness, languor, and

depression both of strength and spirits; their countenance was wan and melancholy, and the surface of the body unusually cold to the touch; giddiness of the head was a frequent complaint, and deep and constant sighing was an universal symptom. I have seen numbers of men," he adds "brought into the hospital, so attacked, die in twenty-four or thirty-six hours after their admission, without a prominent symptom, insensible to every kind of stimulus, and never having had any increased vascular action or accession of heat from the moment of their attack to the hour of their death." During the prevalence of the epidemic cholera in England, patients attacked with typhus were brought to the London hospitals after only a few hours illness, their bodies cold, and covered with petechiæ, the pulse little excited, the face bloated and almost purple, their conjunctiva red — die in a few hours, or a few days, without any very prominent symptom, except perhaps expectorating a small quantity of blood from their loaded lungs. Similar instances of congestive fever are met with during the winter in our own hospitals, particularly among the aged, the destitute, and the intemperate.

More generally the symptoms just enumerated, but of less violence, are limited in their duration, and constitute the precursory or forming stage of typhus, which is followed by reaction and considerable fever. Frequently, again, the first symptoms resemble closely those of inflammation: the skin is hot and dry, and the pulse full and bounding, but with a thrill under pressure rather than tense; and as a general thing we may admit the suddenness of febrile phenomena and early and violent reaction in decided and exanthematous typhus, in contrast with their slower approach and development in the slow nervous fever or typhus mitior.

Weakness of the limbs, or a sense of numbness in the arms, a tremor of the hands, pain and confusion of the head, the pulse quick and small, and the tongue white, indicate the coming on of typhous fever, the regular inception of which is manifested by increasing lassitude and confusion of mind, depression of spirits, pains in the back, nausea and sometimes vomiting of bilious matters. The pulse, whether evacuations by bleeding and purging have been practised or not, loses its fulness at the third or fourth day, and at this time a train of nervous symptoms set in; such as anxiety, restlessness, delirium, *tinnitus aurium*, and evening exacerbations. The morning brings with it some remission. As the disease advances, the patient has more or less stupor, sighs frequently, answers with impatience when addressed: his eyes are red or muddy, full, and of a sad expression; deafness comes on. In a still more advanced period, the patient lies entirely on his back, quite indifferent to every thing, with his legs at some distance from each other, and the body sliding down continually to the foot of the bed. The eyes, in the imperfect slumbers which the patient procures, are but half closed, and the eyeball is turned upwards. Tympanites and hiccup and involuntary discharges, and also hemorrhages are met with towards the closing scene of life. If the disease be of long continuance, bed sores form on the back and loins.

An analysis of the symptoms of typhous fever presents them to our observation as they are furnished by the digestive, respiratory, and

nervous systems, and exhibits its close resemblance to, if not identity with, typhoid. The disorder of the digestive system is manifested by the appearance of the mouth, tongue, and throat, which are dry and covered with adhesive mucus, and the tongue often becomes of a dark-brown or black colour, its upper surface chapped or inclined to bleed. This organ was at first white or yellowish, and if the patient recovers it again, after having been brown or black, becomes white and subsequently natural. Each of these changes corresponds with so many stages of the disease. Then we have thirst, nausea, and hiccup. There is great variety in the evacuations from the bowels. Generally speaking, they are liquid, of an unhealthy colour and consistence, and have a peculiar and very offensive odour. *Obstinate constipation may be met with*, but this is very rare, and in a great majority of typhous fevers *there is rather a tendency to diarrhœa*, as mentioned by Huxham, Pringle, and recent writers on the disease. Of the frequency of *ulceration* of the *Peyerian glands* in typhous fever, we can form a pretty good idea from the following table in Dr. Tweedie's work already quoted :— Of 54 fatal cases of fever examined, inflammation of the intestinal mucous membrane was found in 24, and of these 16 were ulcerated.

Ulceration of the ileum occurred in	- - - - -		8
„ „	ileum and cæcum - - - - -		2
„ „	cæcum - - - - - - -		1
„ „	ileum, cæcum, and colon - - - -		1
„ „	ileum and colon - - - - -		4
			16

In many of these cases the *mesenteric glands were found more or less enlarged;* some of them were of the size of a walnut, and, on being cut into, contained a small quantity of pus.

It thus appears that, in this fever, ulceration is most common at the termination of the ileum near the ileo-cæcal valve.

The ulcerations varied both in size and depth: in some instances they were not larger than a small seed, the largest was about the size of half a dollar. Difference in locality makes a great difference in the extent of intestinal lesions. Thus, at Edinburgh, the proportion of fatal cases, with lesion of the patches, amounts during a series of years to but a small fraction of the whole; at Anstruher, thirty miles distant, no case is examined without these being discovered. At Glasgow, again, they were affected in 68 cases out of 74, according to a numerical analysis, made by Dr. Anderson, of those received at the Royal Infirmary. *Intestinal perforation* also occurs in typhous fever.

Bronchitis is a common accompaniment of typhus; it gives a greater or less lividity of countenance to the patient. Pneumonia may occur under two forms; its symptoms may be manifest and prominent, or they may be latent and inappreciable. Of these, the latter is the most common.

The nervous system manifests its disorder by *direct and great prostration*, without any perceptible local cause to account for it. We

meet with different *varieties of delirium*, furious excitement of the brain, or low and quiet muttering; then the symptoms connected with the muscular system, as floccitation, *subsultus tendinum*, pains and spasms in various parts of the body, tremors, and paralysis of the sphincters.

Still the lesions of the brain and spinal marrow are not numerous in typhous fever, although Pringle mentions abscess of the brain in some cases.

The circulation in the beginning of the fever is often accelerated, as if there were inflammation, but this soon subsides, and we have a weaker and jerking action of the heart with a feeble irregular pulse, which can be compressed by a slight touch of the finger. The *heart* itself, and particularly the left ventricle, is *weak*, and *in cases softened*.

Dr. Tweedie (*Clinical Illustrations of Fever*) regards affections of the lungs and intestinal mucous membrane as essential constituents of typhous fever. When associated with bronchitis, this fever is perhaps the most hopeless of all fevers. Dr. Stokes says: — "If you refer to the best practical treatises on fever published in this country, you will meet with innumerable instances of the remarkable prevalence of gastro-intestinal disease in typhus; and in France so constantly have inflammation and ulceration of the mucous glands of the ileum and other portions of the intestinal canal been discovered, that Andral, in his last edition of the *Clinique Médicale*, ranges fever under the head of abdominal diseases. It is very probable that, in France, these secondary lesions are more frequently met with than in this country, and this I freely admit; but I can say, that even here they are exceedingly common, and form a most important and prominent feature in the pathology of typhus.

"With respect to the extent of this disease of the intestinal glands, there is considerable variety. In some patients we find it very extensive and forming a large sheet of ulceration; in others it is confined to a few small isolated patches. We may meet with it under its different phases of turgescence, softening, or ulceration; or we may have these three states coexisting in the same individual."

The most characteristic symptom of typhus, that which must aid us greatly in our diagnosis, yet remains to be mentioned at this time. In a former lecture, I found it necessary to advert to it when giving the outline features of typhus, in order to establish the comparison or rather to show the resemblance between it and typhoid fever, as between any two varieties of a species. I mean, of course, the exanthematous eruption, noticed by nearly all those who have described the disease. It is called by Pringle, "a petechial efflorescence, of a brighter or paler red." Huxham describes a maculated eruption of different hues — black, livid, green, or chestnut, and includes among these the small *lenticular maculæ* (*lentiginibus similes*); also white miliary pustules (sudamina ?), and a red, itching exanthema, together with vibices resembling sugillations. Hildebrand is more careful to distinguish in his description the exantheme proper from petechiæ. The former occurs as a red-spotted irruption, the characteristic of "which has all the properties of the purpura rubra," and to which

succeed sudamina and small red pustular elevations. The exantheme proper comes out about the fourth, sometimes not till the seventh day; the petechiæ often not till the eighth day, or even later, — the first accompanies the catarrhal or inflammatory stage; the second show themselves in the next or nervous stage, and often only after the disappearance of the other. Dr. Copland thinks the exanthematous eruption attending true typhus to be as characteristic of it as the eruptions of measles or of scarlatina. Pringle is probably more correct when he says that it is the frequent but not irreparable attendant on the disease. Dr. Pebles, in his account of the fever at Edinburgh, held antecedently the same opinion. When the petechiæ do occur at the same time with the exantheme, either by their earlier appearance or the longer duration of the latter, they are still sufficiently distinct and different to be readily distinguished. The exantheme is never so dark or livid as the former generally are, and the petechiæ are not attended with the elevation of the cuticle and roughness or measly character of the eruption. This eruption is commonly found on the chest, trunk, and limbs, sometimes on the face. Its duration is from three to four days.

Hemorrhage has been mentioned among the symptoms of advanced typhus: it is one of those, also, as we have seen, of its variety typhoid. The blood in both of them has lost its crasis, by a notable diminution of its fibrin. The older writers, although unable to assign the chemical cause for this state of the blood, have well described its characteristic appearance. Huxham, in the chapter *De Putridis, Malignis et Petechialibus Febribus*, speaks of the dissolved, and, as it were, sanious state of the blood; the cruor was livid and of a gelatinous softness, and often deposited in the bottom of the vessel in which it was drawn black or soot-like particles. M. Andral, in his *Hematologie Pathologique* (translated by Drs. John F. Meigs and Alfred Stillé), dwells emphatically on this change in the blood in fevers generally, but in a more especial manner in the adynamic or typhous fevers. "The pyrexia now called typhoid fever presents it in a slight degree from the invasion, and the grave cases of the disease are its marked representative." The clot of blood drawn from the arm in typhus is voluminous, never cupped nor buffed, very much in the proportion to its loss of density: it is of slight consistence, easily broken and rendered diffluent. The red particles may be, however, increased in quantity; but this is not a fixed character. When it is said that the blood in typhus is never buffy, this assertion must be understood of the fever not complicated with inflammation of some viscus. In the latter case this appearance of the fluid is met with, but still the crust is far from being firm and consistent, as in the ordinary phlegmasiæ. M. Andral points out, as worthy of particular notice, the relation of hemorrhages in the pyrexia, as a probably contributing cause of the diffluent state of the blood by the loss of its fibrin; and, also, the coincidence of this diminution and the readiness with which congestions are formed. The peculiar congestion yet almost diffluency of the blood of the spleen may be mentioned in connection with these changes.

Causes. — The causes of typhous fever are common and speci-

fic; the first assigned by some as sufficient at any rate to originate the disease, the second regarded by the majority as alone adequate, and the only cause to give rise to it. Under the last category we have contagion; under the other whatever debilitates the frame, and perverts nutrition, in the shape of depressing passions, bad or deficient food, and close and impure air. I still incline to Pringle's manner of presenting the question, and as I am afraid his work (*Observations on the Diseases of the Army*), is not, as it ought to be, in your possession, I have transcribed for your benefit the following passages:

"This disorder is incident to every place ill-aired and kept dirty, that is, filled with animal steams from foul or diseased bodies. And upon this account, jails and military hospitals are most exposed to this kind of pestilential infection; as the first are in a constant state of filth and impurity, and the latter are so much filled with the poisonous *effluvia* of sores, mortifications, dysenteric and other putrid excrements. I have seen instances of its beginning in a ward, when there was no other cause but one of the men having a mortified limb. Nay, there is reason to apprehend, that when a single person is taken ill of any putrid disease (such as the small-pox, dysentery, or the like) and lies in a small but close apartment, he may fall into this malignant fever. This I have actually known to happen in camp, when any one has been seized with such a disorder, and kept his tent too close. But excepting on a few of those occasions, this fever is not properly one of the camp-diseases, though it be universally accounted such; for being frequently seen in camp-hospitals, it is therefore erroneously supposed to come from the field.

"I have observed some instances of a high degree of contagion attending it; but the common course of the infection is slow, and catching to those chiefly who are constantly confined to the bad air; such as the sick in hospitals and their nurses, and prisoners in jails. But when there is no great quantity of infectious matter, or when a person has not breathed long in such dangerous steams, or when they are not particularly virulent, he will either escape altogether, or fall ill so slowly, as to give time for stopping the fever before it be quite formed. Much will also depend on the constitution: some will have the disorder hanging about them for some days before it confines them to their bed; others will complain for weeks of the same symptoms without any regular fever; and others, after leaving the infectious place, without the fever, will afterwards be seized with it."

Dr. Rush, in his notes to Pringle, corroborates the view taken by the author respecting the origin of this fever. It was that also of Cullen, Munro, and Menderer. The force of the line of argument has been supposed to be broken by certain statements of Dr. Bancroft, viz., of a crowded slave ship, and of the French frigate, the Decade, carrying emigrants to Cayenne, and the horrible catastrophe of the Black Hole of Calcutta, in all of which, although a number of persons were confined in an unchanged atmosphere, loaded with human effluvia, no contagious fever was generated. But all these cases occurred in warm latitudes, in which it is generally admitted that typhus is rarely generated or propagated.

Hildebrand divides typhus into the communicated contagious and the originated; the first attacking a person in full health who has received the poison from another person sick of the fever; the second occurring spontaneously as regards the typhous fever, but always secondary as respects some other disease of which it is only an effect. This last may afterwards, he admits, be communicated to other individuals by a subsequent contagion. As he believes in the development of the contagious miasm of typhus from other diseases, so he believes, also, that it may be daily reproduced by means of certain requisite circumstances. The chief of these are, crowding together a number of even healthy individuals into small and illy ventilated apartments. Hildebrand quotes Will, a German writer, who stated that these same causes have produced the typhus of horned cattle, when, during the excitement of war, during bad weather, and in other circumstances, these animals are crowded together, and confined in narrow stables.

These dangers, however, are more particularly manifested in the small and crowded apartments where the confined already suffer from attacks of fevers, especially from those of an inflammatory character (*A Treatise on the Nature, Cure, and Treatment of Contagious Typhus*, translated by Dr. Gross).

In the accuracy of the assertion of Hildebrand, that every fever, whether intermittent or continued, inflammatory, gastric, exanthematous, nervous or putrid, may degenerate into a typhus state I fully believe. In this way I have, in country practice, not unfrequently met with examples, but almost always single cases of typhoid fever, as we used in olden time call it, before the word was wrested from its true meaning and general acceptation by the French pathologists. It is this variety of typhus or the secondary, and this alone which can have a home interest in the minds of most American practitioners, especially of those spread over the great southern and western regions, who will seldom see original typhus.

Dr. Copland tells us, that the exciting causes of typhoid and synochoid fevers are often the same; and we have seen the meaning which he attaches to typhoid, as the head of all the varieties of that fever which is commonly designated as typhus; and hence any general observations on the former cover the details of the latter. The sporadic cases of this fever (typhoid) often originate, he tells us, in the depressing passions, in changes from the usual habits and modes of life, or in exposure to novel influences, physical and moral; or weak delicate persons of a lax habit of body; or persons imperfectly fed, or reduced by previous disease, or by exhausting discharges, &c. And, again, when speaking of typhoid fever with putro-adynamic characters, he says: Infection, either directly or by fomites, is, however, the chief cause, although cold, humidity, fear of the disease, and the other agents just noticed, generate the fever *de novo*, or predispose the system to infection, or aid its operation after exposure to it. Of typhus proper, Dr. Copland regards the chief cause to be an animal miasm.

Dr. Gerhard, in his carefully prepared paper on "the *Typhus Fever which occurred at Philadelphia in the spring and summer of*

1836 (*Am. Jour. Med. Science*, Feb. 1837), describes the beginning of the disease in this city, as it seems to me all writers must do who are not determinately prepossessed in favour of an exclusive hypothesis. I shall give you Dr. Gerhard's own words on the occasion. "The origin of the disease is as unknown as that of most epidemics; according to the general rule it attacked those who were sunk in poverty and intemperance, and huddled together in confined apartments. It also appeared at different and remote points, some miles distant from the focus of infection, without the possibility of tracing any direct communication between those already attacked. There was, thus, a general cause, which extended its influence throughout the vicinity of Philadelphia. But, besides the epidemic cause, from which the greater number of cases seemed to arise, the fever was evidently propagated in a considerable proportion of patients by direct contagion. Those who entered at an early period of the epidemic, came in groups together, some from the prison, whole families from the same room in the same house. About that time I made a careful inspection of the district, as one of the committee of the Board of Health, and in some instances we found houses completely vacated, the tenants being either dead or at the hospitals. In other cases, the whole, or a large portion of the inhabitants of a room were ill. It was rare to meet with a severe case without seeing others in the same house."

Assign what virulence and diffusiveness we may to contagion, we cannot explain the origin of solitary and sporadic cases of typhous fever by supposing the poison is ever present and only wants a properly prepared subject on which to display its characteristic attributes; and yet this broad proposition is laid down by Dr. Williams (*op. cit.*). He assumes that the typhoid poison is generally diffused through the atmosphere; and advances the extraordinary proposition, that typhus fever in those countries in which it is a native, is equally present in the crowded and populous city, and in the lone and solitary hut; and in proportion to the population is as frequent in the mountain as the plain. The poison, also, he continues, may be affirmed to exist at all periods of the year, for no season is free from its ravages. We might ask Dr. Williams, of what countries is typhus a native, and what are the peculiar circumstances of its genesis — what constitutes its nativity? The poison of typhus is not a primary element; it is a product, and if so, of what? The advocates of contagion, to the exclusion of all other causes, may enlarge the circle of reasoning, but they must come back to a primary material source, and if this ever came from the human organism it may do so again.

As the most usual cause of typhus is a poison emanating from persons already affected with the disease, we are ready to say with Dr. Williams—that it is capable of being diffused through the atmosphere, and, according to its intensity, of producing disease at certain distances — it also infects females — has a predilection for certain victims — be latent a given period — gives rise to a certain series of phenomena, and the course of those phenomena is modified by modes of treatment.

The distance at which a person may be infected by the typhoid

poison given out from another is quite short—being only a few feet. Fomites, such as wearing apparel or dirty linen, or any unclean matters, are alleged to contain more concentrated and more contagious poison than the newly omitted effluvia of the sick, and particularly so, if the latter be kept clean by suitable ablution. Bateman mentions, as a known fact, that successive occcupants of the same dwelling have been attacked with contagious fever long after its first introduction.

The mode of introduction of the typhoid poison into the system is generallybelieved to be through the pulmonary mucous membranes. There are not wanting, however, strong and plausible facts tending to show that the first morbid impression was made on the brain through the olfactory nerves. Some ingenious experiments made by the late Dr. Rousseau of Philadelphia, render it quite probable that many of the deleterious effects attributed to the inhalation of poisonous vapours or gases into the lungs, is really due to the action of these substances on the Schneiderian membrane.

The period of latency of the poison in the system varies from a few hours to a few weeks; or, if we can credit certain statements, to a few months.

The typhoid poison may co-exist with other poisons, as in the combination of typhus and scabies — of typhus and syphilis — and of typhus and erysipelas.

The *prognosis* in typhus is always grave. The records of the London Fever Hospital for a period of twenty-seven years exhibit 7093 admissions, of which there died 1064, or less than 1 in 7; and this, adds Dr. Williams, is the largest number of recoveries usually obtained in this country under any mode of treatment. In the Parisian hospitals the deaths, on an average, have been more than 1 in 3, from the modification of typhus or the typhoid fever that prevails in that capital. It is estimated that children under twelve years of age recover in much larger proportions than adults; that adults from fifteen to forty-five recover in nearly equal proportions; and that from forty-five to old age, the chances of recovery diminish with the advance of years. In the Parisian fever it is said that the younger the subject, provided he be an adult, or nearly so, the stronger his chance of recovery. M. Louis in the course of ten years has only seen one person aged less than twenty die of fever. Females are represented by M. Chomel to have a better chance of life than males, and for persons attacked during the summer, the augury is more favourable than at other seasons. A positive opinion of fatal result may, this writer believes, be uttered, if a severe relapse follow a short remission of the symptoms. Slow invasion of the disease is a bad sign.

It is a circumstance worthy of notice, and which, apart from true benevolence, may serve to enlist more readily the protecting sympathies of the rich for the poor, that, although the latter are attacked in larger numbers and are more liable to the disease, yet they have a better chance of recovery than the former. The same apparent anomaly was mentioned in reference to the epidemic cholera by Dr. Griffin, and noticed by me in one of my lectures on that disease.

Treatment. — In beginning the treatment of typhoid fever we ought to be aware that we have little power in abbreviating the duration of the disease, even if we succeed in mitigating its violence and preventing a fatal termination. Bloodletting, once freely used in typhous fever, came afterwards to be regarded with horror, and then again acquired vogue, to be again regarded with mistrust, or at least diminished confidence. Seldom required in simple typhus, it becomes necessary at times when there is complication with visceral inflammation. In this case we prefer the local detraction of blood by cups or leeches. From the frequency of abdominal inflammation in fever, there is no part of the body which requires the topical abstraction of blood so frequently as the abdomen. The local abstraction of blood was of much use in some cases of diarrhœa, which, though unattended by pain or any dysenteric symptoms, probably depended on inflammation of some portion of the mucous membrane of the bowels. In protracted cases of fever, I think the local is preferable to the general abstraction of blood in inflammatory diarrhœa, unless the state of the pulse and other symptoms denote much general excitement.

Much will depend on the prior state of the patient, his temperament, particular exposure and habits, as to the propriety of using the lancet.

Emetics, often had recourse to, are useful either very early in the disease, before there is gastritis, or late, when the bronchia are choked up with mucus. Purging by calomel and rhubarb or castor oil, and castor oil and oil of turpentine, is of service when there is no intestinal phlogosis or ulceration. If purgatives are withheld, enemata should be had recourse to.

The indications for the employment of curative agents in this simpler form of typhus are furnished by the state of the suffering organs. The heart is unduly accelerated, and hence the frequent pulse; the skin, which is hot and acrid, and the mucous membranes require to be restored to their appropriate secretory and absorbing functions, and the glands to their secretory and depuratory office. On the skin we should act at once by means of cool air, or, if this be wanting, cool or cold water supplied in the fashion of sponging, or by affusion or immersion. Cool or cold bathing has been attended with good effects, if not by arresting the fever in its first stage, yet by greatly mitigating the violence and gravity of the symptoms in its progress. In the somewhat analogous state of the system induced by a poison, such as opium, in which the capillaries are in a state of morbid excitement, and largely evolve animal heat, at the same time that the breathing is laboured and the brain oppressed, a shower-bath rouses the nervous system from its torpor, and restores the respiration to its former state. If we admit that this system is poisoned in typhus, we have an argument from analogy in addition to the positive experience of Currie, Jackson, Giannini, and others, in favour of the cold bath, and particularly in the form of a shower, for the cure of this fever. According to the predominance of excitement in an organ or region, as, at one time, of the head, at another of the epigastric region, will be the special di-

rection of the cold shower, or the application of cold cloths, or even of ice. Dr. Stokes has spoken of cold applications to the head; I have used with marked benefit this remedy to the epigastric region, the heat of which, and indeed over the whole abdomen, is often so excessive in typhous and typhoid fevers. The patient will press with evidence of pleasurable sensation the cold cloths, or ice folded in cloths, on his epigastrium, and ask for a renewal of them.

Nausea and some efforts to vomit, are common symptoms in the inception of typhus. It is well known to us all that the operation of a poison which is not directly and speedily narcotic, is to excite the stomach and bowels to empty their contents, and to pour out their mucous secretions, and soon after to excite all the organs of depuration or excretion, in order, as we should say, that the poison might be eliminated from the system. In such cases we are anxious to discharge the poison from the stomach, and if we can do so speedily, we prevent the train of symptoms which would otherwise follow; and among these are narcotism — stupefaction, and obliteration of sentiment, as well as violent efforts of the secretory organs. In typhus we are not prepared to say that there is a poison in the stomach, although it is very probable that this organ has been poisonously affected. At any rate, by an emetic we invert the process which was going on — we produce secretion and excretion, discharge from the stomach and bowels, in place of allowing the absorption and introduction of depraved matters into the general system. In the more advanced stages of typhus complicated with bronchial inflammation, in which the secretion of mucus is excessive and suffocating, an emetic gives at least temporary relief.

The treatment should now be directed to quicken the action of the depurating organs. With this view, we shall administer calomel in small doses to aid the bowels and liver; turpentine and nitre, and other salts, including the hydriodate of potass, the kidneys; polygala senega and squills, the lungs. For these latter, their appropriate hygienic exciter, pure and fresh air, should be freely admitted into the sick room or hospital ward, night and day. It will contribute powerfully to purify them from the morbid bronchial exudation, and to quicken the capillary circulation with its accompanying processes of oxygenation and decarbonation of the blood. The air ought to be diffused equally and gradually, not blowing in currents and with impulse on the body of the patient. If bronchitis predominate, calomel in small doses, say a grain every two hours, with polygala senega, will not be omitted.

Throughout the whole course of a case of typhous fever, as indeed of most fevers, and many of the phlegmasiæ, we ought carefully to guard against the common error of bespeaking, as it were, and persisting in a uniform plan of treatment and a certain series of remedies. Our not having bled at the beginning of the disease is no good reason for our refusing to do so in its progress, especially when visceral inflammation is lighted up. Cold, unpleasant at first, is often refreshing and sanative, and is commonly allowable when the gastric symptoms predominate; but it must be withheld if the lungs or their membranes are inflamed. The stomach, originally but little

affected, may, in a week's time, suffer under gastritis, and require free leeching. The quinia which we give to-day from a belief that the stage is reached in which it will be useful, may still disagree with the patient; but we must not on that account be backward in giving this medicine two days or even another day hence. If there be any notable change in the symptoms, purgatives, proper in the beginning of typhus, will often, if persisted in, prove injurious irritants, and yet, in a later stage, they may give a salutary turn and seem to produce a crisis in the disease. During a period of ten days, I have, in some cases of typhoid fever, trusted entirely to simple cold or tepid water enemata, which served both to abate the morbid heat of the abdomen, and to procure a discharge once in twenty-four hours from the bowels.

But with whatever industry and judgment we may follow up the practice, the heads of which I have just sketched, typhus will still persist in its course, after a while to take a salutary turn towards recovery and health, or to assume a more and more aggravated and complicated character. Among the aggravations will be depression of the cerebral functions, such as stupor and coma or disturbance manifested by delirium, and increased frequency and weakness of the contractions of the heart; whilst in the complications will be ranked pulmonary congestion and bronchitis.

These local phlegmasiæ are to be met by the remedies commonly used in such cases, but with much greater reserve as respects evacuants. Counter-irritants, by terebinthinate and other stimulating liniments and by sinapisms, will be more freely employed. Blisters to the neck and on the chest are, at times, of service. They are less safe to the extremities, particularly in the last stage of typhus.

There is one important point on which Dr. Stokes has elsewhere enlarged with more fulness and detail, and which, on account of its being so important a feature in the disease, merits attentive consideration. I refer now to the state of the heart in the later stage of typhus, which is in a measure made known to us by the rapid and feeble pulse; but more fully indicated by auscultation, and in fatal cases by dissection. It has been long a familiar fact to those who had occasion to treat typhous fever with stimulants, that the best measure of their beneficial operation was a diminished frequency and greater fulness of the pulse; and that, on the contrary, if the pulse became more frequent and smaller, the use of this class of medicines was to be discontinued, and the augury of the case was at the same time commonly unfavourable. I well remember to have heard of, though I cannot say that I actually witnessed, enormous quantities of diffusible stimulants, such as brandy and wine, being used in the advanced stage even of the remittent fever in Virginia, which in this period is commonly designated as typhus, or typhoid. Except to a physician who has had actual experience on the subject, the toleration of the sanguiferous and nervous systems to such large quantities of wine and ardent spirits and carbonate of ammonia, would be absolutely incredible. Once more, after a period which I would fain not consider very long, for it is included within my own profes-

sional observation, we find the practice of the free use of diffusible stimulants in certain forms and stages of typhus to be renewed, and precisely after the same indication as before, to rouse and strengthen a weakened heart and prostrated nervous system; and persevered in for the same reason, viz., until a change of the pulse to greater slowness and fulness. Now, however, that it is in our power to take more accurate measure of the real state of the heart, by means of the stethoscope, we shall be able to define with more nicety the indication for the use of stimulants as well as for their discontinuance, than when we formed our opinion of the heart entirely from the signs furnished by the pulse. It has been the good fortune of Dr. Stokes to give a complete practical application of the general theory of a weakened circulation, and especially of a weakened heart, in typhous fever. His views and cases in illustration are to be found in the *Dublin Journal of Medical Science*, for March, 1839.

If this softening of the heart be one of the secondary diseases of typhus, we should, Dr. Stokes thinks, observe something like periodicity in its phenomena, as in the case of other lesions. It should appear at a certain time, and decline after its proper period expired. On an analysis of his cases, with a view to these points, the result was that in most instances the signs of diminished impulse and of first sound were developed *at or about the sixth day*, and the heart seemed healthy *at or about the fourteenth day*.

The practical inference from these several facts is, that *in the diminished impulse, and in the feebleness or extinction of the first sound, we have a new, direct, and important indication for the use of wine in typhous fever*. In some cases, continues Dr. Stokes, the existence of these phenomena at an early period of the disease led us to anticipate the bad symptoms, and to commence in good time the use of the great remedy; and in others, notwithstanding the existence of some visceral irritation, the use of stimulants has been adopted with the best success from the same indication.

Important as is the guide thus furnished by the state of the heart for the use of stimulants, it may not be in the power of all without some experience to avail of it. The practitioner will, therefore, do well to attend to the following points, directed by Dr. Armstrong, in forming his opinion of the propriety of persevering in the administration of wine to a patient in typhous fever.

1. If the tongue become more dry and baked, it generally does harm; if it becomes moist, it generally does good.

2. If the pulse becomes quicker, it does harm: if it be rendered slower, it does good.

3. If the skin become hot and parched, it does harm; if it become more comfortably moist, it does good.

4. If the breathing become more hurried, it does harm; if it become more deep and slow, it does good.

5. If the patient become more and more restless, it does harm; if he become more and more tranquil, it does good.

You must be cautious in observing its effects; and till you see which way they tend, you should give it only in teaspoonfuls.

Harmonizing well with wine at this stage of typhous fever is

quinia, in the prescribing and continuing the use of which we must be guided by nearly the same rules with those which regulate us in that of wine.

One advantage, and a great one, which, it seems to me, wine possesses at this time, and it may be added in the advanced stages of many diseases, over more potent stimulants, is in its beneficial action on nutritive life, which is in these cases very low, and the extreme depression of which will alone kill. At a particular epoch in febrile diseases we have more to apprehend from nutritive debility, than from the disorganization of an important organ or functional tissue. Under this impression we ought to watch the very first calls made by the system for mild nutriment, and administer it accordingly in the form of sago, or arrow-root, or panada to which a certain portion of wine is added. Fulfilling the ends both of a medicinal and nutritive stimulus, wine-whey is often an admirable aid at this time. I have frequently, I am sure, preserved life for days by this article, towards the termination of diseases generally fatal; phthisis pulmonalis, for example. If one is not sure of the quality of the wine, or if it is not readily procurable, it will be better to turn the milk by an acid, and then add to the whey thus made a portion of spirits — brandy or rum, &c. Milk-punch, a favourite prescription with some physicians, is objectionable in many cases on account of the milk being oppressive to an enfeebled stomach, and not readily disposed of by absorption and subsequent action on the excretory organs, particularly the skin and kidneys, as whey is.

A cautionary advice should be added by the physician who recommends stimulants of this kind — wine and distilled spirits,— to be given to his patient. It is; not to confound their occasionally curative powers in some extreme cases of disease with their effects when used habitually. Opium, quinia, and arsenic itself, are given in disease, but the fact furnishes no argument for their daily use by a person in health. In the one case as in the other, a medicine thus regularly used in a common state of the animal economy becomes a poison; and it is doubtful whether this principle would be more clearly demonstrated by the habitual use of arsenic than it is by that of brandy, rum or whiskey.

There is one remark which I have to make on the views and deductions of Dr. Stokes. It is, that, although the principle which he inculcates is exceedingly valuable and susceptible both of demonstration and practical application, not only in typhus but in other forms of fever, yet the practitioner, in the country especially, who may have to treat sporadic cases only of typhus, or others of a typhoid character, must not expect to find the heart lesed, and its function enfeebled to such an extent as that pointed out by Dr. Stokes, and which is so common in the typhus occurring in a crowded and destitute population, and especially in that which is met with in the hospitals. The air of a hospital speedily displays its deteriorating and depressing effect on all the functions, and greatly increases the tendency to a softening and loss of tone of the solids and to analogous changes in the blood.

Antimonial Practice in Typhous Fever.—Notwithstanding the

extension of this lecture on typhous fever beyond what I had anticipated, I must, ere I conclude, notice what may be called the antimonial or rather the tartar emetic practice in this disease. Rasori, the founder of the new Italian medical doctrine of counter-stimulus, was in the habit of administering tartar emetic in quantities of four, six, or eight grains during the twenty-four hours, in an epidemic petechial typhus which prevailed in Genoa when it was besieged by the Austrians in 1799. He gave it in water, flavoured with substances most agreeable to the patient, but most commonly with cream of tartar. As he informs us in his treatise (*Storia della Febbre Epidemica di Genova*) sometimes venesection preceded the administration of the tartar emetic. He continued the medicine from the beginning of the disease on to convalescence — not as a novice in a knowledge of the operation of antimony on the system might suppose, by vomiting and nauseating, and perhaps also purging, his patient all this time. Not at all — the effects of the medicine were manifested in a gradual abatement of the febrile disturbances; generally without vomiting or purging, or any evacuation. Rasori records, among others, the case of a young man, of a robust habit of body, seized with the fever, to whom he gave during the first day four grains, and afterwards increased the quantity until sixteen grains of the tartar emetic had been taken in a day, without any evacuation either by the mouth or from the rectum resulting. A purgative enema was then given, which was returned without the addition of any fecal matter; but the patient's condition was soon ameliorated, and a continuation of the medicine in smaller doses restored him to health in a week. Another case was that of a young goldsmith, also of a robust habit, who on the first coming on of the fever was seized with violent delirium, which after a few days was followed by a profound stupor, so as to prevent his taking anything whatever by the mouth. Enemata were, therefore, administered; a single one of which contained half an ounce of nitre and sixteen grains of tartar emetic; but no discharge from the bowels took place until after the fourth clyster, to which an ounce of common salt had been added. The enemata were continued without the salt, and according to custom caused no evacuation; to produce which, when it was desired, it was always necessary to add the salt. Under this treatment the stupor ceased about the eleventh day. From this time the patient made use, daily, of a lemonade in which six grains of tartar emetic had been dissolved, but still without the latter causing any discharge, which, however, was obtained from time to time by the enemata as before. After three weeks the disease took a favourable turn, and the cure was completed with small doses of nitre and tartar emetic.

How far this practice of Rasori may have suggested to Dr. Graves that which I am about to describe, is not a matter of any moment. It is with the result that we have to do more than with the means by which the former was reached. The distinguished Dublin physician, an ornament of a city which can now boast of so many celebrated men in all the departments of medicine, prescribed tartar emetic in *delirium tremens*, from a belief that the preparations of antimony have a distinct narcotic effect, and because he had seen patients in

fever whose watchfulness had been removed by antimony given in the form of tartar emetic or James's powder. "Our predecessors," he observes, "were much in the habit of using antimonial mixtures in the treatment of fever; and they did this because they knew, by experience, that these remedies worked well."

In subsequent clinical lectures, Dr. Graves explicitly describes the symptoms in continued fever, which indicate the propriety of using the tartar emetic. In some cases the patient has reached, we will suppose, the third day of the fever, and has now a flushed face, and headache; his pulse is from 100 to 110, but not remarkably strong. He is, also, found to be sweating profusely from the commencement of his illness, but without any proportionate relief to his symptoms; and he is, moreover, restless and watchful. This patient may have no epigastric tenderness, no cough, no sign of local disease in either the thoracic or abdominal cavities; he has been purged, used diaphoretics, and perhaps mercurials; every attention has been paid to regimen, ventilation, and cleanliness; but still he lies there in a state of undiminished febrile excitement, with persistent headache, quickness of pulse, and sleeplessness. In a case of this nature, Dr. Graves has directed venesection, which was attended with some relief, and without increasing the debility.

Dr. Graves claims the discovery of the utility of the antimonial practice in the advanced stages of spotted fever as peculiarly his own. I could wish that he had not added the assertion, "for there is not, in the writing of any author on the subject, the slightest trace of such a method to be found." The lecturer had at the moment forgotten the practice pursued by Rasori more than thirty years before, a sketch of which I have already given, and which certainly exhibits something more than 'the slightest trace' of Dr. Graves's method — in spotted fever, too. Even the administration of tartar emetic in an enema, as extolled by this gentleman in cases of delirium occurring in the progress of fever, was directed by Rasori under similar circumstances, in the case which I have already detailed. Two or three grains of this salt are recommended by Dr. Graves to be dissolved in four or five ounces of mucilage of starch or isinglass, and to be injected with the end of a long flexible tube, so as to make the contents of the syringe pass high up into the bowel. "In this way you can secure all the good effects of tartarized antimony in overcoming the congestion of the brain, and procuring sleep."

Dr. Robert Williams speaks of the good effects of enemata of poppy syrup, together with the application of mustard poultice and sometimes moderate bleeding, in mitigating the disordered states of the intestinal canal in typhous fever.

In some of the more desperate cases of fever in which cerebral symptoms predominate, as well as in other cases of hydrocephalus, Dr. Graves has directed, with happy effect, tartar emetic ointment to be rubbed over the shaven and subsequently blistered scalp — painful and violent inflammation results, and a removal of the worst symptoms.

The troublesome thirst in fever, which is now so generally and properly counteracted by cool and often cold and iced drinks, is often still more effectually subdued by a slight bitter infusion, to which

a little mineral acid has been added, than by large aqueous potations alone.

In taking a survey of the whole subject of typhous fever, its proteiform features, and the multifarious and often contradictory remedies, not to say plans of treatment, which have been at different times employed for its cure, we may, indeed must, display, a wholesome skepticism of the extraordinary results attributed to the enforcement of the rules of art; the more especially so when we find on record so many instanccs of cures accomplished by nature, and nature sometimes crossed too by popular ignorance and superstition. A passage in a paper just now before me (my account of the *Contagious Fever in Italy in* 1817), will come in appropriately in illustration of this truth. "To prove how much nature is capable of performing, and to what extent we should rely on her exertions, Valentini says, that in a great number of cases of this fever, he has administered nothing but copious drinks either of pure water or of lemonade, or of nitrous emulsion. He cites, as a proof of the efficacy of this plan, the cure of a soldier in the Pontifical service, thirty-three years of age, and of a robust habit, who was seized with the gastro-nervous fever. This man obstinately refused all medicines except an emetic which had been given at the commencement of the disease, yet by his drinking simple lemonade, and abundance of the purest water, after having suffered the attack of mortal symptoms, on the seventeenth day of the disease he fell into a copious sweat and recovered. I was persuaded, continues Valentini, of the inefficacy of medicine in the greater number of cases, and willingly followed the wishes of the patient. He supports his opinion by referring to Hippocrates and others of the ancient as well as modern writers; and concludes by a quotation from Celsus, in which this author says: "*Multi magni morbi curantur abstinentiâ et quiete.*"

LECTURE CXXXVII.

DR. BELL.

ACUTE DISEASES OF THE SKIN—Their division; those of a febrile character chiefly from the exanthemata and the pustulæ—EXANTHEMATA—Their general character—Close relation to diseases of the gastro-pulmonary mucous surfaces—*Erythema*—Its chief features, causes, and treatment—Seven varieties of acute erythema described—Chronic erythema—ERYSIPELAS—Its synonyms—General features—Varieties—Cutaneous, phlegmonous or subcutaneous, and the diffuse cellular inflammation—*Anatomical changes*—Lesion of internal organs—*Prognosis—Causes and Treatment*—Venesection or leeching; vomiting and purging; antimony, colchicum; blisters; lunar caustic; unguents—*Erysipelas Neonatorum*—Its danger and mortality—Collateral relations of erysipelas, the most important—Diffuse inflammations of the serous and mucous membranes—Connection between erysipelas and *puerperal fever* or *puerperal peritonitis*—Reasons for believing in the identity of the two disorders—Sameness of diffuse inflammation of the peritoneum and erysipelas in both sexes—Erysipelas passing from the skin to and through the entire digestive canal—Diffuse inflammation of the mucous surfaces—Epidemic erysipelas in the United States—*Black Tongue*—Chief features of the disease, involving both skin and mucous membranes—Outlines of treatment—Connection of this epidemic with puerperal peritonitis—Great mortality of this last during the epidemic.—ROSEOLA—its varieties—Symptoms and treatment.

ERUPTIVE FEVERS.—The next and last order of fever of which I

shall offer some remarks is the *Eruptive*. The order phlegmasiæ of the class DISEASES OF THE SKIN has been divided into five genera:—the first of these is the *Exanthemata* proper, including, under this head, *erysipelas*, *roseola*, *rubeola* or *morbilli*, *scarlatina*, and *urticaria*. The second genus is the *Vesiculæ*, in which we find *miliaria*, *sudamina*, *varicella*, *eczema*, *herpes*, and *psora*. The third genus is *Bullæ*, the species of which are *pemphigus* and *rupia*. Genus fourth, *Pustulæ*, has in it *ecthyma*, *impetigo*, *acne*, *mentagra*, *tinea*, and *variola* and variolous eruptions. Genus fifth, the *Papulæ*, includes *lichen* and *prurigo*. *Purpura* comes under the head of hemorrhages of the skin, which constitutes the third order of the class. The first order, that preceding the exanthematous diseases, according to Andral, whose arrangement I now give, includes the *Hyperemiæ*, which embraces the three genera of active, passive, and mechanical. Hyperemia is simply increased fulness of capillary tissue, with often greater activity of nutrition. *Erythema*, the chief species of the genus of active hyperemia, is more usually classed with the exanthematous affections, and with it I shall begin the description of these.

The exanthematous or cutaneous inflammations are characterised externally in their acme or highest degree of development by the morbid accumulation of blood in a limited point or entire surface of the integuments. These inflammations terminate in resolution or delitescence, or recession, and in desquamation. Their common and generic anatomical character is the *red tint* on the parts affected; the red colour, however, disappears on pressure, and returns immediately on its removal. The injection of the skin, which is slight in roseola and rubeola, and often very transient in urticaria, is more intense and permanent in erysipelas. The principal seat of exanthematous inflammation is in the vascular network of the skin; but in erysipelas, urticaria, and even in rubeola and scarlatina, it will sometimes extend to the subcutaneous cellular tissue.

When these diseases, continues Rayer (*Theoretical and Practical Treatise on Diseases of the Skin*), terminate in resolution, the epidermis is detached in scales, as in scarlatina and erysipelas, and in almost imperceptible furfura in rubeola and roseola. We must be aware, too, that during convalescence from and at the crisis of several acute diseases, the epidermis is detached from the skin without its having been sensibly inflamed. When death happens in the invasion or during the height of an exanthematous inflammation, if the body be examined a few hours afterwards, scarcely can a few injected capillaries be detected on the surface of the parts that were inflamed—a fact pregnant with instruction when we could draw inferences from the appearances of mucous surfaces, in the dead subject, after their having been inflamed.

The cutaneous exanthemata coincide with inflammations of the same nature of the gastro-pulmonary mucous membrane; and we cannot take a step in the satisfactory investigation of their pathology nor establish any correct treatment unless we continually bear in mind this connection. Most of the exanthemata are ushered in with some disorder of the digestive and respiratory mucous membranes, and the sympathetic and sometimes alternate irritation of

these with the skin give rise to some of the most interesting phenomena of the disease.

Exanthematous inflammations are generally acute and continued in their progress, and do not last more than from two to three weeks. Sometimes they are intermittent, as in certain cases of erysipelas and urticaria.

In the exanthemata, the limits of the dermis and vascular rete are much more easily demonstrated than in the healthy skin; a simple incision through the latter being enough to exhibit these two layers. The red colour produced by effusions of blood into the sub-cutaneous cellular tissue or into the substance of the skin itself, differs from that of the exanthemata in this, that it cannot be made to disappear by pressure. This test alone would show the error of placing petechial affections and purpura hemorrhagica among the exanthemata, as Willan has done.

The exanthemata sometimes complicate other inflammatory affections of the skin, and in particular those of a papular, vesicular and bullous kind. Severe erysipelas, left to itself, is often accompanied by bullæ similar to those of pemphigus. On this account it seems to form an intermediate link between the exanthematous and bullous forms of inflammation. Bateman placed erysipelas among the bullæ, whence it was removed by his editor, Dr. A. Thomson, to the exanthemata.

Erythema is characterised by red spots or blotches on the skin, of variable extent and appearance, and is produced by several causes; some external, as solar heat, hot or cold water, irritating substances, bites of certain insects, the secretion from mucous surfaces; others internal, as modifications of innervation, of which deep suffusion of the cheeks is an example, and derangement of the gastric function. There are persons who invariably have erythema, which is sometimes called hives, on different parts of the cutaneous surface, in consequence of any mental emotion. In children it receives the names of tooth-rash and gum. Its duration varies from some hours and days to weeks. The treatment, which is commonly simple, will be modified by the causes producing the disease and its complications.

Erythema is not infectious and occurs without fever. Acute erythema presents seven principal varieties: 1. Erythema *intertrigo* is produced in new-born children and persons who are somewhat corpulent by the repeated rubbing of two contiguous surfaces, as at the mammæ, in the axillæ, the groins, the upper parts of the thighs, the navel, between the buttocks, and generally in the folds of the skin. Intertrigo may also be occasioned by the contact of the matter of fluor albus and of gonorrhœa, by the dribbling of the urine, or escape of the feces, by the flow of tears, of the mucus of the nose, &c. When intertrigo appears between the toes, in the vulva, the prepuce, the margin of the anus, &c., these parts are always affected, sooner or later, with chaps and excoriations. The intertrigo podices of newborn infants is quite as common as it is sometimes a troublesome disorder. 2. Erythema *papulatum*. This shows itself most frequently in females and young people, commonly on the back of the hands, on the neck, the face, the breast, the arms, and fore-arms. The small red

spots composing it are scarcely larger than a lentil or large split pea. Sometimes it shows itself in individuals labouring under acute rheumatism. 3. Erythema *tuberculatum* differs from the preceding variety in the occurrence, between the papular looking patches, of numbers of small, slightly prominent tumours, which gradually disappear within a week, whilst the patches disappear more slowly, becoming livid and only vanishing after a week more. This, like the preceding variety, is often preceded by lassitude and sleeplessness. 4. The erythema *nodosum* of Willan appears after febrile disturbances of a few days duration, under the form of red oval spots, slightly elevated in the centre, and varying in extent from a few lines to an inch and a half in their greatest diameter. Commonly on the arms and parts of the legs. By passing the hands along these spots, they are felt to form true elevations on the skin. Although threatening suppuration, they disappear after a diminution of size and their assuming a bluish colour, which is eventually replaced by stains of yellow and blue, as if the skin had been bruised. 5. Erythema *marginatum* is characterised by circular patches of a livid red, from half an inch to an inch in diameter, the circumference of which is distinctly separated from the healthy skin, raised, prominent, and slightly papular; their shining surface appears vascular, but there is no actual effusion of serum beneath the cuticle. These spots, which may be preceded or accompanied by febrile symptoms, appear on all parts of the body, on the limbs, the face, the hairy scalp, and even on the conjunctiva.

6. The patches of erythema sometimes form complete circles, the centres of which are healthy (Erythema *circinnatum*). This is distinguished from herpes *circinnatus* in the absence of vesicles, as well as in its progress and duration. 7. Erythema *frigax* is the title given to that variety in which the redness is greatly diffused, always superficial without appreciable swelling of the skin or subcutaneous cellular membrane, and which is spread unequally over the different regions of the body. The skin is dry and the heat of the surface always higher than the proper temperature of the body. The disease may occur in an intermittent form, or appear and disappear under the influence of febrile exacerbations or paroxysms.

Chronic Erythema. This disease often attacks the hands of workmen who habitually handle irritating or caustic substances. The skin is at first dry, then red and scaly, becomes hard, chaps, and is never bent without increasing the cracks which usually cross the palm transversely between the thumb and forefinger. This variety of erythema is sometimes seen in the feet of those who go about with these parts uncovered or not properly and regularly cleaned. The lips also are often thus chapped, especially in the opposite extremes of intense cold or excessive heat, or during the continuance of a very dry and parching state of the air.

In women who are nurses, especially for the first time, the repeated application of the child and its eager sucking often excite exanthematous inflammation of the nipple, which sometimes runs so high as to compel the mother to desist from nursing. Chapping of the vulva is almost always consecutive to lichen agrius, or to eczema rubrum developed in the genital parts.

The *treatment* of erythema, as already mentioned, is quite simple. Cooling regimen and washes, with attention to cleanliness and the use of the warm or tepid bath, will suffice. The cracked nipple of nursing women is much more troublesome than the other varieties, owing to the continuance of the exciting cause. After simple fomentations or poultices, various stimulating and astringent washes are recommended. Of these the fluid chloride of soda or solution of chloride of lime, and borax in watery solution with some alcohol added, are the ones I prefer. We find, among the articles recommended, are Goulard's lotion, solutions of acetate or sulphate of zinc. Better than all these, is a tolerably strong solution of the nitrate of silver, four grains to the ounce of water, with which the chaps are to be washed by means of a brush, or the caustic in substance may be lightly applied to the chaps. Guards to the nipple, either of cow's-teats, gum elastic or of silver, are sometimes indispensably necessary to protect it sufficiently long to allow of the sores healing.

I have found, however, that all topical remedies will be unavailing unless the state of the general system be attended to, and digestion made regular and febrile heat removed by purgatives and cooling remedies.

Erysipelas.—*Ignis sacer, Rosa volatica, Rose, St. Anthony's Fire.* —Some writers reject *erysipelas* from the exanthemata, because it is not contagious, and may, as it does, recur frequently in the same person. Important in itself, its study is useful also by throwing light on the kind of connexion and the sympathetic action, direct and alternate, between the skin and the internal organs. Erysipelas is marked not only by redness, with a streak of blue or of yellow, but also by a shining appearance of the skin, and pain, heat, and tension of the teguments, accompanied, but not universally, with fever. The inflamed skin is sometimes covered with vesicles, and even with bullæ or blebs. The fluid they contain dries and forms hard yellowish crusts. Though it may attack all parts of the skin, it most generally appears on the regions habitually uncovered, and hence erysipelas of the face is the most common. Heat of surface, sleeplessness and gastric disorder attend erysipelas.

The *causes* of the disease are external and internal; and are the same with those which produce erythema, to which should be added the suppression of habitual discharges, and fatigue, also the angry and depressing passions. Certain persons have a great predisposition to erysipelas, so that the slightest irritant—the common heat of the sun or of a fire—will serve as an exciting cause. On occasions it seems to be under epidemic influence; and there are seasons when the smallest operation, or even scratch of the skin, particularly in hospitals, will give rise to the disease. Unlike erythema, which appears in different parts at the same time, erysipelas begins at one spot and gradually increases its surface—as when it spreads, for instance, from the hand up and over the arm as far as the shoulder. It must not be forgotten, however, that there is a variety of the disease called wandering, on account of its rapid change of place. I deem it needless to enumerate all the varieties of erysipelas, the chief of which are — 1. The *cutaneous, simplex vel superficiale.* 2. The *phleg-*

monous, or *cellulo-cutaneous*, or that which includes subcutaneous tissues, and runs into a kind of suppuration if the inflammation is not checked. 3. The *cellular* variety, or diffuse inflammation of the cellular texture of Duncan and Earle. Some make a variety called the *bullous* or *phlyctenoid*, in which the cuticle is raised into vesicles filled with serum; but this is rather an evidence of intense disease, and is most common when the face is the part attacked.

The frequency of œdema in erysipelas has given rise to the admission of a variety called *œdematous*, which is seen habitually in erysipelas of the eyelids and scrotum; but the term is applied more particularly to that state of parts in which the swelling formed by the skin and subcutaneous cellular tissue is developed in a slow and gradual manner, and offers the resistance of œdema and of emphysema instead of the tension of phlegmonous erysipelas. The skin, smooth and glistening, pressed on by the finger, retains the pit for a length of time. The genital parts in the female, the scrotum in the male, the legs and swollen limbs of dropsical subjects are the more common seats of œdematous erysipelas, which frequently occurs after the puncture made on the skin and loaded cellular membrane with a view to draw off the fluid. Gangrene is one of the terminations of this modification of erysipelas; and hence, in dropsical swellings of the lower limbs or in anasarca, the effect of certain diseases of the heart, the great danger of making incisions or punctures in the skin of the extremities, where the risk of gangrene is greatest.

As respects the region most liable to erysipelatous attack, the face ranks foremost. *Erysipelas of the face* begins on the nose, the cheeks, the eyelids, or the lips, and extends with a greater or less rapidity to the half and more commonly even the whole facial surface. Of all the varieties of erysipelas, that of the face is most subject to recede or to disappear suddenly by what is called metastasis. It may be that the inflammation of the face spreads by continuity of small bloodvessels from the face and scalp to the inside of the cranium. This is most commonly either preceded or followed by affections of the brain or its membranes, announced by delirium, profound or lethargic sleep, *subsultus tendinum*, &c. The most usual termination of erysipelas of the face is by resolution. Coryza, ophthalmia, external otitis, and bronchitis, are the most common complications of this variety.

I ought, after specifying the chief varieties of erysipelas, to have described the peculiarities of each. Cutaneous or simple erysipelas exhibits the symptoms heretofore mentioned as belonging to the disease in general: vesications are most common in it. It is more erratic and liable to be succeeded by internal membranous inflammation than the other varieties.

The phlegmonous or sub-cutaneous erysipelas, the *phlegmon diffus* of Dupuytren, is that in which both the integuments and sub-cutaneous cellular membrane are affected. The colour of the skin is of deeper red than in the cutaneous variety; the swelling is much greater and less yielding: the pain is often severe and the constitutional disturbance considerable. It frequently terminates in suppuration, which is more or less diffused, and then there is commonly

sloughing of the cellular tissue. Erysipelas of the scalp has almost always the characters of phlegmonous erysipelas. It is apt to be traumatic or to occur after wounds. Coma is not unfrequent; and although the scalp itself seldom suffers from gangrene, the cellular membrane beneath is often destroyed and escapes in shreds through openings in the occipito-frontal aponeuroses.

The cellular variety or diffused inflammation of the cellular tissue, is that in which the morbid process goes on chiefly in the sub-cutaneous cellular tissue, and sometimes spreads to that beneath the fasciæ; the redness of the skin is not so conspicuous as in either of the preceding varieties; suppuration is often extensive with vesications and gangrene. When the veins or absorbents are affected, sometimes a red streak marks their course. The constitutional symptoms are always serious; often of a typhoid character. This form frequently follows inoculation with poisonous animal or acrid vegetable matter; an injury to a vein, either by ligature or wound; sometimes it supervenes upon fractures, or continued or lacerated wounds; an irritating plaster or liniment may, in some conditions of constitution, be sufficient to excite it; and occasionally it appears without any evident accidental cause. (Nunneley, *On the Nature, Causes, and Treatment of Erysipelas* — Am. Edition.)

The *anatomical changes* produced by erysipelas are only well marked in the cellular and diffuse varieties; for, although it is said that in the most simple form not only the skin in its vascular network but also in its entire thickness is implicated, we for the most part must not expect to find the vascular injections, the red and swollen teguments which are so evident during the life-time of the patient. In the cellulo-cutaneous and diffuse varieties we see sometimes turbid serum distending the cellular tissue, and this latter itself becoming more firm and solid than usual. Pus in a more advanced stage, of a reddish and greenish tint, completely saturates the cellular membrane, which has become of a grayish colour, and when divided the pus escapes from its cells. In worse cases, again, the cellular tissue is found sloughed and dead, the parts all broken down, and large detached portions of the membrane appear like wetted tow or shamoy leather; the cuticle is removed, as though by decomposition, and the skin is detached and gangrenous. Even the fascia does not always form a boundary to the spread of the disorganization, so that the muscles are separated from each other, and their fibres have become soft, discoloured, or black, and easily torn. The intervening spaces are filled with matter. The lymphatics and veins of the erysipelatous parts are often found affected, and not unfrequently contain pus. As in phlebitis, so in erysipelas, the blood is found much altered, being in a fluid state and as if mixed with pus; but on this point we are in want of more precise information.

In nearly all fatal cases of erysipelas a lesion of some internal organ has occurred, and ought to be regarded as the chief or at least the immediate cause of death. Of this nature are alterations of the membranes of the brain, adhesions of the pleura, and effusions into its cavity, congestions of the bronchia, and pneumonia, with scat-

tered formations of pus. Inflammatory congestion of the larynx and trachea and similar appearances of the digestive mucous membrane also occur. The glands both of Brunner and Peyer have been found much developed, vascular, and sometimes ulcerated. Pus is not unfrequently disseminated through the viscera, and principally in the substance of the liver. Dupuytren used to say that the external inflammation in the diffuse or cellular variety of erysipelas was much less commonly the cause of death than an internal inflammation produced by some imprudence. Pleurisies, pneumonia, and abscesses of the liver have been noticed, and these maladies have happened after the exposure of the face, neck, chest, or limbs to the cold.

In forming our *prognosis* in erysipelas, we shall be much influenced by the previous state of health and mode of life of the patient. Those who have suffered from chronic maladies or from intemperance, and they who, from any cause, physical or moral, are depressed and exhausted, are very liable to suffer severely and to encounter a fatal termination of their disease. Epidemic is more dangerous than an occasional or sporadic erysipelas; and that occurring in hospitals and in crowded and illy ventilated apartments in town than a large and well aired room in the country. Cases in which the inflammation extends to the fauces and throat are also of bad augury. A quick, unstable pulse, obstinate vomiting of bilious matter, suppressed secretions, hurried respiration, a dry, glazed tongue, continued diarrhœa and low muttering delirium or coma, are always bad symptoms, inasmuch as they denote that the viscera are more or less affected. On the contrary, a cleaner tongue, abatement of thirst, renewal of alvine secretions of a healthy colour, urine with lateritious sediment and more clear, are good symptoms.

The *treatment* of simple erysipelas consists in the use of diluent drinks, abstinence, and quiet. But when there are complications, and in every erysipelas of any degree of intensity these may be expected, we must adopt a different and a more decided and bold course. If the fever runs high, particularly in erysipelas of the face, there is danger of the brain suffering, and we are called upon to bleed early and freely. Some have objected to bloodletting, because, say they, the erysipelatous eruption goes through its course without abreviation by this remedy; but the important consideration is the suffering internal organ, and its protection from disorganizing inflammation. Fibrin is in excess. If, under an idea of erysipelas being a specific disease, which cannot be treated on the same principles with inflammation generally, the use of the lancet, or at any rate of leeches on the sound skin near the affected parts, be omitted, the patient is very apt to be affected with prolonged and sometimes fatal stupor, which is attributed to metastasis from the skin to the cerebral meninges. In broken down constitutions and inhabitants of close quarters in town, we shall of course use sanguine depletion with reserve. Puncture of the skin, from ten to fifty, is a good means of local bloodletting.

Where doubts exist of the propriety of venesection and of topical depletion, the administration of tartar emetic in lemonade, at any rate as a proper preliminary measure, will be found to be undoubtedly

efficacious. I have had opportunities of confirming the favourable opinions of the utility of this medicine in erysipelas, so decidedly expressed by such respectable authorities as Boyer, Dupuytren, Andral, and others. It may be given in a dose varying from the sixth to the fourth, and even half of a grain, and repeated at intervals of three hours. The circumstance of the first and even second dose acting freely as an emetic will often be beneficial, nor will it interdict or render unnecessary a repetition of the medicine, which, should the excitement remain, will be subsequently tolerated by the stomach without inconvenience. But if it continue to cause vomiting, the dose must be reduced to the point of toleration. Purging by means of calomel and rhubarb and the neutral salts, or compound powder of jalap, is a proper part of the practice in this disease. Auxiliary to the evacuant method in acute cases of young subjects, and substitutes for at least venesection in others, is the use of digitalis and colchicum, particularly the last, but hardly in the doses used by M. Bullock. Two to five grains of the powder with an opiate may be given at bedtime, or twenty to forty drops of the *acetum* or *vinum colchici* in repeated doses.

Blisters on the sound skin, yet close to the border of the erysipelatous part, were for a long time highly extolled as a means of arresting the further progress of the inflammation. Lunar caustic applied at a short distance round the inflamed region has a similar effect. I have used blisters at times and with apparent advantage; at others, I have been disappointed in the benefit anticipated from them; and I am disposed to believe that the effect of their application depends very much on the degree of inflammation or disturbance of the internal organ associated with that of the skin. The same remark applies to unguents, of which the mercurial was the first recommended, and subsequently the simple ones, directly on the diseased surface, under the allegation that mere grease was the active agent. Cloths dipped in fluid chloride of soda, or in a solution of chloride of lime, one pint to the quart of water, are useful when applied to the part. Pencilling the border of the diseased surface with a strong solution of iodine, is attended with excellent effects. Free and somewhat deep incisions into the skin and subjacent cellular tissue is just now a rather popular practice. Stupor in a more advanced stage is to be treated with calomel followed by spirits of turpentine and oil; or, if deglutition be impossible, active enemata of turpentine and oil should be administered. Opium alone or combined with camphor and carbonate of ammonia, is of great service to allay restlessness and procure sleep.

Erysipelas Neonatorum, or the erysipelas of new-born infants, is almost entirely confined to lying-in hospitals, and is most liable to attack children within the month. The most ordinary time for its appearance is a few days after birth: in some few cases the disease is congenital. The most frequent causes are want of cleanliness, and the due ablution and removal of all the secretions from the child; the crowded and unwholesome state of the apartments; and especially the prevalence of puerperal fever, coincident with which it has been often observed. Its contagious character seems to be generally admitted. The progress of the disease is very rapid; Underwood says almost instantaneous.

When the erysipelas first appears upon the pubis, it extends upwards on the abdomen, and downwards upon the thighs and genitals, which then become exceedingly enlarged and anasarcous, vesications form, petechiæ and phlyctenæ appear, and the skin becomes gangrenous. The association of disorder of the digestive passages and of the secretions generally is very obvious. In an aggravated form erysipelas sometimes shows itself in the pudenda of young girls, and attacks the genitals, which speedily become of a red and livid hue; vesications form, and spreading ulceration soon destroys the patient. This is represented to be by no means an uncommon disease in children of either sex, in the crowded population of large manufacturing towns, among the children of the poor, who are often ill-clothed and fed, and still worst attended to, or indeed in children of any rank of life, who are unhealthy and cachectic. (Nunneley, *op. cit.*)

Even still more interesting than in its direct symptoms and progress are collateral and occasional manifestations, as in the connection between erysipelas and other diseases and its appearance with epidemic complications. Diffuse inflammation attacking different orders of membranes are met with, as in the serous and mucous membranes. Diffuse inflammation of the peritoneum is more especially seen after wounds, either of it or in its vicinity, as after the operation for strangulated hernîa or stone. Diffuse inflammation of the mucous membranes more frequently presents itself about the fauces, as in some form of angina and laryngitis, or in the mixed affection of the pharynx and larynx, or diphtheritis.

But of all the modifications or relations of erysipelas, that in connection with *puerperal fever* or *puerperal peritonitis* is the most important. By some an identity in these two diseases has been claimed. Mr. Nunneley arranges the facts and arguments, to prove the affirmative proposition, of which I shall only repeat the heads, viz. — 1. Puerperal fever resembles erysipelas in the nature of the constitutional symptoms shown throughout the course of the disorder, and also, generally in the mode of its onset by rigor, sickness, &c. 2. The local symptoms during life and the appearances after death, are, allowance being made for the different situation and textures of the parts attacked, identical, as a comparison of the *post-mortem* appearances in puerperal fever and erysipelas will prove. 3. The treatment in both forms of disease must be guided by the same indications. 4. Both forms of complaint prevail at the same time epidemically, a fact to which I shall soon recur. 5. Both forms of disease arise under the same circumstances, and prevail most at the same season of the year, and during the same kind of weather — as in the spring and autumn, and in close humid weather, in the crowded or badly ventilated wards of hospitals. 6. Both diseases are characterised by the great disposition there is to the deposit of pus in various parts of the body; these are found in the abdomen, pericardium, and pleura, after puerperal fever. 7. The great danger attending inoculation with the effused fluids, in the examination of the bodies of those who have recently died of puerperal fever, with the almost immediate development of erysipelas in the member inoculated, although not direct evidence,

should go for something in the general argument. 8. The two forms of disease may exist at the same time in the same patient. 9. That puerperal fever and erysipelas may, during life, mutually produce each other in a second person, there appears to be evidence of the most indubitable nature. A surgeon, after dressing erysipelatous sores in a male subject, has been suddenly called to attend a woman in labour, who, soon after delivery, was seized with puerperal fever, and sank under it, as did five others in succession, although the disease was not then known in the neighbourhood, had not been for many years, nor had any other practitioner any cases. One of the midwives of the British Lying-in Hospital, a few days after attending in labour a woman who had died of extensive peritoneal inflammation, was seized afterwards in a severe manner with erysipelas of the face. Additional cases of an analogous origin and character are detailed by Mr. Nunneley.

The connection between diffuse inflammation of the peritoneum and erysipelas is seen in both sexes, and hence we are not justified in regarding puerperal peritonitis as a specific disease. Dr. Underwood declares that, upon examining several bodies of children who had died of erysipelas, the contents of the belly have frequently been glued together, and their surface covered with inflammatory exudations, exactly similar to that found in women who have died of puerperal fever. Similar evidence might be greatly multiplied.

The relations of erysipelas to *diffuse inflammation of the mucous membranes*, include the epidemic form of the disease. I cannot better introduce the subject than by repeating the following strong declaration of Dr. Alison:—"The same form (erysipelatous) of inflammation is often seen at the same time, and in the same persons, to affect the mucous membranes of the nose, mouth, throat, and larynx, or even to spread from the face inwards to these parts, or *vice versâ*." Dr. Abercrombie describes an epidemic of a peculiar character which appeared in the Merchant's Hospital in the spring of 1824. Its leading features were a slight erysipelatous affection of the throat; in some the internal fauces were studded with aphthous crusts; in others they were swollen, and in not a few the gums were spongy, and the lips encompassed with irritable ulcers. While the disease was raging in the Hospital, many cases of a similar nature occurred to the doctor in his private practice. In these, the external fauces were of a dark red, but not swollen, and the redness was interrupted by aphthous crusts. The lining of the nose in general became tender, and discharged a copious morbid secretion, and the inflammation ultimately came out upon the face, assuming the character of common erysipelas. Cases are related in which, after erysipelas of the face, there ensued vomiting and purging, and dull pain of the epigastrium on pressure, with great exhaustion, as if the patients were about to sink under severe gastro-enteritis. About the tenth day from the commencement of the erysipelas upon the face, an erysipelatous blotch was observed to surround the anus, and from this it spread over the nates, and then desquamated. It was spreading on the nates at the time of its desquamation on the face. When the erysipelas had become established on the nates, the symptoms of gastro-

enteritis subsided. The patient recovered. This case certainly appeared to be an instance of erysipelas extending throughout the whole length of the intestinal tube.

Within the last year or two there has appeared in different parts of the United States an epidemic erysipelas, in which diffuse inflammation of the mucous membranes constituted an important and pathognomonic feature. This disease has acquired names deduced from some prominent symptom, or part more strikingly changed, and hence the terms "*black tongue*," "*swelled head*," &c. At one time it showed itself as erysipelas connected with cynanche tonsillaris, or swelling of some of the lymphatic glands; at another, as a typhoid pneumonia sometimes connected with swelling of the axillary glands. Dr. Sutton (*Western Lancet*, 1843), among other cases occurring in the State of Indiana, relates one in which, after high fever and its usual concomitants, and also neuralgic pains of the head and neck, the patient, a man of temperate habits, was seized with inflammation of the throat and on the left side of his neck, with painful swelling of the tonsil, sub-maxillary, parotid, and several of the lymphatic glands. Two days afterwards, the throat, palate, and mucous membrane were of a dark purple colour, and the glands of the neck were very much inflamed, tongue covered with a dark-brown coat, swollen at the back part and protruded with great difficulty; voice hoarse; nostrils very much swollen, and respiration through them impeded.

On the following day a phlegmonous erysipelas was observed in the left side of the face, having made its first appearance on the nose, which, as well as the upper lip, was very much swollen. Tongue dry and brown, swollen, and almost immoveable, the palate and whole inside of the mouth very much inflamed, and of a deep purple colour; throat covered with small vesicles. Next day the erysipelas had spread over the whole face, and on the following, over the sides and top of the head. This person recovered.

This disease was generally believed to be contagious. Dr. Sutton relates, that of eight persons in the family in which the patient, just referred to, resided, seven of them, beginning with his wife, were attacked with erysipelas of the mucous membranes, associated in some of them with that of the face. Pneumonia accompanying the disease is also mentioned by Dr. S. He points out its connection with puerperal fever, or rather the fact of this latter being one of its modes of attack. "It attacks," he tells us, "the mucous membrane of the respiratory passages; the tongue; the glands of the throat; the skin in the form of erysipelas; the lungs and thoracic viscera; the uterus and its appendages, producing puerperal fever; *as this last disease in several places has also accompanied the epidemic.* This disease, in every variety, has had a tendency to assume a typhoid grade of fever, after it had continued a few days."

The treatment of this epidemic at the commencement of the attack was for the most part antiphlogistic: "the patient was generally in an upright position, and blood drawn from a large orifice until a decided impression was made upon the system: a few ounces in the pneumonia was generally sufficient to produce that effect." Dr. Sutton gave to most of his patients an emetic followed by mercurial

cathartics, nauseants, blisters, liniments and sinapisms to the throat, pediluvium, acidulated and pepper gargles, scarification of the tonsils, and, when the throat was ulcerated, the application of a solution of nitrate of silver. "In a large number of cases the bleeding, the emetic, and mercurial cathartic cut short the disease at once."

In the northern parts of New England a similar disease or epidemic erysipelas prevailed in the years 1842–3. It has been described by Drs. Charles Hall and George J. Dexter, in *Am. Jour. Med. Science*, and by Dr. J. A. Allen, in *Boston Med. and Surg. Journ.*, 1844. Its connection with puerperal peritonitis is much dwelt on by Drs. Hall and Dexter. Two cases are given of puerperal peritonitis, but occurring at different times and places, in women who had been attended during their confinement by one of these gentlemen, who had, just before visiting them, been in attendance each time on male patients with erysipelas. In the county of Caledonia, Vermont, thirty cases of puerperal peritonitis occurred, only one of which recovered. "And in Bath, New Hampshire, containing a population of 1500 or 1600, twenty mothers died from puerperal peritonitis, and about forty with erysipelas." Dr. Allen tells us, that "most of the child-bed cases which occurred during the heat of the epidemic were, within three or four days after confinement, attacked with chills, rigors, and febrile heat, and all the other symptoms of severe *puerperal peritonitis*. Of sixteen or seventeen of these cases, all died *save two*." "No connection was observed between the disease and particular states of the weather or conditions of the soil."

The antiphlogistic treatment was not used with freedom, or rather was not thought well of by the New England physicians.

I shall close my remarks on erysipelas in its various forms and relations by directing your attention to an excellent volume on the subject, by Mr. Nunneley, in which I incorporated, for publication in my *Select Medical Library*, the notice of the domestic disease by the gentlemen whose names I have just placed before you.

Roseola is another non-contagious phlegmasia of the skin, which, independently of any intrinsic importance, merits attention on account of its being occasionally confounded with measles. Among its common names, are — *rash*, *rose-rash*, and *spurious rubeola*. Its bright rosy hue, and hence its name, will serve to enable us to distinguish it from erythema. It is more common among women and children than men, and more in summer and autumn than in other seasons. The varieties of this exanthema are — 1. *Roseola æstiva*, which is sometimes preceded by a slight fever, and makes its appearance, first on the arms, face, and neck; and in two days afterwards spreads over the rest of the body, producing a pricking and itching. It is exhibited with the appearance of small distinct spots: large, paler, and more irregular than those of measles, and which are separated by numerous spaces, with the skin of a natural colour. At first red, they soon take a deep rose colour. The pharynx exhibits the same tint, and the patient experiences in swallowing a dryness and roughness of the throat which sometimes imposes on those near a belief of the case being one of scarlatina. On the second day the eruption is

still at its height, after which it becomes duller; but dark red spots remain on the fifth day, until which time the constitutional symptoms also persist. Occasionally the eruption comes and goes frequently after moral emotions, or seasoned food and stimulating drinks; but sometimes without any evident cause. The retrocession of the exanthema is accompanied, usually, with gastric disorder, headache, and a state of languor and lassitude, which promptly disappear on the coming out of the eruption. This variety, as its name implies, appears most frequently in the summer in women of an irritable constitution, and is sometimes connected with the intestinal disorders of the season. It is intermediate between erythema and urticaria. The treatment consists in a restricted diet, acidulated drink, and at times laxatives. Passing over the other varieties of *R. annulata, autumnalis, variolosa, vaccina, miliaris,* and *febrilis,* I shall say a few words on the *roseola infantilis, r. rheumatica,* and *r. cholerica.*

In infantile roseola, which may be taken as the representative of the roseolous group, the spots are more numerous and crowded than in the summer roseola; and when the eruption is general, if our diagnosis were to rest on its appearance alone, the case would be considered one of measles. It attacks children during dentition, or supervenes on intestinal and febrile disorders. Sometimes it only exists for a single night, or it appears and disappears for several days successively, accompanied by a derangement of the principal functions. The rheumatic roseola is occasionally a precursor of, and at times follows, paroxysms of gout and rheumatism. That described by Dr. Schoenlein, under the title of *pelliosis rheumatica,* consists of small, isolated, and rounded spots, of the size of a millet-seed, or a lentil, but rarely prominent, and it is of a deep red or violet and sometimes dark colour. The fever ceases and the rheumatic pains are abated so soon as this eruption shows itself; as on the other hand its sudden retrocession by cold and moisture, or by repelling applications, will cause a renewal and aggravation of the pains. Other writers have described an eruptive epidemic rheumatism with fever. The treatment followed at Wurtzburg consisted in the use of tartar emetic, if there was gastric complication; colchicum wine if the rheumatic pains were violent, and diaphoretics, such as the acetate of ammonia and Dover's powder. The drinks are warm and demulcent: the regimen is simple and antiphlogistic. The *choleric roseola* was observed by M. Rayer on the occasion of the epidemic cholera in Paris, 1832. It was more frequently seen on women than men, and appeared most generally on the hand and arms, and extended to the neck, chest, abdomen, and lower limbs. Sometimes the eruption, when at its height, formed spots in tolerable approximation to each other, making a red tissue, like a slight scarlatina. In other places it resembled measles and urticaria. M. Rayer saw this eruption complicated with inflammation of the pharynx and amygdalæ, and its disappearance followed by an aggravation of the symptoms, and even death. Towards the sixth or seventh day the cuticle cracks and falls off in large scales at the part implicated in the eruption.

LECTURE CXXXVIII.

DR. BELL.

EXANTHEMATA (*Continued*)—Different classifications of eruptive fevers; Cullen's; Rayer's—Community of precursory fever and often of the preliminary maculæ and of visceral complication among measles, scarlet fever, and small-pox—Difficulty of special diagnosis in the beginning of febrile eruptive diseases, even after eruption begins—*Symptoms of the different exanthemata*—Measles; its varieties—Scarlatina; its varieties—Epidemical visitations—Diagnosis between scarlet fever and measles—Small-pox; general view of; its varieties—*Anatomical lesions* in measles; in scarlatina; in small-pox—Complications—*Inoculated Small-pox*—*Prognosis* of variola.

DIFFERENT classifications have been made of eruptive fevers. Cullen includes, in the class of exanthemata, *variola* and *varicella*, with *rubeola* and *scarlatina*, and also *erysipelas*, together with *urticaria*, *miliaria*, *aphtha*, and *pemphigus*. Later writers, and particularly those on diseases of the skin, are inclined to restrict the term exanthemata to those eruptions which are accompanied with fever, and which have their regular periods of efflorescence and decline. It is now appropriated to those appearances usually called *rashes*, namely, as defined by Bateman, to patches of superficial redness of the skin, of various extent and intensity, occasioned by an unusual determination of blood into the cutaneous vessels, sometimes with partial extravasation. This latter part of the description seemed to authorise the introduction both by Willan and Bateman of purpura, but erroneously, for reason already assigned. The general view of the exanthemata taken by Bateman is that adopted by M. Rayer; both of whom place small-pox among the *pustulæ;* but while the latter assigns the same place to chicken-pox, the former ranks it among the *vesiculæ*, with vaccinia or cow-pox. By most of the writers on typhous fever, and by some on typhoid fever, these varieties of continued fever have also been included under the exanthemata.

As yet the difference of anatomical basis between the exanthemata proper and small-pox, does not authorise a separate pathological classification; and in reference to their many points of resemblance, in their mode of inception and preliminary features, we shall gain more by speaking of them for the most part under the common head of *eruptive fevers*. Believing as I do, that these diseases have much in common; and that a careful observation and study of the period of their invasion, and of the organ affected during the stage of eruption, and of their sequelæ or organic lesions and disorders consequent on the first affection, will enable us to undertake their treatment on correct principles, you will find me laying more stress on these points than on this or that popular and plausible plan of cure, or last pretended specific. I feel the more encouraged to undertake this task just now (however imperfect and meagre it almost of necessity must be in its execution), after my having enlarged so fully on congestive fever, the pathology and treatment of which is so analogous to those of the eruptive fevers; especially if these put on the form most calculated to alarm and embarrass the practitioner.

In nearly all the systematic works on internal pathology and

the practice of medicine you will read the diagnosis of each of the three great eruptive fevers. When these are fully established, the task is easy to distinguish small-pox from measles and scarlet fever; and tolerably so the one from the other of the two latter. But I defy the most learned physician in diagnosis, if he is not swayed in his judgment by existing epidemic influences, the prevalence of a particular exanthema, and his knowledge of the febrile diseases of an eruptive kind that his patient has had before, to predict positively, from the symptoms before him, during the period of invasion and anterior to the coming out of any eruption, what disease is in process of development — whether it is a remittent fever or small-pox, — whether influenza or measles, — infantile gastric remittent and verminose fever or scarlatina. Equally difficult is it for him to say, from the precursory symptoms, which of the three eruptive fevers is about to reveal itself. You may be called to a young person who has had a chill, and whom you find suffering from headache; pain in the back and limbs; intolerance of light and sound; increased sensibility of touch and to the impressions of heat or cold; rigors with flushing, and gastric distress. You note, also, a tongue foul and loaded, and red at the borders; heat of the abdomen; urine high coloured; skin dry and harsh, and of unequal temperature, though commonly more elevated than natural at the trunk and head, and below the standard at the extremities; pulse frequent, and respiration hurried. If asked, what is the disease? you would naturally reply a fever. But if the kind were demanded, you would feel yourselves at a loss to name it. Let us suppose that, in addition to these symptoms, you discovered the pulse to be very frequent, or upwards of a hundred beats in a minute; and that there are drowsiness and slight delirium, and a very offensive breath, with clammy mouth, and pungent heat of the skin; you might suspect that you had a case of incipient nervous fever. If, at the same time, you find redness of the fauces and tonsils and painful deglutition, you will incline to the belief that the disease may be scarlet fever, — but it may, also, be small-pox or varioloid. I have seen nearly all these symptoms, except the delirium, precede an eruption of *roseola*.

But you will be told that convulsions accompany the precursory fever of small-pox; so they do, occasionally, that of the other eruptive fevers, — so they do, also, verminose fever and meningitis. Stress is laid by some on a severe pain or weakness of the back, so that the patient is all at once unable to support himself on his feet; but certain influenzas have been marked by precisely this symptom. If your patient has been vaccinated, you will be inclined to narrow the diagnostics by excluding small-pox, and then determine which of the two remaining fevers, scarlatina or measles, is coming on. Should there be, however, measles and small-pox epidemic at the same time, your patient may be in the first stage of an attack of varioloid. Contrary to opinion formed *à priori*, I have seen, and on this point I speak, for reasons soon to be given, from large experience, varioloid ushered in by a more violent initiatory fever, including delirium, than it ever fell to my lot in a case of small-pox. I refer now to a fact, and, without by any means

affirming that it coincides with the experience of others or that it is a general one: I believe, indeed, that it is not. Even for the first hours after the eruption has appeared, supposing the case to be one of an eruptive fever, you will still feel somewhat at a loss in discovering the variety to which it belongs. The skin of the face is deeply suffused, or erythematic, and with patches here and there of a darker shade, indicating eruption: over the axillary and inguinal regions, on the sides of the chest and abdomen, there may be also patches of a red or crimson colour, encircled with minute spots, and sometimes crops of maculæ of a less decided hue. Now, it will be no easy matter to tell what precise form and kind of eruption is to rise from this groundwork. All of this latter is not the basis of eruption. Sometimes the maculæ which came out in a case of varioloid fever disappeared in a great measure: in small-pox they commonly represented papulæ of a red and scarlet colour, which took their place, and constituted the first stage of variolous eruption. But the small, red, and somewhat elevated spots, at the cutaneous follicles, in the early period of measles, are not easily distinguished from these papulæ. Frequently in the Small-pox Hospital we had patients sent to us from the Alms-house Infirmary with a primary eruption which was supposed to be that of small-pox, but which, in fact, was rubeolous. The lapse of some hours between their entrance and our visit diminished, of course, the difficulty of the diagnosis, and gave us an opportunity, of which, however, I believe we did not take advantage, to express our surprise that the true disease had not been known to the medical inspectors of the other establishment.

In pointing out the difficulty of diagnosis in the initiatory fever of the eruptive diseases, I do not, you may be sure, mean either to mystify you, or to discourage you from a careful and vigilant study of diagnosis in general, nor even in the circumstances before us. My aim is to show you the general community of organs whose functions are disturbed in all these fevers, as I hope soon to be able to prove that this character of resemblance is maintained in the course of the disease, and is still farther illustrated by the *post-mortem* appearances. Greater errors have been committed than that by the Arabian writers, of regarding the contagious eruptive fevers as varieties of one and the same disease. But whilst, with the modesty of true science, you will frankly acknowledge to an anxious mother, or even to an impatient crone, that no one can say, from the symptoms during the first two or three days of fever antecedently to an eruption, what will be the precise variety of this latter, you must also have made yourself acquainted with the symptoms which are at all entitled to help you towards a minute diagnosis. These I shall now state with all possible brevity.

Symptoms of the Different Exanthemata.— The period of *incubation*, as it is termed, or that which elapses between the reception of the contagion and the beginning of the disease, is said to differ with the kind of fever. In measles, this period is represented to be from six to ten, and even fourteen days, and after inoculation Home says six. The period of incubation of small-pox also varies from ten to twenty, and is fixed by some at eleven or twelve days; whilst in

scarlatina it is but three to four days. The eruption in small-pox takes place at from one to three days after the chill of the precursory fever, — generally it is on the third day, or after forty-eight hours; in scarlatina the eruption shows itself on the second; and in measles, on the fourth day. Sometimes, the period of incubation is one of ailment; the exposed person complaining of lassitude, want of appetite, disturbed sleep, &c.: but in most cases, there is hardly any deviation from the standard of health noticed before the beginning of the paroxysm of the initiatory fever or of the prodromes.

Measles is commonly indicated by symptoms of coryza and catarrh, in addition to those of a common febrile character: sometimes the former are the only precursors, and we are left to suppose the coming on of a rubeolous fever by its epidemic prevalence, the age of the patient, and his not having had the disease. Under these circumstances, if the eyes be suffused and watery, the *tarsi* red, the eyes and nostrils discharging copiously a watery fluid; and there are frequent sneezing, and a hard, dry cough, we may suspect that the patient is in the stage of precursory fever or measles. Hoarseness and weeping eyes I have, however, frequently seen to be premonitory symptoms of small-pox. Nor is the circumstance of difficult deglutition and soreness of throat diagnostic of the latter, since these symptoms are sometimes met with in measles, but less frequently than in small-pox and scarlatina.

The eruption in measles appears usually on the fourth day from the inception of the prodromes or precursory fever, and after a continuance of four days generally declines with the fever. It follows the symptoms of coryza and catarrh, with dry cough, and is associated with red and weeping eyes, and slight soreness of the throat. The rash first appears on the forehead and chin, and then over the rest of the face; on the following or fifth morning it is visible on the neck and breast, spreading towards evening over the trunk of the body, and lastly over the extremities. The efflorescence is most vivid on the face at this time; but on the following or sixth day it begins to fade and subside while the patches on the body are highly red. The patches on the back of the hand, which usually appear last, do not always decline till the eighth.

The form of the rash aids not a little in the diagnosis of measles. It first shows itself in distinct red and nearly circular spots, somewhat less than the ordinary areolæ of flea-bites. As these increase in number they coalesce, forming small patches of an irregular figure, but approaching nearest to that of semicircles or crescents. These patches are intermixed with the single circular dots, and with interstices of the natural colour of the skin: on the face they are slightly raised, so as to give the sensation of inequality of surface to the finger passed over the cuticle. The whole face is swelled at the height of the eruption; and occasionally the tumefaction of the eyelids is so great as to close the eyes for a day or two, as in small-pox, but on the other parts of the body they are not sensibly elevated.

The catarrhal symptoms and fever are somewhat augmented in the appearance of the eruption; but the latter ceases when the eruption declines. At this period a diarrhœa commonly supervenes if it had

not occurred earlier, and afford some relief to the symptoms. This is the period of danger by inflammation of the lungs and even still more serious complications, such as hydrothorax or tuberculous phthisis, which measles quickens into activity.

I shall not enlarge on the common febrile symptoms in measles. The disease has been divided into — 1, *rubeola vulgaris*, common measles; 2, *r. sine catarrho;* 3, *r. nigra;* 4, *febris morbillosa;* 5, *rubeola anomala;* and *r. maligna.* The second, in addition to its peculiarity from the absence of catarrh, ophthalmia and fever, leaves the system still liable to receive the common or febrile measles. An interval of many months or even of two years has been observed between this variety and the subsequent febrile rubeola; but the latter more frequently takes place about three or four days after the non-febrile eruption. In the *febris morbillosa*, on the other hand, we have the fever and other functional disturbance, but there is little, and some allege, at times, no eruption. The *rubeola nigra*, or black measles, a term applied by Willan, is seldom seen, and when it does occur ought to designate a stage rather than a variety of the disease. It occurs at the eighth day, and shows itself by the rash becoming suddenly livid, with a mixture of yellow. M. Rayer mentions an appearance which must have arrested the notice of most practitioners, viz., that in common measles, if the surface of the body be examined with due care, a certain number of patches will almost always be discovered of a deeper red colour than the rest, not disappearing entirely on the pressure of the finger, and subsequently becoming of a yellowish colour and vanishing more slowly than the others during convalescence.

Scarlatina — *Rossalia — Morbilli confluentes — Scarlet Fever.* — This disease is a contagious exantheme, characterised by a close and diffuse efflorescence, of a high scarlet colour, which appears on the surface of the body, or within the mouth and fauces, and often on both surfaces, usually on the second day of the fever, and terminates in about five days or the end of the first week. The colour of the eruption is sometimes compared to that of a strawberry red. Scarlet fever, like the small-pox, measles, and chicken-pox, is propagated by a specific contagion, and like them, as a general rule, it affects individuals but once during life. It is only within a century that the diagnosis between scarlet fever and measles was first clearly made out by Dr. Withering (1779).

Tender age gives the greatest susceptibility to the disease, to which adults, however much, as in the case of physicians, they may be exposed to its contagion, seem but little liable. To this remark we must except some of those epidemic anginas which are in reality scarlatina, but in which, although the skin is irritated, itches, and after a time desquamates, there is no eruption.

Scarlatina is usually divided into four varieties; viz., scarlatina *simplex*, scarlatina *anginosa*, scarlatina *maligna*, and scarlatina *sine exanthemate.* The eruption itself, as seen during life, is of three kinds, designated by Frank as scarlatina *levigata sive plana*, scarla-

tina *milliformis sive papulosa;* and scarlatina *pustulosa sive phlyctænosa sive vesicularis.*

The S. *levigata,* or smooth eruption, is a diffuse inflammation of the skin, in which its surface presents no inequality either to the sight or touch. The S. *papulosa,* or papular eruption, is that in which the inflammation is accompanied by an enlargement of the cutaneous papillæ, especially of those of the abdomen and of the fingers, giving the sensation of roughness, as if these parts were covered with granules, or millet seeds, or in more popular phrase, were "goose skinned." The third form of scarlatina is, when the inflammation is accompanied by a number of small vesicles, variously distributed, and whose number is limited. They may appear with the eruption, or any time during its course, and are filled with serum, which being absorbed, the vesicle shrivels up and desquamates; but in a few cases, especially about the face, it terminates in the formation of a crust.—(Williams—*Morbid Poisons.*)

1. *Scarlatina Simplex, sive benigna et regularis.*—The first appearance of the eruption is that of innumerable small, bright red puncta, or maculæ separated by interstices of healthy skin, which are soon encroached on by the diffusion of the eruption and general redness. This efflorescence almost entirely covers the face, neck, and upper extremities, but not the trunk; for on the back it runs into large patches, greatly varying in size and figure, and sometimes like a reticulated distribution of vessels artificially injected. The colour in the first instance is that of a bright red, like that of a boiled lobster, but as it declines it becomes deeper, and more resembles that of beet-root; and in severe cases it is livid, and intermingled with petechiæ. But at all times it disappears under pressure, and returns after this pressure is withdrawn. The colour is always brighter and more vivid on the flexures of the joints, and about the hips and loins than over the rest of the body.

The efflorescence spreads over the surface of the mouth and fauces, and even into the nostrils, and is occasionally visible over the tunica albuginea of the eye; it gives a prominence also to the papillæ of the tongue, whose scarlet points are visible through the white fur which covers it. The face is often considerably swelled.

The eruption does not appear simultaneously on all parts of the body, but partially in a succession of crops; on the first day on the face, neck, and upper extremities; on the following day on the trunk; and lastly, on the third day, it has extended itself over the lower extremities. The duration of each crop is three days, when it disappears, and in the order of that of attack.

Before the eruption appears and on its first breaking out, the pulse is full and frequent; the surface of the tongue is covered with a whitish fur, and its edges are red; the pharynx presents a dotted erythematous appearance; the tonsils are little swollen, sometimes the eyes are injected, sparkling and humid; the sleep is disturbed and broken by dreams, and even slight delirium may manifest itself. There is usually a remission of the symptoms on the second or third day of the eruption; when sometimes the tongue throws off its coating and its surface appears of the brightest red, with rather promi

nent papulæ of the same hue. At this period, scarlet fever, of a favourable kind, often exhibits a remarkable phenomena. After a febrile paroxysm, the skin is perceived to be covered with red spots, less numerous and of smaller size than that of the first eruption. This renewal (*reversio*) of the disease does not continue long, but is terminated by a more or less copious perspiration.

2. *Scarlatina Anginosa — Cynanchica* of Cullen. The preliminary symptoms are more violent in this variety of scarlet fever than in the simple or benign. The patient complains often of stiffness of the muscles of the neck and lower jaw-bone, just as the disease is about appearing. On the second day of the febrile attack the fauces are inflamed, the voice is hoarse, and deglutition is painful and difficult. The lining membrane of the mouth, fauces and pharynx is of a florid redness, like that of the external tegument, and the tonsils, soft palate and uvula are greatly swelled. To this appearance succeeds, after a day or two, an exudation of lymph adherent to the tonsils and palate, at first in shreds and patches of a pultaceous or caseous appearance, and afterwards forming a continuous coat. They have been called aphthous crusts, and were at one time erroneously supposed to be eschars and ulcers; but they can be detached, leaving the subjacent mucous tissue entire.

The symptoms of fever are usually very severe on the second, third, and fourth days from the inception of the disease; the breathing is hurried and oppressed, the heat of the skin greater than in any other fever, rising from 106°, 108°, or even 112° of Fahrenheit; there is sickness of stomach, with headache, constipation or diarrhœa, cough without expectoration, sneezing, coryza, guttural voice, and frequent hemorrhage from the nose. The pulse is very frequent, but feeble; there is great restlessness, delirium, and extreme languor approaching to faintness.

The rash does not always appear on the second day, as in scarlatina simplex, but not unfrequently on the third; nor does it extend with any uniformity over the whole surface, but comes out in scattered patches, which seldom fail to appear about the elbows. Sometimes it vanishes the day after its appearance, and reappears partially at uncertain times, but without any corresponding changes in the general disorder. The whole duration of the complaint is thus lengthened, and the desquamation is less regular.

A frequent sequence of scarlatina anginosa is tumefaction of the cellular tissue, especially in the face and joints of the fingers, the movements of which are impeded in consequence; but a still more serious attendant disorder is anasarca, or sometimes partial dropsy, by effusions into the arachnoid or pleural cavity, or into the tissue of the lungs. The period of the supervention of dropsy is usually between the fifteenth and twenty-third day of the disease; it commences almost uniformly in the face, and afterwards appears in the hands and feet,

3. *Scarlatina Maligna* occurs with symptoms of a still more formidable description. Ushered in with nearly the same train of symptoms as the anginose variety, this manifests in a day or two those of peculiar severity. I shall give the clear and accurate description by

Bateman, in his own words: — "The efflorescence is unusually faint, excepting in a few irregular patches, and the whole of it soon assumes a dark or livid red colour. It appears late and is very uncertain in its duration; in some instances it suddenly disappears a few hours after it is seen; and comes out again, at the end of a week, continuing two or three days. The skin is of a steady and intense heat; the pulse is small, feeble and irregular; the functions of the sensorium are much disordered; sometimes there is early delirium, and sometimes coma, alternating with fretfulness and violence. The eyes are dull and suffused with redness, the cheeks exhibit a dark-red flush, and the mouth is incrusted with a black or brown fur. The ulcers in the throat are covered with dark sloughs, and surrounded by a livid base; and a large quantity of viscid phlegm clogs up the fauces, impeding the respiration, and occasioning a rattling noise, as well as increasing the difficulty and pain of deglutition. An acrid discharge also distils from the nostrils, producing soreness, chops, and even blisters. These symptoms are often accompanied by severe diarrhœa, and by petechiæ and vibices on the skin, with hemorrhagy from the mouth, throat, bowels, or other parts, which, of course, but too often lead to a fatal termination. This generally takes place in the second or third week; but, in a few instances, the patients have suddenly sunk as early as the second, third, or fourth day, probably from the occurrence of gangrene in the fauces, œsophagus, or other portions of the alimentary canal; and sometimes, at a later period of the disease, when the symptoms had been previously moderate, the malignant changes have suddenly commenced, and proved rapidly fatal. Even those who escape through these dangers have often to struggle against many distressing symptoms, for a considerable length of time, such as ulcerations spreading from the throat to the contiguous parts, suppuration of the glands, tedious cough and dyspnœa, excoriations about the nates, with hectic fever."

The extension of the anginose inflammation to the sub-maxillary, parotid and cervical glands, is by no means uncommon in the severe forms of scarlatina. The enlargement of these parts is sometimes apparent early in the disease; in other cases not until the fifth day; and in some not until after the diappearance of the eruption. The termination is frequently by resolution; but it is, also, in large and extensive abscesses. In one case I have seen the parotid gland almost entirely denuded; although the patient ultimately recovered.

4. *Scarlatina sine exanthemate.* We read occasionally of epidemic anginas, obviously belonging to scarlatina, in cases of which the eruption is wanting. Huxham, in his lucid *Treatise de Angina Maligna*, which was undoubtedly malignant scarlatina, relates that sometimes adults would be attacked with violent affection of the tonsils and throat, in which no eruption was perceptible; but which was followed by itching and desquamation of the skin. Other writers of subsequent date have recorded similar attacks of epidemic anginose scarlatina, in which the eruption was less frequent than the disease of the throat.

The diagnosis between scarlet fever and measles has been drawn out in detail by M. Rayer. Before borrowing from this description,

I may mention that, for a long time, the two diseases were confounded together; scarlet fever being regarded as an aggravated form of measles until the time of Withering, and even of Willan. The eruption is of a deep scarlet colour, and hence the name given to the fever; it appears on the second day of the fever, and is distributed at once nearly over the whole body in large confluent patches of undeterminate figure. That of measles comes out on the fourth day of the fever, in spots or rash, in a series of crescents or imperfect circles, intersecting one another on the upper part of the trunk, and gradually extending to other parts: it is of a raspberry hue, and perceptible to the touch. The constitutional symptoms in measles are for the most part those of coryza and catarrh, with weeping eyes: in scarlatina the eyes are shining and inflamed; the patient complains of sore throat. In scarlatina the eruption is not followed by an abatement of the fever, such as under similar circumstances occurs in measles. Desquamation in the first is by extensive laminæ; in the second by branny scales. The secondary effects of measles are chiefly diseases of the pulmonary organs, — bronchitis, pneumonia, and sometimes phthisis. Scarlet fever leaves behind it often anasarca, inflammation of the serous membranes, and pustular formations in the joints; and, as noticed by Dr. Graves, enlargement of the liver. Of the lesions of the organs of sense in the two diseases, ophthalmia is most common after measles, and otitis after scarlatina. According to Heim, the sense of smell will furnish us with still farther differences; scarlatina giving rise to an odour similar to that which we are sensible of in shops in which old cheese and herring are kept, or to that exhaled at some distance from a lodge of lions or other beasts of prey. This odour is perceptible from the beginning of the disease, and even before the appearance of the exanthema. Measles has also its peculiar odour, which is mild for the first week, and afterwards becomes somewhat more pungent; it resembles that of goose-feathers plucked freshly from a living animal, or one which has been recently killed. After all, however, I must again remark on the difficulty of diagnosis deduced from the sequelæ of measles and scarlatina, or of these again contrasted with small-pox, and which last is also followed by ophthalmia, affections of the air-passages and lungs, as well of irritability, if not positive disease, of the glandular system. Scarlatina may resemble measles in its being followed by laryngitis and bronchitis, as both eruptions are by enteritis, and particularly of the larger intestines, manifested by dysentery and diarrhœa.

Complications.—But whilst we must expect to be embarrassed in our diagnosis, as deduced from the phenomena of the simple forms of the exanthemata in their first stage, still we may expect to meet with certain complications more frequently and of a more severe character in one than in another of these diseases. Thus, for example, while pharyngo-laryngitis, the result of an extension of the eruption and associated irritation to the mucous membrane, may be expected in both measles and scarlet fever, we shall find laryngitis and also broncho-pneumonia of more usual occurrence in measles; whereas, pharyngitis of different degrees of intensity and also tonsillitis are the common complications

of scarlatina. The voice in measles is rough and hoarse, being changed by the irritation of the laryngo-tracheal mucous surface; in scarlet fever it is muffled and nasal by the swelling of the tonsils and pharynx. Small-pox I have noticed to affect both parts of the larynx and the pharynx simultaneously, the eruption extending to their mucous surfaces.

Ophthalmia is common in measles and in small-pox, less so in scarlatina. Otitis is more frequent in measles, but otorrhœa is most apt to follow scarlatina. Intestinal irritation with diarrhœa is much more common in the former than in the latter disease. Cerebral disorders is a more frequent associate of scarlatina than of any other of the eruptive fevers, although they are occasionally met with in all diseases of the kidneys. Dropsy is among the most common sequelæ of scarlatina. Coryza, although not near so common in this disease as in measles, yet when it does occur it is of bad augury.

Variola — Small-pox. — Under the head of *variolæ*, or *variolous eruptions*, as of a family, are sometimes ranged *variola*, *varioloid*, and *varicella*, or chicken-pox. It is justly remarked by M. Rayer (*op. cit.*), that these eruptions have in truth a greater number of points of resemblance and of natural connection than many other diseases, the identity of whose origin has never been disputed — than syphilitic affections, for instance. This indefatigable observer and learned writer arranges the variolous eruptions under two series: the one comprising the *pure and legitimate variolæ*, which gives the type to the genus; the other including the *varicellæ*, which appear to be modifications of the former. The second series may be subdivided into five principal forms, most usually met with mingled together; there are, 1, the pustular umbilicated varicella, or varioloid; 2, the pustular conoidal varicella; 3, the pustular globose varicella; 4, the papular varicella; and, 5, the vesicular varicella, or chicken-pox. The affinity of these affections or their origin from the same source is, M. Rayer thinks, demonstrated by facts, which he adduces in his great work, but which I cannot here repeat. I regret this the less, as I believe I can say, with some degree of certainty, that it will be brought out by one of the most enterprising and tasteful of the publishing houses in this city, together with the numerous and beautifully executed plates that give so much additional value to the text.

Variola, or *small-pox* proper, is an acute contagious inflammatory disease, which begins to show itself on the external surface of the body in the course of the third or fourth day from the invasion, by an acuminated eruption, which arrives at its height between the seventh and eighth day, having, in the meantime, become pustular and umbilicated, or depressed in the centre; the pustules after this still continue in a state of suppuration during a secondary fever of several days duration; they then dry up and become covered with scabs, which, finally falling off towards the end of the third and occasionally of the fourth week, leave small, irregular, and generally permanent cicatrices on the skin.

There are two very distinct varieties of small-pox: the one known under the name of the natural small-pox, the other is the *inoculated* small-pox. The former, or natural small-pox, has been somewhat

artificially divided into four periods: viz., incubation, invasion, eruption, and desiccation. In one instance the pustules are exceedingly numerous, agglomerated as it were, and united by their corresponding edges (*confluent small-pox*); in another the pustules are fewer in number, and are distinct or scattered singly over the whole surface of the body (*distinct, discreet* or *benign small-pox*). The period of incubation, or that between the reception of the poison into the system and its first manifestation by febrile and other general disturbance, is from ten to twenty days, and is very rarely characterised by any morbid symptoms, save perhaps occasionally lassitude.

So far M. Rayer's synopsis. I proceed to give a brief summary of my own experience in small-pox, which has been ample.

As regard the appearances of the eruption in the early stage, fitted to furnish materials for special diagnosis, we can say that the papulæ of small-pox are firmer than those of measles; and have a granular hard feeling under the finger. But we are not left long in doubt as to the character of the eruption, if the case be one of *small-pox;* as then the *papulæ* become more and more defined and elevated, and are, after a day or two, converted into *vesicles*, with small elevated centres or bodies of a yellowish-white, and more diffused red and somewhat hard basis or margins. The first erythematic blush which preceded the eruption had yielded with the distinct formation of the papulæ: but now, as the vesicular eruption becomes copious, the redness of the margin extending, especially on the face, neck, and hands, the skin becomes a red ground, from which project in relief the whitish vesicles. These latter become gradually larger, fuller, and more yellow, and are filled with a thick, tenacious matter. This last change is into *pustules* or the stage of maturation, which on the face begins at the fifth day, and on the rest of the body on the eighth or ninth day: the early depression in the centre of the pustule is thought to be one of its diagnostic characters. The changes from papula to pustule are not gone through in the same period in all parts of the body. I frequently saw, in the same patient and at the same time, the eruption to be papular on the legs, vesicular on the trunk and arms, and pustular on the face. Even one part, the arm, exhibited the three stages at the same time. About the eighth or ninth day, desiccation begins with a yellow dry point on the summit of the pustule, although the suppurative stage may be said to last to the twelfth day without any material change. At the date of beginning desiccation, the body exhales that peculiar and unpleasant odour so readily recognisable after it has been once perceived. But the eruption in small-pox is not confined to the skin; it extends to the mouth, pharynx, and larynx; and I have seen it, in *post-mortem* examinations, as low down as the larger bronchia. Ptyalism is a common symptom in the pustular stage.

The febrile symptoms which abate during the process of maturation are apt to return during desiccation, and when the skin begins to desquamate; and they then constitute what is called secondary fever. The skin, which had suffered so much, occasionally exhibits at this time an erysipelatous blush, accompa-

nied by an inflammation of the subjacent cellular tissue; and the formation of troublesome boils, or infiltration of serum, especially where there is much laxity of structure, as in the eyelids, lips, cheeks, &c. During the years 1823 and 1824, I had ample opportunities of seeing and treating small-pox as it occurred in persons of different ages, sexes, and colours, from infancy to adult life. The facilities given to me by my situation as Dispensary physician were still farther increased by my being associated with Dr. J. K. Mitchell, now of the Jefferson Medical College, in attendance on the Small-pox Hospital at Bush-hill, and subsequently at the old Sugar-house in the city. The results of our observations and experience in variola and varioloid, and on the protecting power of vaccination, obtained during this period, are to be found in two papers, the preparation of which devolved on me, published under our joint names in the *North Amer. Med. and Surg. Journ.*, vol. ii. The materials were of joint contribution: the system of careful record and statistical enumeration begun by Dr. Mitchell, was continued by me during six months of nearly daily attendance. Such a document now-a-days would be said to be prepared in the spirit and fashion of the numeral method. Dr. Mitchell and myself are somewhat in the situation of the *Bourgeois Gentilhomme* of Moliere, who expressed his surprise so naively when he was told that he had been speaking prose all his life. We must marvel at the revelation of our new teachers, when they tell us that in all our statistical estimates we have been using numbers.

My references already made to hospital practice and other observations which I may still have occasion to make on the pathology of small-pox, induce me to advert to the sources of my experience on this subject. Still more in hospital than in private, and even Dispensary practice, had I an opportunity of witnessing the dangerous and often fatal varieties of small-pox which I have described in the papers just mentioned. These were the *confluent*, that which is commonly contrasted with the regular and mild, or *discreet* eruption; the *roseate;* the *tuberculous*, and the *erysipelatous*. Drunkards among the men, and prostitutes among the women, who were attacked with variola, rarely escaped death. The former had the roseate eruption; the latter the confluent, on which dark spots, as if gangrenous, were a frequent appearance. Menorrhagia at any time in the course of the disease was a bad augury.

The African race would seem to be peculiarly obnoxious to the small-pox: the actual number of people of colour brought to the hospital being greater than the whites, and the proportionate mortality being much more considerable, or as four deaths to six cases of disease of the former and two deaths to four cases of the latter. The proportion of coloured to the white population of the city and suburbs at the time of making these observations, was about one to twelve. The less probability of the unfortunate black being vaccinated must not, however, be forgotten in any estimate of this kind. Of the two sexes brought to the hospital, males fell victims in the proportion of three out of five; females two out of five.

During the period of our more special observations and experience,

from the fall of 1823 to the midsummer of 1824, other eruptive fevers prevailed to a great extent at the same time with small-pox. Chicken-pox, measles, scarlatina, and erysipelas, were of constant occurrence. Measles in particular was exceedingly malignant during the summer of 1823, or the season preceding the appearance of small-pox; and continued its ravages to the month of August, 1824. Small-pox may coexist with scarlatina, hooping-cough, measles, psora, syphilis, and intermittent fever. Its coexistence with vaccinia gives rise to some phenomena worthy of note, and particularly the reciprocal influence which each of the two viruses exerts in restraining and modifying the constitutional effects of the other. The occurrence of variola during fœtal existence is a curious problem. It is probable, from some cases on record, that the disease can pass through its stages in the fœtus *in utero.*

The powerfully contagious nature of the variolous poison is made manifest in various ways; in its transmission from person to person by inoculation, through the air and through infected matters, fomites.

Inoculated Small-Pox differs in many particulars from the natural disease, and chiefly in the comparatively few pustules on the skin, and the slight fever and constitutional disturbance. On the second or third day after the inoculation or insertion of small-pox virus under the cuticle and in the punctured cutis a slight itching is felt, which precedes the appearance of a small spot or spots of an orange or tawney-red colour. On the third day the spots enlarge. On the fourth their redness increases, and a sense of tingling or pinching takes the place of the pruritus; the punctures become prominent and lenticular. On the fifth the pricking sensation is more acute; local inflammatory symptoms are more strongly marked. On the sixth the spots contain a transparent fluid in their apices. On the seventh they grow white and purulent, and show a depression in their centre; the pain extends along the inner side of the arm, when the punctures have been made on this member, as is usual; the spots become phlegmonous, and are surrounded by a livid areola. On the eighth slight shivering fits take place, the skin feels hot, there is headache of varying intensity, listlessness and want of spirits, nausea, now and then actual vomiting at intervals, during four and twenty hours, and drowsiness. On the ninth, the inflammation of the inner part of the arm and axilla abates, the livid colour of the areola fades; the pus is dried up; occasionally the neighbouring pustules, when more than one puncture has been made, unite and form one thick and large crust, which is detached between the twentieth and twenty-fifth day from that of the inoculation. In this case, a broad and deep cicatrix is left upon the point inoculated, very similar to that which results from an issue.

Prognosis of Variola. — I shall not enter into details of the strictly semeiological part of prognosis, but content myself with pointing out the almost inevitable frightful mortality attendant on natural small-pox. I do this, in order that, seeing the evil in all its magnitude, you may not allow yourselves, by speculative refinements, to be misled into an oversight or denial of the true prophylactic value of vaccination, of which I shall soon speak.

It was calculated, before the introduction of the practice of vaccination, that upwards of forty thousand persons died annually in Great Britain alone of the natural small-pox, or that one in five or six of those attacked perished. At that time, however, as Dr. Williams correctly observes, the disease was common to boyhood and to youth, periods of life much better calculated to struggle with the effects of this poison than a more mature age. In the present day, the adult is almost its only victim, and the records of the Small-pox Hospital show a much larger number of deaths in proportion to the number attacked; the mortality at that institution during the last fifty years having averaged thirty per cent., the extremes being eighteen and forty-one per cent. (*Cyclop. Pract. Med.*) Since, therefore, the deaths are nearly one in three, the prognosis in every case of natural small-pox is grave, and more grave in proportion to the age of the party. On the other hand, young children, as below seven years, for example, and infants, are in danger even when the eruption is moderate. These remarks apply to the average of patients whom we are called to treat. As regards individual cases, the augury is favourable if the erupton be distinct and the preliminary fever mild; under these circumstances the throat and pulmonary mucous membranes generally suffer less, and there is less risk of cerebral or pulmonic complications and of high fever, all of which would render the prognosis more grave.

In inoculated small-pox the proportionate mortality is very small; but although the individuals who were submitted to the process of inoculation were safe, with comparatively little risk from present disease, and protected with considerable certainty from future attacks of small-pox, yet the mortality from this disease among the people generally was greatly increased. A large class of unprotected persons, who either could not or would not avail themselves of the benefit of inoculation, continued to exist in every country; and they became greater sufferers by the multiplied foci of contagion, caused by the separate cases of inoculation. Dr. Lettsom, by documents delivered to the committee of the House of Commons, and founded on deductions from the bills of mortality, distinctly proved that in the fifty-five years preceding the introduction of inoculation, or between 1667 and 1772, the average number of deaths occasioned by small-pox was, to the number of persons that had died of all diseases, only as seventy-two to 1000; while in the forty-two years succeeding the practice of inoculation, the proportion had increased to eighty-five in the 1000; and subsequently, Sir Gilbert Blane had calculated, that in the last thirty years of the past century it had increased to ninety-five in 1000; adding, that in the year 1800 the small-pox had broken out twenty times in the Channel Fleet alone.

In our estimate of the effects of small-pox, we ought to take into account the sequelæ of the disease. Of these, Willan enumerates glandular swellings, ulcers, often gangrenous, about the thighs, scrotum, and knees, puffy tumours of the soft parts, enlargement of the bones, stiffness of the joints, ophthalmia, deafness, cough, dyspnœa, diarrhœa, anarsarca, hydrothorax.

Anatomical Lesions in the Exanthemata. — *In Measles.* — The reticular tissue of the skin and the mucous membranes are the parts

chiefly affected in measles. The intensity of the symptoms in the acute stage of the disease leaves no doubt of the fact of inflammation of the air-passages, and often of the lungs; but we cannot speak so determinately on this point, as the deaths in this disease are more from its secondary affections. In the cases which terminate fatally, the marks of pulmonic alteration are generally clear, and next are those of inflammation of the bowels and brain. Mackintosh declares, that the lining membrane of the bronchia, trachea, and larynx, has not only been found in a highly vascular state, but it has been thickened, softened, and occasionally ulcerated; the ulcers are small, and generally situated near the bifurcation; the bronchial tubes are more or less filled with a matter like pus or thick mucus, as in bronchitis.

In Scarlatina. — The morbid alterations produced by scarlatina are chiefly sanguineous congestion of the brain, serous membranes, spleen, plates of Peyer, and internal follicles. M. Rayer reports extraordinary evolutions of the glands of Peyer. One is less surprised at the general resemblance of functional disturbance in eruptive fevers, after having learned that the same organs are shown, by *post-mortem* examinations, to have been the seat of structural lesions, and this to a greater extent than might have been inferred during life. "In fatal cases of scarlet fever," Armstrong says, "you almost invariably find proofs of inflammation of the fauces extending down the larynx, trachea, and bronchia. In nine cases out of ten the air-passages are inflamed." Strong as this language seems, its accuracy is borne out by the observations on the epidemic in Edinburgh, in 1832, by Mr. Hamilton, a record of which is in the *Edinburgh Med. and Surg. Jour.*, vol. xxxix. He states that almost every severe case had more or less of the chest affection; and he only met with one exception to the uniform extension in fatal cases of the inflammation to the larynx, trachea, and lungs. The comparative frequency of inflammation of the mucous membrane of the bowels, dwelt on by Dr. Armstrong, is not admitted to the same extent by other observers, though the occasional presence of this lesion is undoubted. The same remark applies to the brain, which exhibits increased vascularity, with opacity of the arachnoid membrane and effusions of serous or turbid fluid between it and the pia mater. The kidneys might be supposed to exhibit organic alterations in those cases in which dropsy had existed before death and albuminous urine was discharged; but Mr. Hamilton, who paid particular attention to the state of these organs, found in one case only the granular appearance indicative of what has been called Bright's disease. In some cases, again, you must not be surprised if you are unable to detect any textural or other change to account for the fatal result.

In Small-Pox —Almost identical with the appearances just described in subject dead of measles, were those noticed in all the autopsic examinations which we made of persons who had died of small-pox, viz., great injection of the lining membrane of the larynx and trachea, varying in intensity from a deep red to a mahogany hue; thickening of the tissue, and most generally ulcerations extending from the fauces to the larynx, and thence down into the bronchial bifurcations, with abundant frothy mucus. The colour of the ulcerated spots was in some cases white, in others yellowish. In one case, the subject of

which died on the twenty-fifth day of disease, and after desquamation had been nearly completed, the lining membrane of the larynx and trachea was of a greenish-yellow colour throughout, and in the spaces between the cartilages ulcerated and disorganised in several spots; chocolate-coloured liquor, with a sediment, filled the bronchia and the larger tracheal subdivisions. In the stomach I noticed injections of more or less extent, either of a roseate hue or brown, and sometimes bloody effusion surrounded by a vascular network; the intestines exhibited similar appearances, but in a less degree and with less frequency. Enlargement of the mucous follicles in many cases might seem to the observer to be an eruption of the same nature as that on the skin. The glands of Peyer are also greatly developed, and in this feature, as well as in the augmented volume of the spleen, resembles typhous fever. The kidneys are, also, much congested. The lungs were sometimes healthy and at times inflamed, as was also the pleura, which in the latter state exhibited sometimes effusion in its cavity. The pulmonary alterations, apart from those of the air-passages, do not seem to be necessary effects of the variolous disease, but to be dependent on the season and prior exposure of the patient, either during the period of incubation, or during the secondary fever and after desquamation. On this point I used, in the communication already referred to, the following language: "It not unfrequently happened that persons who had passed through the different stages of the disease, and were advancing rapidly to convalescence, were suddenly seized with an affection of the chest, — pleurisy, bronchitis, or pneumonia, — and speedily carried off by the violence of the inflammation." M. Rayer remarks, that in all the varieties of small-pox which end fatally, the lungs are frequently found gorged with blood

LECTURE CXXXIX.

DR. BELL.

EXANTHEMATA (*Continued*).—*Treatment*—With a general resemblance in feature, is a general sameness in treatment, of the first or precursory stage of eruptive fevers.—*Measles*—Treatment of the milder kind, simple—Pulmonary complications require bloodletting; general and at times local—Epistaxis prevented by this means—Blisters, their remedial value—Disappearance of eruption from two causes—Treatment; moderately stimulating in one case, antiphlogistic in the other—Counter-irritation—Diarrhœa, two kinds, and corresponding remedies—Occasionally critical, relieves secondary inflammations—Attention to regimen——Liability to tuberculous development by measles.—*Scarlatina*—Treatment—General outlines—Embarrassment owing to difference in epidemic visitation——Modifications of disease and consequently of treatment—Example of epidemic malignant scarlatina—Early attention to glandular swelling of neck and of tonsils—Leeches—Emetics—To detach adherent matters from throat by the hand; aided by vomiting—Congestion of the brain; remedies for—Cold affusion, good in nearly all the varieties of scarlatina; its soothing and sedative operation—Sponging the surface a substitute—Tepid and warm bath—Stimulants may be easily applied, even alternately with depleting remedies—Œdema and dropsical effusions common sequelæ of scarlatina—Treatment of—Chief remedy venesection—Alleged prophylactic power of belladonna against scarlatina—*Small-pox*—Outlines of treatment—External or topical remedies—Prophylaxis.

TREATMENT OF THE EXANTHEMATA. — You can hardly have failed

to perceive that the eruptive fevers have many features in common, and consequently you will be prepared to assent to the remark, that the treatment of them all will be governed by the same genera principles. In fact, there is not so marked a difference in the general febrile phenomena and visceral complications between any two of the three exanthemata of which I have been lately speaking, viz., measles, scarlet fever, and small-pox, as there is between two varieties of any one of these diseases. In the first period, or that of invasion, the most skilled in diagnosis, apart from any aid furnished by the existing epidemic or known circumstances of recent personal exposure, will be at a loss to say which of the three is about to exhibit itself. Nor will his embarrassment be removed immediately on the first appearance of the eruption, or by the determination to some suffering organ, whether this be the stomach, lungs, or brain. All three are ushered in with fever of an inflammatory nature, which seldom preserves this character long in any of them. All are liable to be modified, and their more open features masked by violent congestions, typhoid depressions and complications, attended with change in the colour and other characteristics of the eruption; and all, in fine, are rendered perilous in their sequelæ by diseases of more or less intensity and duration. The cutaneous eruption in each of the three exanthemata is not so much a disease in itself as an effect of, and, according to the varieties of appearance, an index to diseases depending on a poisoning of the blood, and inflammation and congestion of internal membranes and organs.

We cannot, as I intimated when first bringing the subject of the exanthemata to your notice, make any satisfactory advance in the treatment of this class of diseases, unless we can take cognisance and appreciate at their true value the almost uniformly corresponding disorders of the gastro-pulmonary mucous surfaces; for on the moderating and removing of these will greatly depend the favourable issue of the disease.

It has been made a question, how far active treatment in the first or second stage, that of invasion, of an exantheme will contribute to mitigate subsequent symptoms, or by possibility prevent them coming on at all; in other words, strangle the disease. Although the problem cannot be said to be completely solved, yet the casual attempts towards this result have not been satisfactory. It is difficult, indeed, for the requisite trials to be made; as few will think themselves justifiable during a precursory fever or forming stage of a disease which has not yet declared itself, to adopt extreme measures against what a few days may show to be an imaginary or mistaken evil. The disease may turn out to be gastric fever or typhoid fever, common angina, epidemic catarrh, or endemic congestive fever, in place of the expected exantheme. The case related by Sydenham would not encourage the strangulating, or preventive method: "I solemnly affirm," he says, "that one of the worst cases I ever met with of the confluent small-pox, in which the patient died, happened in a young woman soon after her recovery from rheumatism, treated in the usual method by copious and repeated bleeding; and from this instance I learned that bleeding did not contribute to keep

the small-pox within due bounds as I had imagined." When the eruption makes its first appearance, or almost contemporaneously with this event, the patient is sometimes seized with convulsions, or is delirious and suffers from high fever, greatly oppressed respiration and gastric distress, the indications would seem to be clear for active treatment, which, while it relieves the present urgent symptoms, might also prevent the occurrence of others of a dangerous nature. But even here experience comes in to tell us that these convulsions, or this delirium and fever, are often but transitory, and that, although they may require venesection, yet they may pass off without any remedy, certainly without any remedy of power.

The inference from these premises, furnished by the observations of ages upon ages, is, that we cannot act, with a view at least to decided and connected therapeutical measures, in advance, but must wait until the exanthematous or family characteristics show themselves; and this period reached, the most sanguine must not hope to abbreviate materially the march of the disease. It remains, then, for us to watch the symptoms as they are developed by the febrile and organic disorder, and mitigate them by abating the morbid excitement or other abnormal condition of the organ or organs on which they depend. But, although we are deprived of recourse to heroic means, we have the privilege, and ought to exercise it, of adopting some general plan of a palliating nature, from the very beginning, which will be applicable to any pyrexial disease, and tend to restrain the more violent outbreaks of an inflammatory one. To this end, so soon as rigors and gastric disorder with any irritation of the throat or air passages are manifested, the patient should be at once secluded from all causes of excitement; such as of food, bodily or mental exertion, hot or close air, and much clothing. The cooling regimen, as it is called, is at once to be adopted, by the introduction of fresh or rather cool air, and the use of simple diluent drinks and the lightest farinaceous food, if any be desired. Inequality of temperature of the surface is to be removed by warmth to the extremities and a warm pediluvium. Nausea or sickness of stomach will justify the use of a mild emetic of salt and water or of ipecacuanha, and any intestinal disturbance or decided febrile movement will be followed by the exhibition of a laxative, as of castor oil, rhubarb and magnesia, or calomel and rhubarb.

Measles. — These measures are applicable to the period of invasion of any of the exanthemata; and if promptly adopted, will render the subsequent treatment easier, while it will tend to prevent the possible violence of subsequent disease. If the eruption be of a rubeolous character and the measles more clearly defined, remedies adapted to the new exigency will be given; but not then in power proportionate to the catarrhal symptoms. In the measles without irritation of the air passages, *morbilli sine catarrho*, simple regimen and avoidance of all excitement will suffice often without any medicine; and even when the voice is hoarse and there is a dry cough and little or no expectoration and fever at the same time, the remedies need not be of an active kind, as we know that this stage will generally pass away without danger. Neutral salts, to act gently on

the bowels, and the bitartrate of potassa dissolved in water, with the addition of a little tartar emetic, will constitute all the needful febrifuges. Their effect is increased by the moderately warm bath or warm pediluvia, and if the cough be urgent, a few drops of laudanum may be taken in the evening with the drink of cream of tartar, and the tartar emetic. By some ipecacuanha in powder or the wine is preferred.

But if with persistent cough there be a stitch of the side, permanently flushed cheeks, and other signs of pneumonia complicated with bronchial irritation, we must not hesitate to bleed from the arm, or in certain weak habits abstract blood by means of cups to the chest. It is in such cases that tartar emetic with a small proportion of opium given at intervals of two or three hours, will manifest the same good effects as in common pneumonic inflammation. The symptoms requiring this treatment may exist early in the disease, but more generally they occur at the decline of the eruption or after its disappearance. Though not an advocate for that simplicity of practice which would deprive us of collateral aid, and mistrustful of the dogmas of those who would confine the remedial course to the administration of one remedy alone for the cure of a disease, yet upon the whole, if our attention is to be steadily fixed on a particular therapeutical view, I should feel more inclined to adopt that of the practical Heberden, who says, when recommending the use of the lancet: "particularly an oppression of breath, to which every stage of this distemper is liable, bleeding, with such medicines as the occasional symptoms would require in any other fever, is the whole medical treatment required in measles." My own practice is coincident with that set forth by M. Rayer, in the following terms: "The inflammatory affections that precede, accompany, or follow measles, in proportion as they are severe, require a greater degree of care and attention on the part of the practitioner. The application of leeches to the epigastric region, when the intestinal canal is the seat of the adventitious malady, and to the forepart of the neck when laryngitis is threatened, with one or two bleedings from the arm when the lungs are invaded, will commonly give a most favourable turn to the symptoms, secure the development of the eruption when it has not yet appeared, regulate it when it has come out imperfectly, and bring about its restoration when it has vanished suddenly."

The occurrence of epistaxis has seemed to me to be much more frequent and repeated in measles when bloodletting has been neglected. Blisters have generally been an approved remedy in peripneumony with measles, and if they follow the use of the lancet they are often serviceable; but when mainly relied on, as we sometimes find to be the case, for the removal of pain and pulmonic congestion, they will more generally fail if they are not positively injurious, When the eruption disappears suddenly, vesication has been used to bring it out again; and if the retrocession have been owing to cold, blisters and moderate stimuli, such as carbonate of ammonia, and a little opium, together with recourse to the warm bath, will do good. But if the disappearance of the eruption be owing to the lighting up or aggravation of visceral inflammation, the antiphlogistic treatment

by bloodletting and cool drinks is the more appropriate and more successful practice. When cutaneous irritation is demanded in these cases more will be gained by a quick succession of sinapisms on the epigastrium and the inside of the legs and thighs and arms, than by blisters. Cold affusion and sponging have been used in cases with good effect.

Diarrhœa, if simply serous, is to be obviated by chalk mixture with laudanum and ipecacuanha wine; but if it be the result of inflammation of the mucous membrane of the large intestine, and accompanied with pain and straining of a dysenteric character, a small bleeding from the arm or leeching of the abdomen and demulcents should be preferred, with afterwards blue mass, or calomel and ipecacuanha in pill form. The first kind of evacuation is that which some writers regard as critical, and in fact its coming on towards the decline of measles is rather salutary, and contributes to the relief of secondary inflammations, such as ophthalmia, laryngitis, and pneumonia. The second or dysenteric, is part of a morbid circle, and ought to be removed. We are recommended to imitate nature by giving, towards the decline of measles, mild purgatives, so as to induce a kind of artificial diarrhœa.

Aware of the irritable if not inflamed state of the bronchial mucous membrane, as well as of the digestive one, and of the great susceptibility of the skin after an attack of measles, too much attention cannot be paid to preserve the equable temperature of the body by warm clothing, and to avoid exposure to a keen and cold air, and the use of stimulating or even nutritive substances. Even with all the care that can be used, we are sometimes pained to find chronic inflammation of the lungs and associated tubercle, which ere long carry off the patient. An attack of measles has been regarded by some as the test of tuberculous tendency. If the patient stands it without the development of tubercles, he may expect comparative exemption afterwards.

Scarlatina.—"Scarlet fever," says Armstrong, "is a disease which has been most successfully treated in modern times. Formerly it was very fatal, and I am confident that the mortality arose from bad treatment." The contrast is meant here to be made in favour of depletion over stimulation. So, also, Mackintosh, who states that he saw many fatal cases when he practised according to the opinions of the schools, "carefully abstaining from bloodletting, and using all the means recommended to support the strength;" but he "occasionally observed patients snatched from the grave by considerable bleedings from the nose, and at times when it was thought the loss of an ounce of blood would prove destructive. These circumstances," continues the author, "together with the appearances found on dissection, led me to bleed in many subsequent cases, and I have never had occasion to regret it." The practice, as advocated by these and other gentlemen, and as tried by myself at different times, was no doubt serviceable; but its success is no proof of the error of other physicians in former epidemics, who adopted a different plan of treatment; nor that those who, coming after us, do not imitate it, will be to blame. A better philosophy, based upon a large and impartial view of the facts of the case, teaches, that eruptive

fevers, which sometimes in their worst form are of epidemic occurrence, vary, like other epidemics, not a little in the intensity of attack and, danger at different periods. Scarlatina, measles, and smallpox too, sometimes assume an inflammatory, sometimes a congestive, and, at others, a more simple yet prostrating or nervous type, in successive epidemic visitations; as in the same epidemic they will manifest these distinguishing features in particular families and individuals in preference to others. Dr. Graves, in lecturing on scarlatina, remarks, with his customary good sense, after speaking of the great mortality from scarlet fever in Dublin, in the year 1801–2, and of the subsequent occurrence, at intervals, of epidemic visitations, but always in a mild form, until the wide-spreading and destructive visitation of 1834–5: "It was argued, that had the cases which proved fatal in 1801–2 been treated by copious depletion in their very commencement, the fatal debility would never have set in, for we all regarded this debility as a mere consequence of previous excessive reaction. The experience derived from the present epidemic has completely refuted this reasoning, and has proved that, in spite of our boasted improvements, we have not been more successful in 1834–5 than our predecessors in 1801–2."

I must confess — and I do so in the hope that others will be benefitted by the acknowledgment — I entertained for several years no little confidence in the value of the remedial means which I had recourse to in the treatment of scarlet fever. Both in Dispensary and in private practice, I had a considerable number of patients with the disease under my care in different years; and with hardly an exception the result was favourable. My practice, and it is that which I am still disposed to recommend to you in the inflammatory and *anginose* variety of scarlet fever, consisted in keeping the patient lying on a mattrass and lightly covered, in a room well ventilated and without a fire: after the eruption was at its height, flannel, even if worn next to the skin, was dispensed with until desquamation was in progress. Sometimes a mild emetic, and always a purgative, was administered; and if the efflorescence and cutaneous heat were great and general, cold affusion was used: a temperature less high and diffused was met by tepid affusion. For the rules and practical details on the remedial effects of bathing in fevers and the exanthemata, I refer you to my work on *Baths and Mineral Waters.* After the bowels were acted on, the neutral mixture, or acetate of potassa in solution, with a portion of tartar emetic added, was administered at suitable intervals. If the pulse was tense, and the evidences of determination to the head and throat considerable, or much wakefulness and occasional delirium present, I had a small quantity of blood taken from the arm, or leeches applied under the angle of the jaw, and on the skin corresponding with the region of the tonsils. Gargles, usually of a simple kind, were allowed towards the decline of the fever. The drinks were cold, and, if the patient wished it, acidulated; the regimen was of the simplest kind. After the eruption began to decline, if there were restlessness, wakefulness, and dry skin, with a frequent and yet small pulse, Dover's powder in moderate doses was given. In this way, and without being blistered

or stimulated, my patients went through the disease with less suffering and to a more successful termination than I could have expected from the alexipharmic plan. I had several bad cases to encounter, too; in one of two children, who were both grievously afflicted with the disease, there was a large abscess which burst and involved with it a loss of the teguments over the parotid gland, which, until the swelling had subsided and the matter was discharged, was, I thought, itself disorganized and lost. Both recovered. I have had three cases in one family sick at the same time, in two of which scarlet fever followed measles, and in one preceded the rubeolous fever: they all recovered. I thought, and I may be pardoned, perhaps, for my presumption, that I had the power of combating scarlatina, wherever and whenever I met it, if I saw it in time, and the little patient was not broken down by former disease. But I had yet to discover the other and darker parts of the picture, and to see my patients die notwithstanding all the resources of art; and worse again, after death I sometimes could not find a trace of organic lesion, notwithstanding the violence of the symptoms during life.

As regards the probable cause of death in eruptive fevers, one is common and cannot be prevented: — I mean the loss of vitality, at any rate, of functional action, of the skin. Its secretion and absorption, fluid and gaseous, are both arrested: and as the pulmonary mucous membrane suffers in a similar manner, need we marvel that the disease exhibits the appearance of virulent poisoning, in the production of which retained excreta in the blood and deterioration of this fluid must come in for a large share. The circulation is oppressed, the skin and mucous membranes are congested, and the nervous system is depressed and its properties perverted. To talk of inflammation in such a case gives no definite idea of the state of things, or guide for ameliorating it. Sometimes the disease is aggravated to agony: the skin becoming pale, at least loses the colour derived from the eruption, which last is then said to strike in. An effect of the concentrated irritation of the internal organs is here mistaken for a cause, — as if fainting were to be attributed to the cessation, or striking in, to use the popular phraseology, of a preceding, and, it may have been, intense blush. Though we may be afraid to bleed in such cases of great and alarming oppression, accompanied as it often is with coma, and constituting the worst or typhoid or *malignant* scarlatina, we are not, therefore, bound to stimulate. A simple abatement of internal visceral phlogosis by a cool drink, as of simple water, or a cold or tepid enema, has brought out the eruption, when hot-toddy, or wine and various other stimuli, would not only fail to produce this effect, but would probably increase the violence of the symptoms. It is on this occasion that you will apply the principles which have guided us in the treatment of congestive fever; and they will be found adapted to congestive measles and small-pox, as well as to malignant scarlatina. Thus, after a mild emetic of ipecacuanha, while you give cool and simple drinks with a few drops of laudanum inwardly, you apply warmth by means of water or vapour, aided by friction, externally; and if the stomach continue, or should become very irritable, without epigastric tenderness and thirst,

you may suspect congestion, perhaps inflammation of the brain or its meninges, and address your remedies more especially to that organ. To do so, you direct leeches behind the mastoid process, a few in number and repeated frequently, according to the urgency of the symptoms, so as to produce a more complete and gradual revulsion, — sinapisms at the same time being applied to the feet, or the lower limbs immersed in a hot-mustard bath. If the fauces are red, and a sense of suffocation is present, you will leech with more freedom than when they are of a whitish or ash-colour. The anginose variety of scarlatina will be more especially benefitted by this leeching, which, in such cases, should always precede gargles or cauterization. When these are necessary, you will select from the list the chloride of soda or of lime, muriatic acid diluted, lunar caustic, or alum. If you have cases in which there is a persistent inflammatory and open action, calomel may be used : in those of lower or typhoid action, spirits of turpentine and carbonate of ammonia. This last is particularly serviceable in scarlatina. So soon as the first pressing symptoms in the malignant or typhoid scarlatina, which is sometimes congesto-inflammatory, sometimes congesto-nervous, are abated or removed by local bloodletting, evacuations from the stomach and bowels, and revulsives to the skin, you ought to give the sulpate of quinia, either alone or in union with opium or the sulphate of morphia, according to the presence or absence of diarrhœa and the extent of nervous irritation. Of the internal medicines the list must be small: a weak solution of salines may be used with advantage, as already recommended in congestive fever; and here, again, will carbonate of ammonia be available. Fresh and cool air is to be continually introduced into the sick room.

Having given my general confession of faith as respects the treatment of scarlatina, it is right that I should add some explanatory comments, — notes, as it were, to the text. One of the chief causes modifying scarlatina is its epidemic appearance, and its attacking a number of persons collected together in a hospital or asylum of any description. Under these circumstances we must not expect to see so much of the simple anginose or inflammatory variety as the malignant or typhoid ; and even if the disease begins with the appearance of phlegmasia, it soon degenerates into the congestive and typhoid. Vibices and petechiæ are then met with, and in some instances lividity of the extremities as great, as in patients who have died of cholera. In many of these parts, too, when the body had been exposed to pressure, the integuments are found in a state of slough. The cerebral substance is usually injected, and the ventricles contain fluid. Sometimes, too, there is an appearance of extravasation of blood beneath the arachnoid, such as is occasionally met with in typhous fever. The lungs are congested, the bronchia loaded with frothy serum, and their mucous membrane much congested. The heart is loaded with black blood, petechiæ are sometimes present on its surface, and its texture was occasionally softened. The blood is usually thin and watery. Congestion in patches, of the different abdominal viscera, is all that is found in many cases where, during life, the abdominal symptoms had been most striking.

In a still more malignant, because complicated variety of the dis-

ease, we meet with a severe affection of the throat, which sometimes comes on when the fever was at its height, but quite as often after convalescence. Diphtherite is sometimes met with, as described long ago by Huxham, and quite recently by Dr. Kennedy, in Dublin. From a synopsis of the latter account, in the *Brit. and For. Med. Rev.*, I am now transcribing, although the original paper of Dr. Kennedy in the *Dublin Journal* is in my possession. Œdema of the glottis proved fatal in some cases. Among the sequelæ of the disease are inflammation and suppuration of the internal ear, purulent effusion into some of the joints, or the formation of abscesses in the soft parts of the extremities.

I recur now to some details of treatment. So soon as we observe the glands of the neck swell much and deglutition become more difficult, leading to a belief in a similar enlargement of the tonsils — for often we cannot see into the back part of the mouth — leeches ought to be applied over and round the basis of the swelled glands, even in the malignant form of the disease; for unless the tumefaction be resisted or abated, it would soon be impossible for the patient to swallow anything, and the agony and distress of the little sufferer are greatly increased. He cannot sleep for any time without starting up in great alarm with a feeling of imminent suffocation. An emetic is not without its use, but it will have little effect in reducing the swelling of the throat unless suppuration has taken place.

In cases in which the mouth and throat are lined with the effused matter, already described under the head of symptoms, mixed with tenacious mucus, a fluid, such as the chloride of soda in solution, or vinegar and water, or dilute mineral acid, should be injected, by means of a syringe with a long terminal tube, into the mouth and far back against the fauces. Attempts should be made also to remove these shreds and patches from the tonsils and palate, by means of a rod, to the end of which is tied a piece of rag or sponge, introduced into the mouth. Directions in the sick room will not avail much to have this done. The physician ought himself to perform the operation, for such it may be called. I have removed masses, time after time, from the throat, in the malignant form of the disease, and believe that I have in this way been instrumental in saving life.

An emetic under such circumstances will sometimes help to detach the muco-purulent adhesions, and in other ways do good by equalising the circulation and promoting abundant secretions from the mouth, pharynx, and pulmonary mucous membrane.

In the form of scarlatina in which, besides fever, sore throat, and headache, there is a violent congestion of the brain and determination of blood to the head, giving rise to convulsions and apoplectic coma, we should draw blood in the manner already indicated, viz., by leeches in the mastoid processes and under the ears; apply sinapisms to the extremities, and practice cold affusion if the heat of the skin be great, or tepid, if it be of an unequal or not very much increased temperature. In this form and stage I have not hesitated to use the cold affusion, and, if I might judge from the results, its operation was most beneficial. Often, when all other means failed to tranquillize the patient, cold or sometimes tepid affusion, according to the heat of the surface, would be followed in a very few minutes

by quiet sleep and a reduction both of the heat of the body and of the pulse. If timidity or false docirine interfere to prevent affusion, you must content yourself with sponging the surface with cold water, and particularly the face, neck, chest, and abdomen, after the excitement and cutaneous heat subside; but if restlessness and depression still remain, the tepid or slightly warm bath, or in its place sponging, is pleasant and soothing to the patient. In all the epidemic exanthemata, the tendency to congestion and prostration is great, and hence, even when direct depletion is employed, we must not wait for a period of remission or of entire abatement of febrile excitement before we have recourse to stimulants. These should not, however, be taken indiscriminately from the list. I have before mentioned oil of turpentine and carbonate of ammonia. Both of these substances may be had recourse to earlier in the disease, and their use persevered in longer than would be justifiable in some other diffusible and more irritating stimulants. Camphor, in the weak formula of mixture, has also a tranquillising and withal sustaining action, and may very well be the menstruum for the exhibition of the volatile alkali. Capsicum alone or in a decoction with a little vinegar also belongs to the stimuli whose action is measurably local and at any rate excites but little the bloodvessel system. During all this time the bowels must be attended to and acted on by calomel and rhubarb, or calomel with capsicum. Chlorine, in the proportion of two drachms in twelve ounces of water, taken during the twenty-four hours, has been extolled as a specific in some of the worst or most malignant forms of scarlatina. I have sometimes sponged the surface, when the eruption was of a dark colour and the skin permanently congested, with water and nitro-muriatic acid. The internal use of some of the mineral acids, alone or united with decoction of bark, has been strenuously recommended.

The most common and frequently alarming sequela of scarlatina is dropsy, either of the chest, brain, or general cellular tissue. So soon as œdema shows itself in any part, and it will commonly be first over the face, we ought to have recourse to decisive measures, under a fear, too often well grounded, that the external is but a prelude if not an accompaniment of some incipient internal effusion. Accordingly venesection is to be practised at once, and is to be followed by purging with the compound powder of jalap, calomel and extract of colocynth pill, and for drink a solution of the bitartrate of potassa in water or the acetate in doses of half a drachm daily. The warm bath and moderate friction of the skin are useful adjuvants to bleeding and purging. Iodide of potassium, as an alterant corrective to the morbid state of the kidneys in their secretion of albuminous urine, a frequent occurrence in this stage of scarlatina, is worthy of trial, in moderate doses at relatively short intervals.

In some epidemics of scarlatina, although the disease pursues a very regular course and is marked by great mildness of the symptoms, œdema of the face and general anasarca are quite common affections. Interesting cases of this nature are recorded by Dr. Cathcart Lees, of Dublin; some of which were treated successfully by bloodletting and purging with calomel and the compound powder

of jalap — followed by aqua ammonia acetatis and tincture of digitalis. Leeches to the feet and abdomen were mostly preferred to venesection. In the two first cases there was hematuria. The fatal cases revealed some effusion in the pleura and hepatised lung, and again œdema of the lung, and effusion into the ventricles; but the kidneys were generally healthy.

Much has been written and said within these few years past of the properties of belladonna as a prophylactic against scarlet fever, especially when used in homœopathic fashion, that is, in such minute doses, as to pass all credibility, as their alleged operation certainly passes all probability, not to say fact. If the patient and friends can be amused in this way there would seem to be no harm in indulging them; but for this great inconvenience, that once having acquired the habit of consulting their imagination rather than their common sense, and yielding to their own vagaries rather to the sober judgment of those whose lives have been spent in acquiring a knowledge of the subject, they may on an occasion of real danger lose valuable, sometimes irrecoverable, opportunity for recourse to the right means.

Treatment of Small-Pox. — On this point I have little to offer, notwithstanding many months of large and daily clinical experience in Hospital and Dispensary practice. The cooling regimen, or cool air and cool drinks, ought to be carried out as far as the feelings of the patient require, but no farther. The mere fever and eruption will not call for venesection, or other active depleting remedies, unless some important organ, such as the brain or lungs, be inflamed or much congested. The great source of danger is from inflammation and ulceration, and the necessary interuption of function of two such important membranes as the cutaneous and the pulmonary mucous. Laxatives, to preserve a regular state of the bowels, cool and acidulated drinks, and fresh but not very cool air, and light vegetable nutriment after maturation is complete, with the occasional administration of Dover's powder, and, if the debility be considerable during the desiccation of the eruption, wine-whey and compound infusion of bark or sulphate of quinia, will constitute the outlines of the treatment in small-pox. In anginose complications of unusual severity it will be necessary to cauterise the fauces, palate, and tonsils, in the manner and by the means already advised in cases of angina maligna or diphtheritis.

If in the progress of any of the eruptive fevers, inflammation of an organ arise, you must not allow any hypothetical notions respecting the modifying nature of the exanthematous poison to prevent your abating and removing it by the customary and appropriate means against phlogosis. In all these fevers there is no little danger of sequelæ occurring or of their being aggravated after desquamation is completed, or even in its progress, by exposure of the skin to a cold and moist air, and above all to currents of air. The clothing, however light during the fever, should now be of a suitable texture, and abundant both day and night, in order to prevent a real congestion, and, not seldom, serous effusions from such exposures.

Among the local remedies, the chief ones are an oiled or otherwise medicated covering to the face to prevent pitting, and the applica-

tion of caustic to the yet incipient pustules with a similar view, as well as with a hope of preventing the secondary fever; but neither rests upon sufficiently strong proof to encourage its repetition, or at any rate methodical use. M. Rayer tells us that if, during the course of the first and second day of the eruption, the variolous papulæ be deeply cauterised individually, after opening their apices with the point of a lancet, they are often completely arrested in their progress. About the seventh day the cuticle, which has been exposed to the action of the caustic, falls off in plates, generally without leaving any apparent cicatrix. If the pustules are not treated with the caustic sooner than the third day they frequently do not miscarry completely, and if the measure is not attempted earlier than on the fourth or fifth day, the operation then fails to check the progress of the inflammation, and the pustules are followed by cicatrices.

But a question of still greater importance than the treatment of variola is prophylaxis, which bring us to the subject of vaccination or cow-pox, the introduction of which into the system gives, in a vast majority of cases, immunity against variola.

LECTURE CXL.

DR. BELL.

VACCINIA, OR SMALL-POX.—Its origin and alleged identity with variola—Its habits.—VACCINATION—Causes diminishing confidence in—Misconception of its primary protecting power—Inferences in favour of vaccination—Revaccination—Age for vaccination—Stages of vaccine pustule—Selection of matter—Its insertion, or application—Retro-vaccination—Number of incisions—Causes modifying development of vaccine pustule—Anatomy of the vaccine pustule—Vaccine cicatrix.—*Varioloid*—Its origin, symptoms, and comparative frequency—Occurrence not proportionate to the period after vaccination.

VACCINIA—COW-POX—VACCINE-POX.—"This poison is simply contagious, and produces a single vesicle at each point of puncture. This vesicle undergoes certain mutations, and runs a given course of fourteen days. A slight fever generally accompanies the latter stages of the local affection," which often gives rise to swelling and slight inflammation of the lymphatic glands nearest the point of insertion of the poison. The first experiment made by Jenner, to test the antivariolous properties of this secretion from the cow, after many years' profound meditation on the subject, was on the 14th May, 1796. It was eminently successful; and he was afterwards induced to publish his "Inquiry" in the year 1798; showing that the vaccine disease had, in every instance within his experience, proved an infallible preventive of the small-pox. An experience of now more than forty years, although it does not allow us to realize all that benevolent enthusiasm promised from Jenner's discovery, proves incontestably its extraordinary value in diminishing the mortality from small-pox, the greatest pestilence of modern times; and also in indirectly improving the health and prolonging the life of the people in nearly all parts of the civilized world.

The original source of vaccine virus was believed by Jenner to be in the heel of the horse when this animal is affected with the disorder

called grease. Experiment and analogy are, however, opposed to this view. Another hypothesis of Jenner has been revised of late years, and apparently its reality confirmed by experiment. He expressed "his unalterable conviction that how different soever they might be in some particulars, the cow-pox and the small-pox were in reality identical;" that the cow-pox was not "an antidote but the substitution of a mild species of small-pox instead of a malignant sort, or of cow small-pox for human small-pox." Trials were made to test this hypothesis; but although many cows have been clothed with blankets taken from the bed on which small-pox patients had just died, and have been inoculated in every possible way, yet, not only has this small-pox not been satisfactorily produced, but this failure of such experiments rendered it probable that the cow was unsusceptible of the disease.

Of late years the question has assumed a new aspect since the success of Mr. Ceely's trials by inoculating the cow with variolous virus, and procuring from the pustules matter which, introduced into the skin of the hitherto unprotected human subject, gave rise to distinct vaccinia and allowed of successive transfers to other subjects, with the preservation of all the regular features and other phenomena of the cow-pox. Mr. Farr, in his letter to the Registrar-General of England, in the annual report for 1842, adopts, as a received truth, these results, when he says; *varioline*, or the specific matter of small-pox, is converted into vaccine. It had been asserted in 1828 by Dr. M'Michael, in an essay read before the College of Physicians, that "vaccine matter having failed in Egypt, medical gentlemen were led to institute certain experiments by which it has been discovered that, by inoculating the cow with small-pox from the human body, fine active vaccine virus is produced." Connected with this question are the interesting facts on record, of the prevalence, at the same period, of the cow-pox among cattle and the small-pox among men, and the transmission by contagion of the small-pox to cattle, and the consequent development of cow-pox in these animals.

If we are to speak of the habits of the *vaccinine* or vaccine poison as seen in the cow, we learn that the disease is occasionally epizootic or prevalent, at the same time, at several farms at no great distance from each other, but that more commonly it is sporadic, or nearly solitary. So irregular is its appearance, that Mr. Ceely (*On Variolæ Vaccinæ*) states that he has known it to occur twice in five years, in two contiguous farms in Buckinghamshire; while at a third adjoining dairy it had not been known to exist for forty years. It is said to appear most commonly about the beginning or end of spring, rarely during the height of summer, but has been seen at any period from August till May, or the beginning of June. One other remarkable circumstance, however, connected with the disease in the case, is that it is peculiar to some countries, and to certain districts of the same country. On the first publication of Dr. Jenner's discovery it was much sought for in England, but found to exist only in eighteen counties. It has been found, also, among the cattle of Lombardy, Holstein, Persia, the southern parts of America, and in India. It is singular, however, continues Dr. Williams, whose narrative I am now following, that it was altogether unknown in France till 1836, when,

by an inexplicable *biazarrerie*, it was discovered in three separate districts, at a short distance from each other, or at Passy, near Paris, Amiens, and at Rambouillet. This latter fact is strong argument against the disease being small-pox, and of the cow being affected by the human subject, for on such an hypothesis it is impossible to assign any reason why the disease should be so often communicated in England and so seldom in France. The poison is capable, also, of producing the cow-pox in many animals, not naturally liable to it by vaccination, as the dog, the goat, the she-ass, the sheep, and, perhaps, the horse.

The extensive and fatal variolous epidemics within the last twenty-five years, and the very frequent occurrence of variolous disease after vaccination, generally in a mitigated and somewhat modified form, called varioloid, very naturally excited the profession to new and more extended inquiries and experiments on the whole subject. Some, in consequence, were induced to deny the protecting power of the vaccine against the variolous contagion, and others have contended that the protection was only effective for a limited period,—on the duration of which there was, however, little accordance of opinion. Extensive oportunities of experimental observation, of which I have before spoken, convinced me that these fears and objections were either unfounded or greatly exaggerated. The chief cause of variolous seizure of vaccinated persons was and is the imperfect and incomplete vaccination to which they had been subjected, either owing to spurious vaccine matter having been used, or the person on whom the operation was performed being at the time affected with a cutaneous disease, especially psoriasis and herpes. Giving additional force to these causes, was the predisposition induced by the state of the atmosphere during the prevalence of epidemic small-pox, so that contact with a patient labouring under this disease, or still more, breathing the air contaminated by volatilized contagion from his body, subjected an imperfectly vaccinated subject to the varioloid or modified small-pox, which under similar circumstances of personal exposure but different atmospherical constitution he would have escaped. A farther cause was to be found in the peculiarity of constitution of the vaccinated individual, by which he was liable to an attack of small-pox, just as persons of a particular constitution have had a *second* attack of small-pox although the first had been of such violence as to threaten life and to scar and disfigure the skin.

Overweening confidence in the all-protecting power of vaccination against small-pox was followed by undue mistrust of its efficacy. Physicians had too generally forgotten, that Jenner himself, and some of his zealous contemporaries engaged in the same philanthropic task with him, had clearly pointed out the fact of small-pox supervening after vaccination had been duly performed. The reason assigned then was the shortness of time that had elapsed between the vaccination and the exposure to variolous contagion. Since, and now, the reason set forth is the length of time by which the vaccine impression on the system is worn out. Both of these two opposite and

contradictory reasons cannot be true — the probability is, that neither rests on a stable foundation.

In the two papers which I wrote exhibiting the joint experience of Dr. J. K. Mitchell and myself, we concluded with the following inferences, the accuracy of which has been tested by succeeding observations in different parts of Europe, and of this country. The first inference was, that the disease which prevailed in Philadelphia, in 1823–4, and which we had been called upon to treat in so large a number of cases, was the real small-pox.

2. That this disease, distressing to the persons labouring under it, and disgusting to those in attendance, is usually violent, never without danger, and always in large proportion, under any known treatment, is of fatal termination.

3. That the unsusceptibility of persons who have once had the small-pox to a second attack, though of general notoriety and truth, is not universal, and that with us, as elsewhere, persons, thus apparently protected, were seized with the disease, of which some of them died.

4. That inoculation of small-pox, though in general conferring on the person subjected to this process immunity from the effects of variolous contagion in after life, does not necessarily or infallibly guaranty him against the disease, nor prevent death when it has made its invasion.

5. That vaccination cannot now, any more than on its first introduction, be received as a certain preventive against the effects of the variolous poison, though now, as formerly, it must be considered as the best and safest with which we are acquainted.

6. That occasionally under all circumstances of exposure, but more especially during the epidemic prevalence of small-pox, its contagion will affect both the inoculated and the vaccinated, and produce in them a fever and eruption, differing in no essential feature from the primary variolous disease, except in the general mildness and speedier subsidence of the cutaneous disorder, and the more common exemption from secondary fever.

7. That, of the inoculated and the vaccinated exposed to the variolous poison, the former will more probably escape its influence than the latter; but if both be affected by this contagion, the chances of recovery are in favour of the vaccinated.

8. That the protecting power of the vaccine virus on persons who have been duly subject to its influence, is not diminished nor destroyed by the length of time from its first introduction into the bodies of such persons; and that no proportion whatever exists between its efficacy and the recency or remoteness of the epoch, when the constitution was placed under the influence of the virus.

9. That there is no reason for believing in the deterioration or alteration of the vaccine virus, which is used at this time, from that which was in use during the first years of the practice of vaccination.

The data on which we based the above conclusions were observations of 248 cases of natural and modified small-pox, of which 176 were visited at the hospital. Of these there were —

	Unprotected.	Vaccinated.	Inoculated.	Prev. Small-Pox.	Unk.
	155	64	9	7	13
Deaths	85	1	3	3	

In regard to colour the proportion was —

	Whites, total.	Whites unprotected.	Col. persons total.	Id. unprotect.
	111	60	122	91
Deaths		31		54

It is pleasant to find, after a period of enlarged experienced of fifteen years, these opinions of ours so fully sustained by the conclusions of the French Commission of Vaccine, made in 1839.

"1. That the simultaneous vaccination of the mass instantly arrests the progress of the variolous epidemic.

"2. That if vaccinia be not an absolute and infallible preservative against variola, it is at least the most certain, and the most exempt from danger.

"3. That varioloid, in the majority of cases, is the only inconvenience to which the vaccinated are exposed.

"4. That there seems no reason for the belief that the long vaccinated are not as surely preserved at the present day as they have hitherto been; or that the recently vaccinated have received less security than those who preceded them.

"5. That the complete success of-revaccination affords no proof that the individual had ceased to be protected by vaccination, and that he had again become susceptible of variola.

"6. That a second vaccination does not appear to possess the power, any more than the first, of protecting all persons indiscriminately from the risk of a future attack of variola.

"7. That government ought not to command a general re-vaccination.

"8. That the total extinction of variola is to be effected by the universal adoption of vaccination."

I am well aware, that of late years re-vaccination has been practised on a large scale on the soldiers in the armies of Prussia and Wirtemberg, as well as on the people, and with such results as would seem to weaken a belief in the continuedly protecting power through life of the first vaccination — but other and different testimony leave us nearly free to retain our first belief, with the explanations already offered.

Age for Vaccination — Selection of Matter. — I have always myself delayed vaccinating an infant until it was three or four months old; the practice, deemed to rest, by many of my medical friends, on speculation, is now gaining ground. Dr. Heim, of Wirtemberg, in a valuable work, of which a full analysis and critical notice are to be found in the *British and Foreign Medical Review*, for January, 1839, thinks that no child should be vaccinated within the first twelvemonth. I do not believe that so long a period is necessary for the functions of the new being to acquire their proportionate and harmonious rhythm and sympathy one with another, and thus to insure an adequate and

permanent impression being made on the system at large through the local affection on the skin produced by the vaccine virus; at the same time that I am fully convinced of the necessity of waiting some months after birth until this co-ordinate action and sympathy are established. "Four months," says the Reviewer, "was the age at which variolous inoculation was most successfully practised, and we are convinced that the same period is equally fitted for the development of the vaccine."

The vaccine pustule runs a given course of varus and of vesicle, which at length terminates in a concretion, and forms a crust. The stage of varus, or the papular, lasts but one day; the vesicular consists of four days *umbilicated*, and three *acuminated* and pustular: the process of incrustation is also three days more; so that allowing three days for incubation, the whole duration of the disease, from the time of puncture until the detaching of the crust, is from fourteen to seventeen days; but some days elapse after this before the crust or scab falls off. The eighth day is the period of the first blush of the areola; this enlarges on the three following days, or those of pustulation, which is also the period of slight fever.

As to the kind of vaccine matter to be selected, there will be little difficulty, if due attention have been paid to the preliminary conditions for the performance of the operation on the persons from whom we procure the vaccine matter. Although it is desirable on occasions to be able to use the fresh lymph, yet, for nearly all practical purposes, the dried matter of the scab, after the vesicle has attained maturity, will suffice. The greater convenience in keeping and transporting the vaccine matter in this state, has led pretty generally to the practice of vaccinating from the scab, previously moistened with water, and reduced to the consistence of mucus or thin mucilage, before it is used. Either this or the lymph from the vesicle is introduced into the skin, or at least under the cuticle by puncture or incision. Mere contact with some degree of pressure will at times suffice.

A question recently argued with considerable zeal is, whether matter from the human subject, after its transmission from person to person for a series of years, is to be still preferred to matter recently procured from a cow. Means of comparison within the last three years have been furnished to the profession in England, and measurably to many physicians in the United States, chiefly through the labours of Mr. Estlin of Bristol; but as yet the question is not clearly settled. The few comparative trials made by myself do not incline me to give a preference to the vaccine virus recently procured from the cow; or to retro-vaccination, as it is called. We have no evidence as yet of its greater protecting power.

Another question of practical moment is, the number of incisions or of points for the insertion of the vaccine. Commonly, one has been thought enough: but within a short period the practice of making numerous incisions has strong advocates, the chief of whom are Eichhorn and Gregory. The main advantage alleged to accrue from numerous insertions (by puncture or incision) is the greater probability of constitutional fever ensuing, and the consequent immunity from small-pox afterwards, or the necessity of re-vaccination. From

three to twenty is the number of punctures or ncisions and the insertions of vaccine matter in them recommended by different practitioners.

It is worth while to consider the strong probability, resting on evidence from different quarters, of the influence of atmospheric temperature on the development of vaccine pustules. The effects of cold in retaining and of heat in accelerating their progress, must be admitted to a certain extent. But in addition to these more obvious conditions of atmosphere, there are others of a local kind which greatly affect this question, such as the sirocco in Italy, the hot winds in Egypt, &c. — See *Brit. and For. Med. Rev.*, Art. *ut supra.*

Anatomically considered, the vaccine pustule has its seat in the muciform tissue of the cutis, and is a little more superficial than the small-pox pustule, which has its seat in the thickness of the dermis. At its origin, it is only a small tubercle, more or less hard, but when most perfectly organized, bisect, either horizontally or perpendicularly, a pustule, and it will be seen divided into a number of cells, separated from each other by a thin cellular tissue, each filled with a clear diaphanous liquid, which is the vaccine virus. The cells do not communicate together, but radiate from the circumference to the centre, where they unite in a common bride, which depresses the cuticle and gives the umbilicated character to the pustule. This is the state of the parts from the sixth to the ninth day — but it does not last, the lymph becoming altered and turbid, and pus mingles with the virus, the bride is broken, and the pustule ruptures. There are many anomalies in the form and character of the pustule. This latter we should regard as an external sign of a constitutional disease, but not necessary to it.

The *vaccine cicatrix* is round, deep, puckered, radiated, and studded with points, which answer, without doubt, to the cells into which the interior of the pustule is divided. It is more marked in proportion as it is more recent; but it is never entirely effaced by time. The cicatrix is not to be received as an infallible criterion of the actual amount of constitutional protection, although, in the existing state of our knowledge, it is the best.

Varioloid. — A few observations on varioloid or small-pox, and I have done. The subject bears on the protecting power of vaccination. I shall, for the present, content myself with the statement and conclusions in my paper before adverted to. — *North Am. Med. and Surg. Journ.*, vol. ii.

We must beg leave to press on the attention of our readers, the admitted and indisputable fact, that nearly every history of small-pox prevailing extensively or epidemically, furnishes cases of persons who had been attacked and died of the existing disease, who had gone through a previous one, and that so unequivocally, as to have been much marked and scarred. Similar returns have been noticed after inoculation. It is also well known that, occasionally, the fever and eruption of small-pox would seize those who have been vaccinated.

That in an epidemic season, in which the tendency to cutaneous disease was very great, as in the years 1823 and 1824, the poison of small-pox should affect the then three privileged classes, viz., those

who had had the disease in early life, those who had had it by inoculation, and those who had been vaccinated, was not an anomaly.

The operation of variolous poison, when it took effect on the vaccinated, was often similar for the first few days to that on the unprotected, that is, on those who had never been subjected to inoculation or vaccination, or who had not been in any former period attacked with the small-pox. The fever, the gastric distress, and pains in the back and head, were occasionally as distinctly defined as in the first period of the unmitigated disease. In some cases, the activity of the circulation, and the determination to the brain seemed to be greater in the modified than in the unprotected subject. The eruption on such occasions was at first of maculæ, in abundant crops, of a crimson colour, with scarlet borders, especially copious about the back, shoulders, and hips. But it is worthy of observation, that these maculæ, smooth, and without elevation, would for the most part disappear, without leaving corresponding papulæ. Where the eruption was constant, and proceeded on to maturation, the pustules were usually fewer, the constitutional disturbance at the time less, and the subsequent process of desiccation more rapid than in the genuine small-pox. Nor was there, in general, secondary fever in the former, as in the latter. In these particulars there were, however, some notable varieties; so that some who had been previously vaccinated were atttacked with such violence by the varioloid disease or modified small-pox, as to have their lives endangered, and the face subsequently marked with the scars from the pustules. But, in general the disease in this form was milder, more obedient to remedies, and very rarely of fatal termination.

It will be observed that we speak of the disease occurring in the vaccinated, and possessing the characters already described as necessarily the product of variolous poison, or that same contagion, which, in the unprotected, produced the natural small-pox. The identity of cause of the two forms of eruptive fever, variolous and varioloid, has been, we know, denied by some; but, for ourselves, we see no ground to doubt the sameness, if we are to be swayed by the customary laws of evidence. We are led to this conclusion by the following reasons.

1. Some of the vaccinated have at all times since the introduction of the cow-pox, had, on exposure to the poison of the small-pox, an eruptive fever similar in appearance and symptoms to the latter disease, except on the score of its mildness.

2. Some of the vaccinated have, on the introduction of small-pox matter by inoculation, had a pustule with an extensive areola, accompanied by fever, and a partial eruption on the other parts of the body.

3. In the same family, persons previously vaccinated have had this modified eruptive fever, while living with, or nursing, those labouring under the natural small-pox; and *e converso* persons have had the natural disease without having been exposed to any other known cause than living with others who were then suffering under, or had just recovered from, the modified or varioloid disease.

"The fact that small-pox, by effluvia, or in the casual way, can

take place within a limited time after the cow-pox, was first observed in Mr. Malim's case, see Med. and Chir. Review, No. 58; and I think Mr. Bevan's case (Med. and Phys. Journal, p. 455. vol. v.) is an instance of the same kind."* "Hence," continues this writer, "it appears that there are two different sets of eruptive instances, *to wit*, 1. Those of the casual small-pox contemporary with the vaccina. 2. Those of the casual small-pox supervening a few days after the constitutional affection in the vaccina." Dr. Pearson was one of the earliest and most zealous advocates for the practice of vaccination, and his opinion, as just given, comes most opportunely to the present argument. In his time, we see that the liability of small-pox supervening on vaccination, was thought to depend on the recency of this latter operation; merely, we presume, by a process of negative reasoning, for there were no opportunities to ascertain the liability of those vaccinated for a length of time, as the practice was then but of few years' adoption. In our day, we have seen an opposite opinion held, viz., the greater susceptibility to small-pox in those vaccinated for a term of years. Experience has shown long ago the fallacy of the first belief; the second must, we think, be abandoned on the same showing.

LECTURE CXLI.

DR. BELL.

RHEUMATISM—RHEUMATIC FEVER.—Fever anterior to the local inflammation—Rather a diathesis disposing readily to inflammation and fever—Rheumatic diathesis met with in the vigour of life—Division of rheumatism into *acute* and *chronic*—Distinction between the two—Seat of acute rheumatism—Extent of parts affected—Metastasis to internal organs; sometimes these first attacked—Practical inference—Community of causes of external and internal rheumatic inflammation—Acute articular rheumatism, or acute arthritis—*Symptoms* and *progress*—Constitutional disturbance great—Complications and transfers of disease—*Anatomical changes*—*Causes*—Vicissitudes of weather—The chief predisposing cause, excess of nutrition and hematosis—Sudden and violent strain, long marches—Special predisposition—Other causes—Males more liable than females—Influence of age—TREATMENT—Free and repeated venesection—Not to expect to remove at once the rheumatic fever—Local bloodletting, to the part affected and to the spine; purgatives; tartar emetic; colchicum; the two combined; their great depressing power: opium in large doses; nitre in large quantities; mercury, its true remedial value and time of use; warm bath; tonics; sulphate of quinia with opium—Other varieties of rheumatism; endocarditis; pericarditis—*Capsular rheumatism*—its affinity to gout; preference for the knee—Treatment—Nodosities of the joints—Rheumatic ophthalmia; bark so serviceable in—*Muscular Rheumatism*, is less acute than articular—Parts of the muscular system affected—Rheumatic diaphragmatis the worst—Treatment—Membranous, fibrous, or aponeurotic rheumatism—Treatment; iodide of potassium—Rheumatic paralysis—Electricity in.

RHEUMATISM (from ῥεῦμα, a catarrh or defluxion), a term originating

* An Examination of the Report of the Committee of the House of Commons on the claims of Remuneration for the Vaccine Pox Inoculation, containing a statement of the principal historical facts of the Vaccina. By George Pearson, M.D., F.R.S.

in hypothetical notions about the origin of a disease, is still retained; but so little is its derivation now thought of, that its use is become as harmless as any indifferent title.

Rheumatism is generally spoken of as a peculiar inflammation, chiefly attacking the joints and muscles and occasionally transferred to internal organs, as the heart; and in its acute form accompanied with great pyrexia. Some pathologists, however, having noticed the want of proportion between the alleged phlegmasia and the fever, have thought that this latter was the chief disease, which usually manifests itself by the appearance of inflammation or a kind of determination to a particular part. The tendency to this fever constitutes in their minds a rheumatic diathesis, which may, they tell us, exist and be actively developed in a rheumatic fever, the origin, progress, and decline of which are not dependent on the accompanying disease of the joints, muscles, or membranes, as the case may be.

This view is the more probable when we learn that the rheumatic diathesis is met with in persons in the vigour of life, or, at any rate, during the period when the nutrition is most active and their blood most abundant in the rich and stimulating element of fibrin. The greater number of cases of rheumatism of the active or acute kind is in men, and of these in a period between the fifteenth and thirtieth year of age.

Rheumatism is divided into *acute* and *chronic*. The first is commonly regarded as inflammatory; and to this view there is little practical objection: but more serious evils would follow in the belief that chronic rheumatism is always characterized, among other things, by an absence of inflammation; whereas this form of the disease consists, at times, in a true chronic inflammation of the parts affected, or it may be simple neuralgia, or is kept up by sympathy with derangements of the digestive apparatus and notably of the liver. Intermediate between the acute and chronic there is, occasionally, a stage which by some writers and lecturers is termed *active*, and in which, with little fever, there is considerable heat, swelling, and pain in the joints. You will have juster views of the character and progress of rheumatism as well as a better guide to its treatment, by your learning the order of parts chiefly and primarily affected, on the lesions of which and their associated functional disturbances, depend the features of the disease. I shall begin with acute rheumatism:

Seat of Rheumatism. — The first manifestations of acute rheumatism, are the symptoms common to the inception of all febrile diseases: rigors succeeded by flushing; accelerated pulse and thirst, but to which, in the case before us, are speedily added pain and tumefaction, with some redness and augmented heat of one or more of the larger joints — the ankles, knees, wrists, or elbows. These last are regarded as diagnostic signs of rheumatism. Reduced to their proper value, they indicate a lesion of the synovial or serous capsule of the joint and of the contiguous and adjoining ligaments and other parts of the fibrous tissue. But simultaneously or rapidly succeeding to or alternating with this state of the tissues

of the joint, may be a similar one of those of internal organs, as the serous lining of the heart, or the endocardium, and the investing sero-fibrous membrane of this organ, or the pericardium; the arachnoid and pia-mater of the brain; the muscular coat of the alimentary canal, bladder, and uterus; the diaphragm; the muscles of the chest and abdomen; the pleura; and the sclerotica, the tunica albuginea, and the fibrous envelope of the kidneys; the fibro-cellular sheath or neurilema of particular nerves; and the aponeurotic investments and divisions of the muscles generally, but in a more particular manner of the voluntary ones; finally, the ligaments of the spinal articulations and those termed sacro-iliac. Wherever fibrous and muscular tissues are present rheumatism may make its attacks.

The same cause or series of causes which produces acute rheumatism in the joints will give rise to this disease in any one or more of the tissues of the internal and other organs just enumerated. Commonly, indeed, it happens that the latter comes on after the affection of the joints, sometimes, but rarely, by metastasis, or a complete transfer of morbid action from the one part to the other; sometimes by more evident addition. But, on occasions, and they are more frequent than is believed, the internal organs will be primarily attacked, or at least the premonition, in some previous inflammation or tumefaction of a joint, will have been so slight as hardly to attract the notice of the physician, and was forgotten by the patient until he was carefully questioned in the matter. The practical inference from this view is, that in place of regarding rheumatism of the internal organs as anomalous, and to be driven to the joints, and thus reduced to its alleged true type, we ought to see in this affection of the internal organ a lesion of tissues, analogous to those which are the seat of acute articular rheumatism, and to be treated in the same manner as we would this latter. If there is a difference in our treatment it should be in the greater energy and promptitude of the means employed in internal than in external rheumatism. We shall, after all, have more correct pathological notions on this head, if we admit that inflammations of certain membranes, and especially of serous, sero-fibrous, and fibrous ones, are frequently induced by the same causes which gave rise to acute articular rheumatism; and, as marked by many, it may be said most, of the constitutional symptoms of this latter, they will require for their removal a similarly energetic course of treatment to that which is practised for the external inflammation.

Symptoms. — An imminent predisposition to this disease is manifested by the urine being deeply reddened, and by its depositing a red sediment. Another sign is a zone of vessels of a light pink colour surrounding the cornea, and often discernible, especially during the prevalence of northerly and easterly winds.

Acute articular rheumatism, or acute arthritis, as it is sometimes called, makes its attack in the manner already mentioned. The subcutaneous veins of the affected joints are more dilated than usual, and are the more apparent owing to the skin being now stretched, thin, and shining. The pain of the joint is increased by the slightest

motion, and even by touching it. Fluctuation, a sign of effusion into the cavity of the articulation, is only readily discoverable in the large joints, and especially in the knees, when the synovial membrane is the special seat of the morbid action. This change belongs, however, to that division of articular rheumatism which is designated as capsular.

With the local symptoms are associated fever, the more violent the greater number of joints attacked, unless, indeed, the membranes of the heart are affected at the same time, in which case the intensity of the febrile symptoms does not bear a proportion to the extent of the articular inflammation. The pulse is strong, full, and hard, and in a state which is best designated by the term vibratory or jerking: its beats are from a hundred to a hundred and twenty in a minute. There is much heat of the surface; little abated by abundant and somewhat clammy sweats of a stale, acescent, and nauseating odour, which often bathe the whole body; but which are still more frequent on the face and neck. After some days' continuance of the sweating, the skin, particularly where the perspired fluid has been most abundant, is covered with myriads of *sudamina*, which are often accompanied with a miliary eruption and red spots something like roseola. Derangement of the digestive function is manifested by loss of appetite; thirst, often excessive and continued; constipation, and high-coloured and deficient urine. This fluid becomes muddy a short time after its evacuation, and looks like new or sweet wine, and reddens litmus paper. The tongue is whitish and clammy, as if powdered chalk had been sprinkled on it: as the disease advances, if the stomach be irritated and stimulating articles used, it assumes more of a reddish colour. The mind and senses generally, if we except that of touch in the skin of the affected joint, are but little affected. At times, however, and more particularly with the evening exacerbation, there is some incoherency of thought and expression in the waking state, and disturbing dreams and mutterings during sleep. These last symptoms are more apt to occur if the patient have lived freely, or led a somewhat dissipated life, and has had his constitution enfeebled by this means.

The blood drawn from the arm exhibits very speedily a firm and glutinous crassamentum covered by a buffy coat, which I have seen in one case under my care, to be fully half an inch in thickness. The coagulated portion floats in a clear yellow or green serum. If the former be inverted it has the form of a mushroom. The fibrinous portion of the blood acquires its maximum in acute rheumatism.

Articular rheumatism, apart from its numerous complications with internal organs, shows itself with great variety, both in extent and intensity; sometimes attacking but a few joints, such as the foot, hand, or knee; at other times invading all the joints: and as to intensity, it is sometimes so slight as to be dissipated in twenty-four hours; and then again so severe as to last whole months, unless the most energetic treatment has been employed. In no disease are there such rapid and frequent transfers of morbid action, or metastases, as in acute rheumatism: subsidence of pain and redness, and even of swelling of the wrist, for example, being speedily succeeded by similar

phenomena in the knee or ankle; or a still more painful change, inflammation of the fibrous junctions of some of the spinal vertebræ or of the sacro-iliac articulations, rendering the slightest attempt at movement exquisitely painful. An extension or transfer of the disease to the aponeuroses and cellulo-fibrous investments of the muscles, which constitutes, in fact, for the most part, that variety called improperly muscular rheumatism, is, also, attended by excessively augmented sensibility; so that the pressure, even of the bed-clothes, is intolerable, and the jar communicated to the bed by a person walking heavily across the room is bitterly complained of by the suffering patient. In general, the fixedness and obstinacy of acute articular rheumatism are in the inverse ratio of the number of joints attacked; and the readiness of transfer is diminished in proportion to the positive structural changes in a joint, as by effusion, thickening of the membranes, &c. The average duration of acute rheumatism is laid down at thirty days, while by others it is stated to be eight days. The younger the age of the person attacked, the shorter, according to M. Chomel, is the period of his disease.

Anatomical changes. — That acute articular rheumatism is a true ARTHRITIS or inflammation of the joints, is evident from the appearances and morbid products of the tissues affected. As rheumatism is not often directly fatal, the opportunities of determining this question are, happily, not proportionate to the cases of the disease. Enough has been noticed, however, to assure us of the fact, that the fibrous and serous capsules of the joints are the parts which suffer most and primarily, and that they undergo, in persons who have died from other causes during or immediately after an attack of rheumatism, the changes characteristic of inflammation, such as thickening of the membranes, effusion of lymph into the cavity of the joint, and formation of pus. Alterations by enlargements of the ligaments are of subsequent occurrence, and in cases in which the disease assumes a chronic form. Instances are given by Bouillaud, some within his own observation, others collected from different practitioners, of pus having been found in the joints which had been attacked with rheumatism, and also of partial destruction of the articulating and fibro-cartilages. Mr. Cruveilhier, in an article on *Puerperal Rheumatism* of the muscles and synovial membranes, reports three cases which ended in suppuration, and with removal of the articular surfaces. The tendency to suppuration in rheumatism is said to be greater in puerperal females than in other persons.

Frequently as the muscles are represented to be the seats of rheumatism, we see that the muscular tissue proper is little subjected to structural changes from this cause. These take place in the interposed cellular tissue and the investing aponeuroses of the muscles, causing in the first, the formation of pus, and, in the second, the secretion of a sero-albuminous fluid. The one may terminate after a time as phlegmonous abscesses do; the other is extremely troublesome and hard to be cured. Notwithstanding the familiar reference to *carditis* and rheumatism of the heart in works of medicine, the number of cases of this nature is very small indeed, compared to the affections of the lining and investing membranes and of the valves

of the heart. Dr. Williams, in his excellent lectures on the *Physiology and Diseases of the Chest* (published in the SELECT MEDICAL LIBRARY for 1839), when speaking of carditis proper, or inflammation of the substance of the heart, admits that he has not seen it, at least distinct from the membranous affections.

Causes.—The common causes of rheumatism are various; but the chief one is exposure of the body to sudden vicissitudes of temperature, and more especially from a warm to a cold and moist air, and to the latter after the person has been greatly heated by exercise or labour. Much, however, of the susceptibility to be impressed in this way depends on the constitution and habits of life of the individual. The young and robust of the male sex who are of a sanguine temperament, and in whom there is a sanguineous plethora; they, also of the male sex, who have strained, as it were, the functions of life, whilst yet apparently in their prime and vigour, by the use of ardent spirits and stimulating ingesta, are the persons who most readily suffer in their health from the mutations of temperature and other atmospherical conditions, which are spoken of as the chief causes of rheumatism. It is not so much the activity of nutritive life generally, manifested in the deposition of cellular and adipose tissue under the skin and between the muscles and around the viscera, as of hematosis or the rapid formation and elaboration of blood with excess of fibrin by which the individual is rendered prone to rheumatism. Hence we often see persons of a spare habit of body, and who are far from being remarkable for their strength and muscular development, suffer as much from this disease as the athletic and robust. A very slight irregularity in the functions of secretion and depuration, induced by exposure to cold after the body is heated, will suffice in these cases to determine the blood to the fibrous tissues, and make it a stimulant in excess. Some of the persons, with this susceptibility, will have common inflammatory fever,—others acute rheumatism or rheumatic fever, according to the season, and their subjection to occasional and predisposing causes, and a sudden and violent exertion or strain upon a particular part is the exciting cause; as when the effort to pull on a tight boot gives rise to lumbago. The susceptibility, again, is created by prior irritation in a part, as in the joints of the lower limbs by a long march, in the alimentary canal by the frequent use of drastic purgatives, in the kidneys and bladder by the use of fermented and distilled liquors and highly azotised food.

The atmospherical alternations and vicissitudes, so manifest and sensible in spring, are recognised causes of rheumatism in common with those of pleurisy,—whilst analogous changes, together with the prevalence of easterly winds and a still more abundant moisture, place the former on a line with fevers of alleged miasmatic origin; and hence it is no uncommon thing to find violent pains in the fibrous tissues, as well tendinous as aponeurotic, to alternate with or themselves assume the type of periodical fevers.

Much stress has been deservedly laid by some writers, MM. Roche and Andral, for example, on a predisposition to rheumatism, which, in addition to the states of the system already mentioned, consists in great sensibility of the skin and an especial activity of the capillaries

of this part. It is increased after each attack, so that the person who has often suffered in this way will have a return of the disease from the slightest causes, as any error of regimen, the changes of season, and other varieties of temperature. Stress is laid by Prout and some other writers on the predominance of lactic acid in the blood as a cause of the rheumatic diathesis. Hereditary predisposition is not without its force in many persons who are frequent and early victims to rheumatism.

Among the causes depending on prior alterations in the state of the body itself, are the disappearance of a cutaneous affection, the sudden drying up of an issue, or of the hemorrhoidal or menstrual discharges; blows and falls; and the protracted use of mercury. If the influence of this last cause be admitted, its operation is more evident in the production of chronic than of acute rheumatism.

As regards sex, acute rheumatism is more prevalent among men than women. The influence of age is manifested in the fact, that a majority of those attacked with the disease are between fifteen and thirty years of age.

Treatment.—The age and sanguineous plethora of the patient attacked with acute articular rheumatism; the frequent and hard pulse, hot skin, violent pain, redness and swelling of the affected joint or joints, and the diminished secretions, would seem to indicate at once the propriety of venesection. General experience sanctions this practice, which, in order to be fully serviceable, ought to be early resorted to, and in such measure as shall produce a decided impression on the general system as well as an abatement of the local inflammation. From sixteen to thirty ounces of blood, according to the vigour of the patient and intensity of the disease, may be taken from the arm at once; and if the distress and pain continue, or are soon renewed, the bleeding should be repeated to an extent commensurate with the urgency of the case and the degree of toleration by the patient of the first evacuation. They who, with M. Andral, allege that the blood in a rheumatic subject is not only in excess, but also that it is too stimulating by its over-abundant quantity of fibrin, which is at its maximum in acute articular rheumatism, will find additional motives for a diminution, by venesection, of the amount of a fluid which, through the medium of the capillaries, morbidly excites all the tissues, and notably at this time the fibrous, the sero-fibrous, the synovial, and the muscular. The appearance of the blood drawn, consisting as it does in such large proportion of a dense and tenacious coagulum, and exhibiting a buffy coat of great thickness, would seem to justify the wisdom of the treatment. But, although it is one of the elements in our calculation of the intensity of the disease and of the parts affected, we are not to lay undue stress upon this appearance; and we must remember that, in some cases of rheumatic fever, nothing short of an entire renewal of the circulating mass would be followed by an absence of buff on the surface of the blood drawn. It is, however, not the less clear that, in this first stage of acute rheumatism, whether we regard the state of the heart and bloodvessels, even though we may not believe them to be the seat of phlogosis, or the quantity and quality of the blood circulating in them, the vascular system has the

ascendency, and by its morbid change gives its features to the disease. Hence, so long as these features persist unchanged, so long, without a very nice reference to the number of days which have elapsed since the disease began, or to the prior frequency of venesection, ought we to persist in the practice of this latter. If the inflammation of the joints should continue after an abatement of the morbid excitement of the heart, which is to be measured, as well by auscultation and percussion over this organ, as by the state of the pulse, cups in the vicinity of the inflamed part, or leeches directly over it, will often contribute to the end proposed. When the pains shift rapidly from joint to joint, and from the upper to the lower extremities, or contrary wise, cupping on each side of the spinal ridge, in lines extending from the cervical to the lumbar vertebræ, will be followed by manifest relief. Auxiliary to bloodletting, but seldom adequate substitutes for it, will be the administration of mercurial followed by saline purgatives, and afterwards of tartar emetic. This last is to be begun in a sixth and increased to a fourth, and soon afterwards to half of a grain every two hours. The physician who has not made trial of the antimony in this manner, with a view to its directly antiphlogistic or counter-stimulating operation, irrespective of and even unaccompanied by evacuations, either of vomiting, purging, or sweating, will be greatly surprised at its effects, and the extent to which the stomach will tolerate it, so long as vascular excitement is maintained. It is more especially in inflammation of the fibrous or serous system, or in acute articular rheumatism and pleurisy, that I hold tartar emetic, given in large doses frequently repeated, to be a valuable therapeutical aid.

With the same view by which we are guided in having recourse to tartar emetic, we may also use the colchicum in acute rheumatism, either alone or in combination with the first named medicine. The preparation with which I am most familiar is the vinous tincture of the seeds, which I gave at first in a dose of a drachm or two drachms with magnesia or salts, in order to produce an early and marked impression; or I add to a drachm of the wine of colchicum seeds a grain or two, as the case may be, of tartar emetic, dissolved in four ounces of camphor mixture with some sugar, and direct a table-spoonful every two hours. The effects of this combination, thus administered, are — general perspiration; at times purging without griping; and a decided abatement of the pain and fever. The salutary action on the skin is rendered still more evident, if twenty to thirty drops of laudanum have been added to the mixture. Earlier recourse may be had to opium when thus combined, than either alone or in any other form. But you must be prepared to find the stomach more and deeply affected by large doses or the protracted use of the colchicum, than by tartar emetic. Hence you will be required to exercise vigilance in watching the operation of the former, and withholding it when it begins to display its poisonous effects; such as frequent vomiting, and purging of mere watery fluid; deep-felt distress and anxiety, chiefly due to the powerful impression of the drug on the sympathetic nerve; and great feebleness of the voluntary muscular system. The *acetum colchici* is also much used in this disease; and more recently, the acetic extract, in a dose of half a grain gradually increased to three grains.

Opium, always a favourite remedy in rheumatism of every form, has been recently, on the strength of Dr. Cazenave's experience in its favour, used by Dr. Webb of Providence, in a dose of one grain every two hours, until "hilarity" and "perspiration" are induced; and then in the same dose every two hours, and afterwards a diminution of dose and increase of interval. In one case forty-two grains were taken in fifty-four hours; in another, sixteen grains in the same number of hours. Sometimes v.s. and purging had been premised, at other times not. Ptyalism and purging were occasional effects of the opium. — (*Boston Med. and Surg. Jour.*, vol. xvi.) Dr. Corrigan, of Dublin, gives similar testimony in favour of the opium practice in acute rheumatism. He has prescribed ten or twelve grains in the twenty-four hours. Small doses are said to increase the fever and restlessness. My own belief, however, still is, that in rheumatism and in the phlegmasiæ generally, so long as the vascular system maintains its disproportionate ascendency, as manifested by the chief symptoms and secondary changes, which are the result of its morbid state and action, little good can be expected from the use of opium or of any of the narcotics, unless in combination with tartar emetic or colchicum.

Purgatives may well alternate with the use of colchicum and antimony and their repetition will be indicated by the appearance of the tongue, and the discharges being fetid and slimy. Calomel and jalap, or calomel with the compound extract of colocynth, will answer in these cases. Nitre, recommended nearly a century ago by Dr. Bucklesby, in quantities of six to ten drachms in the twenty-four hours with large dilution, has been of late prescribed by M. Aran, of Paris, in the same dose and hours until relief is obtained.

Under the circumstance in which, although vascular excitement is in a measure controlled, yet the articular inflammation and pain, and the general disturbance and anxiety still remain, mercury is recommended as an almost certain means of relief.

I believe, however, that we shall do better to abstain from calomel, or other preparation of mercury, except as a purge, or from mercury and opium, in the early days of the first stage of acute rheumatism; and to wait until vascular excitement is somewhat reduced. When the inflammatory condition is about to yield to the irritative; when capillary is more evident than cardiac excitement; or when the sub-acute, or as some writers call it, the active stage, has arrived, calomel or blue mass may, if necessary, be had recourse to, either alone or in conjunction with opium. If, indeed, the nervous has succeeded to the ascendency of the vascular system; and pain, restlessness, and wakefulness, with simple irritability and a dry skin have replaced a hot or clammy skin, a hard pulse, flushed cheeks, and great thirst; then may opium alone, or with ipecacuanha or antimony, or even with minute doses of colchicum, be directed, with great benefit for the time, and more safely to the patient than the so-highly praised combination of calomel and opium.

It is in this sub-acute stage of the disease that the warm water or warm air bath, sponging of the surface, and the moist vapour bath, will conduce, in addition to the above remedies, to a restoration of the natural state of the skin, and through it to the internal secretions, and

at the same time contribute to remove the remains of inflammation and associated stiffening of the joints.

Now, also, is the time for the administration of sulphate of quinia or some other preparation of the bark. Little as I can doubt the powers of observation and fidelity of narrative of so many English practitioners who have lauded the bark in rheumatism from the very beginning of the disease, I cannot abandon my own convictions of its inapplicableness to the acute stage, such as we find it in the class of subjects, young, sanguine, and plethoric, who are its chief victims. But when this stage is passed, and the patient is enfeebled, sweats excessively, and is still unable to move his limbs without suffering extreme pain, quinia should be had recourse to as a means of completing the recovery, rather than as necessary repressive of the primary intensity of the malady. More especially will it be useful in cases strictly paroxysmal and which exhibit tolerably distinct intervals of ease from pain. We need not wait, whether we have to deal with common articular rheumatism or that variety in which the sclerotic coat of the eye is so severely affected, until the yet injected and sensitive, though no longer inflamed membranes, have resumed their natural colour and appearance. This resumption will be often expedited, and the general system strengthened by the use of the quinia — provided, as already stated, that the intensity of the inflammation be subdued, that the tissues of the internal organs are not the seat of acute disease, and that the digestive canal be neither phlogosed nor loaded by feculent or fetid matter.

It rarely happens that we are forbidden to combine opium with sulphate of quinia when the stage is reached in which this latter is admissible; and there are often good reasons in the vigilance and restlessness, indicated by the common yet vague term nervousness, which will render such a combination very useful. In the latter period of acute articular rheumatism, iodide of potassium is used by Dr. Graves, in the dose of ten grains, sometimes increased to thirty, three times a day. Such large doses are not necessary.

The *regimen*, using the word in its large and appropriate sense, in acute rheumatism, ought to be exceedingly simple. Exquisitely and painfully sensible as the patient often is to cold air, and even to the momentary perflation caused by a sudden motion given to the bed-clothes or curtains, he ought to be protected against any action of this kind, whether by under currents affecting his feet when he is able to set up, or by draughts in the opening of doors, or through the crevices of these and of windows when he is confined to his bed. In an especial manner, also, it is the duty of the nurse, or other attendant in the sick room, to preserve a uniform temperature, not less than 60 nor above 70 degrees of Fahrenheit, and to watch that the patient is not exposed during sleep by any deficiency of covering from the bed-clothes.

The diet will consist for a while exclusively of simple drinks; water alone, or an infusion of rice or barley, of such temperature as may be most grateful to the patient, and weak tea — common, or that of the simpler herbs. One proof of the state of excessive hematosis and the hypersthenia of the system generally, which pre-

cede, and for a time exist after the coming on of acute rheumatism, is found in the toleration of extreme abstinence, not merely in the sense understood by the physician, but in that, also, admitted by the patient, and evinced in his want of appetite and prolonged thirst, and call for drink alone. I have had a case of acute rheumatism under charge, in which large and frequent sanguineous depletions had been practised, together with the administration of the more active remedies already indicated, and in which the patient for three weeks ate but a few mouthfuls of bread and rice, and drank little else than cold water. He had an aversion to and took little of the drinks which I recommended, and which are appropriate for an inflammatory febrile disease. But with a reduction of the pulse in its frequency and hardness and a removal entirely of the local inflammation, together with a return of the skin and tongue to nearly their natural state, came appetite and its allowably moderate gratification. The sulphate of quinia, I may mention here, was given at this stage with good effect in accelerating convalescence, which was, ere long, complete.

Other Varieties of Rheumatism. — Reference has been already made to the frequency of metastasis of rheumatism, not only from one joint to another, but, also, from the joints to the internal organs, and especially the lining and investing membrane of the heart, constituting *endocarditis* and *pericarditis*. These affections not only supervene after often very slight premonition from articular rheumatism, but they may occur primarily as results of the rheumatic diathesis. But, having adequately enlarged on this topic, in my lectures on diseases of the heart, I shall not recur to it now.

I have not, in the preceding remarks on the pathology and treatment of articular rheumatism, drawn a line of distinction between disease of the articular ligaments and their cellular investments, and disease of the synovial capsules and bursæ. To this latter Dr. McLeod, in his useful volume on *Rheumatism in its Various Forms*, &c., affixes the title of capsular or synovial rheumatism, and which he thinks is characterized by less inflammation and pain, and requires a less depletory treatment: local bloodletting by cups or leeches sufficing for this intention, and colchicum and the iodide of potassium here displaying their best and distinctive effects, such as we not do not see evinced in the ligamentous articular rheumatism. That there is undoubtedly in most cases a marked predominance of one or other of these parts, the ligamentous or the synovial, capsular, I do not deny; but that there is that separation which would justify a classification on this basis is quite problematical. For practical purposes it may be well to be able to appreciate the predominance of one or other of these tissues, with a view to some modification, but not, as it seems to me, difference in treatment.

Capsular rheumatism bears a close relation to gout, and is alleged by Dr. Todd to belong to this disease rather than to rheumatism proper. Be this as it may, it is infinitely more persistent than the kind already described, the true acute articular rheumatism. It affects several joints, but more generally becomes fixed in a limited

number, and of those its preference is for the knee. Suppurative disorganization of the joint is sometimes produced by capsular rheumatism. This latter is rarely if ever cut short at once, and its subacute or chronic fever is more enduring. The fever is generally of a remittent type with copious perspirations.

Thus far I follow Dr. McLeod's description and attempt at diagnosis, but after all must it have been noticed by the observing physician that in the beginning the ligamentous or fibrous inflammation shows itself with such an intensity as to mask for a while the capsular, and it is only when the former subsides that the latter by its persistence becomes more evident. They stand, therefore, rather in the relation of the stages of the same disease than of distinct varieties. This view harmonises very well with the treatment which, in the capsular, is less active, as already stated, than in the fibrous rheumatism.

Recourse is had to leeches, or, if pain allows, to cups; to the parts affected, camphorated and spirituous lotions have also been recommended. Purging will alternate with the use of colchicum, its wine or the acetous extract. If of the former, the dose is twenty drops three times a day with carbonate of soda or of potash; and of the latter, one to three grains at bedtime, combined with a grain of opium, or a quarter of a grain of morphia, or with five grains of Dover's powder. In the subacute and chronic form, the iodide of potassium is given in a dose of from two to four grains three times a day.

There is sometimes a thickening about the small joints, which Dr. Haygarth many years ago called nodosities of the joints. The deposits formed are found to consist of carbonate of lime; whereas the chalkstones, as they are called in gout, are well known to consist of lithate of soda.

The most painful and important rheumatic inflammations of the fibrous tissue is that of the tunica albuginea of the eye or the sclerotica, constituting rheumatic or catarrho-rheumatic ophthalmia. The disease is characterised by a haziness and dulness of the cornea and corresponding indistinctness of vision; with a dull aching pain and some sense of tightness; but often a more serious pain around the eye, as in the brow, temple, cheek, nose, and side of the head, than in the eye itself. The pain is worse at night. Sometimes the disease extends slowly to the iris. In chronic rheumatic ophthalmia, the sclerotica is the only part affected.

The treatment of rheumatic ophthalmia is to be conducted on the same principles and with the same remedies as rheumatism of the other fibrous textures. Bark has been found by Mr. Wardrop, Mr. Lawrence, and others, to be of the greatest utility. It is administered in small doses, five to ten grains every two hours, or as long as the stomach will bear it; and better still, in combination with the carbonate of soda.

Muscular rheumatism is represented to be more generally chronic than either the ligamentous or capsular, and attacks later in life. Its most common seat is in the muscles moving some of the large joints, as in the hips or shoulder; the loins, too, are often affected, constituting *lumbago*, and not unfrequently the neck. M. Andral thinks that

the anatomical seat of this last variety is in the investing membranes of the spinal marrow.

Sciatica, commonly spoken of after lumbago, as a variety of rheumatism, is, in fact, an inflammation of the cellulo-fibrous envelope, or neurilema of the sciatic nerve, and belongs to the class of neuralgic affections. As such it has already engaged our attention.

The other parts of the muscular system which are represented to be occasionally the seat of rheumatism, are the diaphragm, and of that part belonging to animal life, the occipito-frontalis, the temporal, masseter, sterno-cleido-mastoidean, the superficial and deep-seated muscles of the thorax and the lumbar ones. In all these cases, however, I am inclined to believe that the tissue really affected is the aponeurotic and tendinous expansions and interlacements, with occasionally the subjacent and contiguous cellular tissue. This opinion would seem to be the more probable, from the fact of all the muscles above mentioned being largely supplied with fibrous tissue, — aponeuroses and tendons, and of the absence of organic changes in the proper muscular tissue. Where, as in the case of abscesses of the masseter muscle, there is really an inflammation under the fasciæ in the substance of the muscle itself, the sensation of the sufferer and the other accompanying phenomena are far from being identical with those experienced and noted in rheumatism of this part, and in which, among other peculiarities, the patient sometimes labours under a sort of trismus. We are led also to the same inference by noting the severity of rheumatism when seated in the pericranium, a fibrous expansion in the disease of which no muscular tissue can be supposed to play a part.

Rheumatic pains may attack all the regions of the spinal column, — the cervical, dorsal, or lumbar vertebræ, — either in their articulations or in the muscles which unite them; or rather, as I believe, in the fasciæ which extend from the articulations over the muscles. M. Andral thinks that the true anatomical seat in that variety called *lumbago*, is in the investing membranes of the spinal marrow. If possible, a still more painful variety is in the sacro-iliac articulations, and it may be in the investments of the sacral nerves at the same time. Of the thoracic muscles, the pectoralis major and minor, which have, we know, a full share of tendino-aponeurotic structure, are occasionally affected with rheumatism. In the female this may sometimes simulate, or at least be confounded with a disease of the mamma. Rheumatism of the deeper seated or the intercostal muscles is designated by the term *pleurodynia*, which is liable to be mistaken for pleurisy, unless attention be paid to the fact, that, although in both diseases there is a catch, owing to the severe stitch in breathing, yet that the pain in the former is greatly augmented by pressure and movement of the body, while at the same time there is little or no fever. Pleurodynia has been mistaken for disease of the liver, of the kidneys, and of the intestines. But a mistake, of still more probable occurrence, is the confounding of lumbago with chronic inflammation of the kidney, in which latter both pressure and, in degree, motion, aggravate the pain; but the rising up and sitting down, which are so difficult for a person affected with lumbago, will aid us

to form a diagnosis of this latter disease. It is distinguished from overloaded colon, which is sometimes attended with pain in the back as well as in the hip, but which is detected by the unequal resistance on feeling the abdomen, and by an examination of the stools.

Of all rheumatic inflammations of muscular structures, that of the *diaphragm* is by far the most distressing and painful in its symptoms and dangerous in its results. In such a case respiration is laborious, and accompanied with *singultus* and a sardonic grin, or convulsive distortion of the angles of the mouth; there is acute pain and a cord-like constriction of the lower part of the thorax extending to the back and loins, increased and descending lower during inspiration, diminished and ascending higher during expiration. The breathing is short, frequent, anxious, small, and performed entirely by the intercostal muscles — the abdomen being nearly motionless. In addition to these symptoms, the deglutition is frequently painful and difficult, and the patient sighs and exhibits a most anxious expression. Delirium is also a common adjunct to the other morbid peculiarities. The pulse is always frequent — at first strong and hard, afterwards small, more quick and wiry. For full details on inflammation and other lesions of the diaphragm I refer to *Copland's Medical Dictionary*.

The treatment ought to be active in proportion to the alarming intensity of the malady; and hence, in primary *diaphragmitis*, venesection, so as nearly to produce syncope, the patient being in an erect or at least sitting up posture, will be the first measure resorted to, after which cupping on the loins and back, leeches under the sternum, purgatives, &c., are to be used. In acute rheumatism of the diaphragm the same remedy to nearly the same extent should be used: but if it be of a more chronic character, or succeed to gout, then will cups to the loins, and leeches under the sternum be a suitable substitute for venesection; they should be followed by the use of active mercurial cathartics, colchicum, derivatives applied to the joints, and large doses of soda or potash with magnesia, ammonia, or camphor.

The practitioner ought not to be deceived by the presence of *singultus* and the great depression of the powers of life so frequently attendant on diaphragmitis; so as to forego the use of the lancet, cups and leeches in favour of antispasmodics and stimulants. Nor should he be induced, by the state of the stomach, and of the matters discharged from it, to exhibit emetics. After the first bleeding the author of the Dictionary cited above recommends recourse to large doses of calomel and opium in the true inflammation of the diaphragm, such as from ten to twenty grains of the former, and one to three of the latter, either with or without from one to three grains of camphor, and repeated at intervals of six or seven hours. If inflammation of the adjoining viscera be associated with the disease, and the pleura and pericardium implicated, calomel, antimonials, and diuretics, ought to be used.

In general, however, depletion need not be carried to the same extent in muscular as in fibrous or acute articular rheumatism. Purgatives answer a better purpose, and after their use, if the acute stage

have declined, the more stimulating remedies come into use; such as the ammoniated tincture of guaiacum, in a dose of from half a drachm to a drachm, and even two drachms, three times a day. Oil of turpentine is, by some, the preferred article in this variety, in doses of from half a drachm to two drachms three times a day. It ought not, any more than the guaiacum tincture, to purge. The common warm and the vapour bath answer very well at this time. Acupuncture sometimes produces great and sudden relief.

In a subdivision of fibrous rheumatism, or the aponeurotic, we include rheumatic inflammation of the periosteum, periosteal rheumatism of Dr. McLeod, pericranium, &c. The treatment in primary attacks will consist in leeching and the use of opium, iodide of potassium, and sarsaparilla. Blisters over the pained periosteum are frequently of service, and in obstinate cases relief is obtained by painting the parts with tincture of iodine. The warm bath is both grateful to the patient and serviceable to the complaint. It is in some of the chronic cases that arsenic displays such good effects.

LECTURE CXLII.

DR. BELL.

CHRONIC RHEUMATISM.—Ideas to be attached to the term chronic; its relation to acute—Division of chronic rheumatism—Anatomical lesions in—Length of time for cure—Entire renovation of the system necessary—Classes of subjects of chronic rheumatism—*Treatment*; sometimes analogous to that in the acute; occasionally bloodletting; always free purging; Dover's powder; diaphoretics; colchicum; iodide of potassium; sulphate of quinia, sometimes with purgatives, preceded by blue mass or colchicum. Mixed varieties of chronic rheumatism; blue mass with hyosciamus, &c.; various remedies for chronic rheumatism; bathing after various fashions; embrocations and liniments; bandaging; acupuncturation; warm and hot bathing; sea-bathing; hygienic treatment, preventive and curative.

CHRONIC RHEUMATISM. — The term chronic should imply simple duration without regard to the degree of structural change, or of functional disturbance. In pathology, duration is, however, evidence in general of the relatively diminished intensity and violence of a disease; since, we know that life is incompatible with its unabated continuance; and hence, when we speak of a chronic affection we connect with it the ideas both of a period of some duration from the date of its onset and of an abatement of the characteristic symptoms; but beyond this inferences cannot legitimately be carried. We have no authority in the premises for saying or supposing that acute and chronic are contrasted, as inflammation and its absence, sthenia and asthenia, organic changes and their cessation, would be. If there was inflammation in the acute stage of the disease there may be inflammation still in the chronic; if fever in the former, this perturbation may be present also in the latter: the difference is in degree but not in kind. Divested, then, of hypothesis, and studied in reference to the facts of the case, chronic rheumatism is found to be manifested by similar symptoms, because it depends on lesions of the same tissues and order of parts, and on the same functional disturbances with those of acute rheumatism. In both stages, for so we ought to express it, rather than to say in

both diseases, the pain may be either fixed in a part, or wandering to other parts; in both, the heart, the alimentary canal, the kidneys, bladder, &c., may be the suffering organ. So long as there is decided inflammation, we might say progressive organic excitement in the joints, tending to the formation of new products, or to the thickening of tissues, there will be associated with it a quickened pulse, some increase of heat of the skin, a furred or loaded tongue, and imperfect cutaneous and renal secretions. Reference being had to the symptoms in such a case, the disease might be called *active*, as akin to, but less in degree than acute: but if we take duration as the measure of our terminology, the disease must still be qualified by the epithet chronic, since it may last in this state for months.

Chronic rheumatism may be articular or simply fascial. In the first the organic changes are the same as those already noted in acute rheumatism. In the second the pains are felt more in the length of the limb; in the muscles, as we are commonly told, but, in fact, in their fasciæ, and, at times, we may suppose, in the periosteum of the long bones. When the inflammation has lasted for a length of time the articular swelling is increased; the ligaments, the capsules, and the cellular tissue even, are sometimes blended into a mass which soon assumes a homogeneous and lardaceous aspect, and in which all traces of organization are lost. In some cases the synovial membrane is inflamed, the cartilages are exposed and partially destroyed, the ends of the bones softened and carious, and there seems to be no other resource for the unhappy patient than amputation. The limbs adjoining the swelled and rheumatic joints occasionally become emaciated and atrophied; and if, for example, the elbow or the knee be the seat of the disease, the forearm is flexed on the arm, or the leg upon the thigh, and the flexor muscles acquire a habit of contraction, often most painful and at times incurable. Some kind of white swelling is one of the effects of chronic rheumatism.

If you are called to treat such cases as this you will not allow yourselves to be deterred by the possible misconception of its nature by another physician, or, what is more likely, the prior neglect and foolish quackery of the parents or friends, for a long period previously, from adopting at once those measures, to which the same symptoms at the beginning of the disease would have urged you.

In giving advice in chronic rheumatism, it is proper to apprise the patient, that, although an occasional prescription may palliate unpleasant symptoms and procure for him a period of ease, yet he must not hope for entire restoration to health without persevering for a length of time in the medicinal and dietetic course marked out for him. His whole diathesis must be altered. It is necessary, also, to fix his attention on the functions, the proper performance of which constitutes the indispensable condition for this recovery. These are the digestive and perspiratory; the organs, the gastro-intestinal mucous and the skin. The other important organs, the kidneys, will discharge their functions if the two first conditions have been carried out. But in chronic disorders, in which the skin, alimentary canal and kidneys have been long implicated, we cannot hope for health until the morbid habits which they have contracted are broken; and which require

for their severance a deeper impression than is produced by the temporary disturbance and alteration of medicines,—short always of the destructive ones of mercury and arsenic. We must set about, therefore, a restoration of healthy habit through the channel of the organs of assimilation and nutrition, and by means of regimen in the large and philosophical sense; that is, of suitable diet, exercise, occupation, periods of sleeping and waking, and the adjuncts of bathing and friction, and shampooing or massage of the skin. These are the principal; medicines and medical compositions the secondary and auxiliary, but not on this account unimportant or always dispensable. The subjects of chronic rheumatism may be classed in two divisions: The first or active exhibits, in addition to pain and tumefaction of a joint, febrile excitement; a quickened and sometimes a rather tense, but small pulse; a dry and somewhat hot skin, but which readily perspires and as readily cools afterwards; a foul and furred tongue; irregular state of the bowels; urine often high coloured and with a cloudy sediment. The sleep is disturbed by dreams; the appetite is unequal, often wanting; the disposition moody and fretful. The second or passive division shows proofs of torpor,—1, of the skin, which is cold; 2, of the bowels, which are costive; 3, of the kidney, the secretion from which, though often copious as regards the mere amount of fluid, is deficient in urea and saline proportions. The appetite is generally good, sometimes voracious; the tongue is moist—it may be large and whitish on its surface: the frame of mind is rather apathetic than merely depressed. Sleep is obtained and enjoyed when it is not interrupted by pain. This latter is seldom confined to a joint; but wanders especially over the fasciæ of the muscles of the trunk and limbs and those of the head and face.

In cases of the first division or analogous ones, the treatment will be similar to that adopted in acute rheumatism, with perhaps a less reliance on bloodletting, though still not to the exclusion of venesection from the arm, if the collection of symptoms seems to call for this remedy. If there is persistent fever, and with it symptoms of chronic pericarditis, or endo-pericarditis associated with or immediately preceding the disease of the joints, bloodletting is proper, but with more reserve as to the quantity and repetition than in the acute stage of these sero-fibrous inflammations. The extent to which you will carry purging will be influenced by the state of the stomach,—thirst and epigastric heat forbidding; but in general this measure is required both on account of its directly ameliorating effects, and as a preparation for the use of remedies of another class called, we may suppose for want of a better name, alteratives. Purgatives, composed of calomel with some of the vegetable resins or extracts, such as jalap, colocynth, aloes, &c., will be required at first; and afterwards the blue mass given in the evening, and infusion of senna with some carminative in the morning. These measures, aided by a reduced regimen, short, however, of that entire abstinence so useful in acute rheumatism, will of themselves abate, if they do not remove, the local pain and constitutional disturbance; and, at any rate, they will singularly facilitate the beneficial operation of opium, in the form of Dover's

powder, repeated at regular intervals during the twenty-four hours, and by warm drinks, until free sweating is produced. During the administration of diaphoretics, or of opium alone, which so often acts as a diaphoretic, the patient should be kept in bed in a room of a even and moderately elevated temperature. The vinous tincture of colchicum, alone or in conjunction with laudanum, but in smaller doses and at longer intervals than when it is taken for acute rheumatism, is a useful remedy at this time, and particularly if there be any remains of febrile action. In this form of disease, as well as in rheumatic gout, for which the remedy has been more particularly recommended, the colchicum powdered minutely with loaf sugar, would be of service. Mr. Wigan advises it in a dose of eight grains every hour, in a medium most acceptable to the patient, untils what he calls the point of saturation is obtained; which is generally after eight or ten doses have been taken. Five grains, at longer intervals, will be quite enough.

It is now that iodide of potassium in full doses, with sarsaparilla syrup and decoction, performs so good a part.

If the skin is cold, and there is much exhaustion by prior disease, or profuse but exhausting sweats, sulphate of quinia will be administered without delay in a dose of five grains early in the morning; its use at this time having been preceded by that of five or eight grains of the blue mass, or half a drachm of the tincture of colchicum seeds in the evening before. In the efficacy of this practice experience has given me considerable confidence. It is that to which you should have recourse at once in the torpid cases of the second division,—contenting yourselves with having given an active aloetic purge, such as of five to eight grain of aloes and a drachm of sulphate of potash, on the day before you begin the quinine, and omitting the blue pill and the colchicum. In the mixed varieties of chronic rheumatism, in which the digestive functions are impaired, the blue mass given in combination, as with hyosciamus or stramonium, in such doses as to insure an obvious effect on the intestinal secretions, and consentaneously on the nervous system, seems to me to be preferable to the calomel and opium so generally and often so lavishly and empirically prescribed, with little reference to other immediate or remote effects on the systems just specified.

Among the numerous, one might say innumerable, remedies for chronic rheumatism, favourable notice has been made by Armstrong of the mountain flax (*Linum catharticum*); and by Brera, of the *Ballotta lanata* in decoction, procured by boiling half an ounce of the plant in an unglazed vessel with as much water as when strained shall amount to eight ounces, which quantity is to be taken at four doses in the twenty-four hours. The alcoholic extract of aconite, on the authority of Drs. Lombard, Sigmond, and others, in a dose of a quarter of a grain every two hours, gradually increased to six or eight grains in the same period; and the decoction of the cimicifuga or black snake-root among ourselves, have been used with benefit. Of the remedies whose action is more particularly directed to the tissues by modifying their nutrition, it will suffice to mention the chief ones; viz., arsenic in the form of Fowler's solution, two drops

twice or thrice a day; corrosive sublimate, a twenty-fourth part of a grain; and iodine and its salts. The effects of the corrosive sublimate and of the iodine are, respectively, augmented by the simultaneous use of the infusion or the compound syrup of sarsaparilla. My own experience would make me partial to a solution of the iodide of potassium, or of this salt and of the iodine itself — Lugol's solution, with the syrup of sarsaparilla. Dr. Otto relates his success, in cases of obstinate chronic rheumatism and of sciatica, with the carburet of sulphur, in the form of a tincture, — two drachms of the carburet in half an ounce of rectified spirits of wine, for internal use; and a liniment, composed of two drachms of the carburet in half an ounce of olive oil, for external use. Dr. Graves, with a view of meeting the double indication, to act on the alimentary canal and the skin, and to preserve the strength of the patient, has prescribed the following formula, similar in its composition to a well known popular remedy in Great Britain, called the Chelsea pensioner:—℞. Powdered bark, ʒi.; Powdered guaiacum, ʒij.; Cream of tartar, ℥i.; Flower of sulphur, ℥ss.; Powdered ginger, ʒi.: to be made into an electuary with common syrup. The ordinary dose is a teaspoonful three times a day; but in this respect the quantity must be varied in different subjects, so as to keep up a mild yet steady action in the bowels, and to procure a full alvine discharge at least once a day. Mezereon, guaiacum, volatile alkali, separately and combined, have been proved in chronic rheumatism. The ammoniated tincture of guaiacum is the most active preparation, in the dose already mentioned. Dr. Chapman retains his partiality, long ago expressed, for savin in this disease. It must be given in full and gradually increased doses until an itching and heat are felt on the skin. Arsenic, in the shape of Fowler's solution, has cured some obstinate cases of chronic rheumatism.

But neither these various remedies nor others that might be cited, if a catalogue rather than a methodical distribution were the object, should cause us to forget the alleviating, if not positively curative, powers of opium and its different preparations. Of more uniform strength and convenient exhibition than any other medicine of the vegetable tribe, opium has the additional advantage of producing effects which, whether propitious or otherwise, can soon be appreciated, and serve as a guide for its subsequent administration. In rheumatism of a decidedly chronic character, and more especially in that variety in which the muscular aponeuroses and other fibrous membranes are affected, and in which the pains are erratic, yet severe and harassing, the nervous system has the ascendency over the vascular. In such a state will opium given in full doses display its benign effects. Among these, and a no small evidence at any time of its adaptation to the case and stage of disease, is diaphoresis, or at least a softness and warm moisture of the skin. It has seemed to me that this effect more frequently and readily ensued on the administration of the salts of morphia than of solid opium or laudanum. I have succeeded in giving entire relief to a person who had been afflicted for some days with violent sciatica, by directing a grain of the acetate of morphia, in solution, of which a fourth part every hour was taken until the whole was used. Venesection to the

extent of a pound had been previously practised by my direction. Preparations of iron, including the iodide, are requisite in the more decidedly atonic cases of this disease.

It is in the torpid and atonic states of the system, when it is suffering from chronic rheumatism, that the sweating method has been serviceable. In order to give full effect to this part of the treatment, a direct impression should be made on the skin by prolonged immersion in a warm bath of about 96 to 98 degrees; the same nearly with that of the deservedly celebrated *Warm Spring* in Virginia; or, what is preferable, by the application of simple watery vapour, for a period of from twenty to thirty minutes. The vapour of alcohol, in the manner recommended and successfully practised by Dr. Jennings of Baltimore, and that of sulphur, have been productive of the best results in chronic rheumatism; more particularly in cases in which there was stiffening of the joints, with swelling of the bursæ and dropsical effusions. The temperature of the vapour from water need not be less than 95° F., nor, advantageously, more than 120°. In active rheumatism, or in those cases of chronic in which there is still some fever and gastric irritation, the vapour ought to be at the minimum temperature; whereas, in the more protracted cases, with cold skin and rigid joints, it may be used at the maximum. For numerous additional details respecting the method of evolving and of applying vapour, and of the auxiliary processes of friction, as also of the application and virtues of douching with hot water and vapour, I must refer you to my work on *Baths and Mineral Waters*, in which these and kindred subjects are fully discussed. The douche or spout bath, is one of our best, perhaps the very best *discutient*, to use an old-fashioned term, but one as expressive and therapeutical as any of more recent origin.

Simple hot air, with certain substances volatilized in it, as benzoin, amber, juniper leaves, has been used with alleged good effect. The testimony in favour of sulphur baths is still stronger. Of late years camphor, vaporised by being thrown on a plate of hot iron, has been extolled by M. Delormel. Instances are recorded of the heat in some of these dry vapour baths having been raised to 70° of the centigrade thermometer, or 158 of Fahrenheit, without any inconvenience being experienced by the patients. In these cases, either the head is entirely external to the bath, or a communication is established between the mouth and the common air. This precaution, generally proper, is indispensable with subjects of a plethoric habit, who are disposed to a determination of blood to the head or to hæmoptysis.

When the pain and swelling of a joint persist after suitable local depletion, successive blisters, the *vesicatoires volans* of French writers, have a beneficial effect. The following is the manner of employing them to the best advantage. A plaster of cantharides of moderate size is to be applied on the affected joint, and after twenty-four hours it is to be removed, and the blistered surface dressed with cerate, having merely opened the raised vesicle without detaching any of the epidermis. So soon as this heals, a second blister is to be put on another part of the joint, and to be followed

by the dressing, as before; and so on until the desired relief is obtained, or a cure accomplished. The patient often expresses himself as benefited after each blister.

Various embrocations and stimulating liniments have been used for the purpose both of abating pain in a joint and of removing the induration and thickening of tissues by which it is enlarged. An enumeration of these is hardly to be expected, nor is it necessary on this occasion. Oil of turpentine and water of ammonia are the basis of most of them, to which some empirics add tincture of cantharides, croton oil, tartar emetic, &c., so as to make a liniment which at times gives decided relief by the counter-irritation of the skin to which it is applied; but which, heedlessly and ignorantly used, has caused not only ulceration of the skin, but permanent deformity of the subjacent tissues. Mr. Laycock, of York, Eng., has given cases to show the good effects of the tincture of colchicum and camphor rubbed on the pained parts.

M. Gondret, in a work on Derivation as a Means of Relief and Cure of Plethora, Inflammation, Hemorrhage, &c., takes great pains, first to describe all the means which he uses for the purpose of counter-irritation, and then their different degrees of strength and adaptation to the several stages of the disease. — (*British and Foreign Medical Review*, 1839.)

One of the favourite means which M. Gondret employed for the purpose of producing counter-irritation, and thus relieving rheumatism, both acute and chronic, is what he terms '*pommade ammoniacale*;' the preparation of which is thus described: Take of hog's lard seven drachms, of oil of sweet almonds one drachm and a half, and of liquid ammonia (of twenty-five degrees) from five to six drachms. Melt the hog's lard, mix with it the oil, and pour them into a wide-mouthed bottle with a ground-glass stopper; then add the ammonia, close the bottle, mix the contents together by shaking, and keep the mixture in a cool place. A report of a committee of the French Royal Academy of Science is strongly in favour of this remedy, which is represented to be more prompt in its action than cantharides, exempt from the distress occasioned by the absorption of this medicine, and capable of much more varied effects. If the skin is to be excited, perspiration re-established, and some sub-cutaneous engorgement to be dissipated, light and hasty frictions accomplish these objects. If a rubefacient effect is sought, its application for one or two minutes spread thickly on linen answers the purpose. In case vesication is required, a similar application for five or ten minutes produces the effect. On the other hand, should absolute cauterization be desired without alarming the patient, or shocking the prejudices of certain medical men against the cautery, a somewhat longer application attains this end.

Not only in chronic articular rheumatism, but in the fascial and neuralgic varieties, this pomade will be found serviceable, if rubbed along the course of the pain or, as in sciatica, of the nerve itself.

Among the local means of relief we may enumerate rollers applied with some degree of tightness round the affected limb and joint. More benefit is expected from this process, if at each time of the

renewed application of the roller, once or twice a day, friction be assiduously practised; and, in addition, some liniment or ointment rubbed on the part. Dr. Graves mentions the entire relief procured by this plan, in a case of most obstinate chronic articular rheumatism, which had been intractable to a great variety of remedies, among others of mercury to the extent of salivation. The medication which he directed in the case was to rub mercurial ointment gently over the affected parts, assisting its action by the use of rollers in the way just specified. The mouth was affected by this inunction. In a similar state of disease I have used the ointment of iodide of potassium with benefit. The commentary offered by Dr. Graves on the question, whether good can result from the local application of mercury, unless it affect the general system, is applicable to the use of both the ointments here mentioned. He argues that there is no necessary connexion between the local and general effects, in regard to the topical use of mercury; and that although ptyalism follows in cases, yet in others unequivocal benefit is obtained without this result.

Acupuncturation, an old remedjal means revived some years ago, has afforded, unquestionably, with all due deductions for the credulity of physicians and the imagination of patients, relief from harassing and severe pain in this form of rheumatism, as it has also done in certain varieties of neuralgia.

I must forego for the present addressing you on the subject of the details of a full hygienic course, requisite to be pursued by the rheumatic invalid, as well to complete his cure as to prevent a return of the disease. This would embrace a consideration of the use of mineral waters, particularly those of the *sulphurous* kind; sea-bathing; change of climate; and travel, &c.; and an observance of the rules of temperance in the exercise of both his bodily and mental functions. The resources from which the patient must mainly draw, are furnished by regimen more than by medicine. On the regulation of his habits, his command over his appetites, his prudence and perseverance, will his entire restoration to health chiefly depend. A point of the first, if not paramount importance, is to restore the digestive functions to a healthy state, — a result to be procured, not so much by daily purging, or by the alternation of purgatives and tonics, though these are at times admissible, as by wholesome food — moderate in quantity, simple, yet tasteful in quality — walking in the open air, or riding on horseback, — and by the lighter sports, or gymnastic exercises, which call into action all the limbs and the muscular system generally, without strain or stretch.

The pleasantest natural warm bath, of a temperature the best adapted to most cases of advanced chronic rheumatism, is that of the Warm Springs; and hot bath, at the Hot Springs, Virginia. The saline sulphurous water, which has deservedly acquired the greatest vogue, is the White Sulphur Spring, thirty-five miles distant from the Hot. Akin in virtue to those of the White Sulphur, are the waters of the Salt and Grey Sulphur. Of a temperature midway between that of common water and of the Warm Spring, is the natural bath of the Sweet Springs, which, on this account, is well adapted to the

cases of rheumatism in which the Hot and even the Warm Springs are found to be too exciting. The invalid whose stiffened limbs have acquired freedom of motion by the spout bath or douche at the Hot Springs, and general bathing at the Warm, might advantageously complete his course, and prepare himself for encountering the common fluctuations of atmosphere, by daily bathing for a while at the Sweet Springs.

The high and deserved reputation, so long enjoyed by natural sulphurous water, for the cure of chronic rheumatism and many other chronic maladies, has not prompted physicians to prescribe artificial sulphurous and saline waters to the extent and with the frequency which, from my own experience, would, I am sure, be justifiable and proper. I have often derived the best effect from the sulphuret and sulphat of potash, with sulphate of magnesia largely diluted in water, and drank once or twice a day for some weeks. If there be hepatic complications or enduring disorder in the digestive canal, indicated by a loaded and furred tongue, and other concomitant symptoms, especially scanty and perverted renal secretion, I prescribed three to five grains of the blue mass in the evening, and the saline and sulphurous water in the morning before breakfast and, if necessary, at noon, or thereabouts. The proportions of the latter are as follows: Sulphuret. potass. ʒi.; Sulphat. potass. ʒij.; Sulphat. magnes. ℥ss.; Aqua fluvial. Oij. After shaking up this imperfect solution, the dose is a wine-glassful, to be taken still further dissolved in a tumblerful of water. The proportion of the two sulphates will be, of course, increased when it is desired to act on the bowels. Care should be taken to keep the bottle which contains this mineral water closely stopped. The occasional use of the warm bath, and twice daily frictions of the whole cutaneous surface, will aid the good effects of the water.

In common, and when there is no special tendency to an increase of the perspiratory function by the use of sulphur or diaphoretics, a substitute for sea-bathing will be found in immersion for a few minutes, sometimes less, in a cool bath of about sixty-five degrees, saturated with salt — or what will be more convenient and adapted to a greater variety of cases and complications, daily sponging the surface in the morning after rising with salt water, and then rubbing it well with a dry towel and a flesh brush.

But whatever value we may attach to these and other parts of an alterative and prophylactic course of treatment, the essential ones are, after all, to be found in regimen — plain food taken at proper hours and after proper intervals; regular exercise; and an avoidance of all the causes which enfeeble the nervous system, and predispose the erring individual to the morbid impression of atmospherical vicissitudes. Among these causes, and almost on a line with positive and debasing sensual indulgences, is a prolonging the period of study or of business application far into the night. A minute specification of the articles of food proper to be used by a rheumatic invalid, who is going about, and who is intent on preventing a return of his malady, need not be given here. In the selection, something will depend on his own personal experience of their relative digestibility; something in the

facility of procuring them. It may be laid down, however, as a general rule, that if he had been in the habit of free repletion he must eat less, no matter how simple may have been his fare; and if, a more probable supposition, he have erred by using mixed and stimulating food, he must substitute unity and simplicity in its stead, remembering, however, that the meal of one day need not be representative in every particular of that of the next. Each day should be marked by plainness of food used; but there may be, as regards many days, variety with simplicity. If the milk regimen accord with his former custom, and be found to agree with his stomach, it ought to have the preference, with its proper adjuncts, good but never warm or fresh bread, well boiled vegetables, and ripe fruits in their season. Green and acid fruits are unfriendly to those afflicted with rheumatism.

On the score of drink, there is only one proper for both the rheumatic and the gouty invalids, who really desire to recover their health and entire usefulness; and that is water. If its coldness offend the stomach, it is easy to amend this fault; if saline or earthy matters are in excess, boiling and a common filter will produce nearly all the requisite changes; at any rate, so far as to preclude all excuse for adulterating the water by the admixture of ardent spirits, or wine. Putting aside all special pleading, as to the temporary relief procured by distilled spirits and vinous and malt liquors, the plain proposition is proved beyond all reasonable question, that, for anything like perfect recovery and subsequent exemption from the violent attacks of acute, or the harassing and wearing down ones of chronic rheumatism and gout, a simple regimen — one of the chief features of which will be abstinence from ardent spirits or fermented liquors — is a *sine qua non*. In thus specifying the kind of drinks to be abstained from, it is not meant, however, to undervalue the injury from persistence in gross alimentation, nor the great advantages from a marked change of living in this respect.

Electricity has been sometimes used with good effect in chronic rheumatism, but more especially is it serviceable, according to the recent experience of Dr. Golding Bird (*Guy's Hospital Reports*, No. xii.), in paralysis following this disease. Rheumatic paralysis occurs after exposure to damp and cold, and sudden alternations of temperature, which leaves the patient in a febrile state, followed by inability to move one or other of the limbs, and often a single leg or arm, if either of these have been exposed to the influence of a draught or current of air. In general, sensation remains either slightly or not at all impaired, but the paralysis is generally complete. This state may continue for an almost indefinite period; and at length, from want of exercise, the muscles of the affected limb become atrophied; and the chance of relief from treatment of any kind becomes proportionably diminished. In cases of this kind, before the wasting has occurred, the influence of electricity is very remarkable, frequently restoring power to the paralysed muscles in a very short time. I have seen cases of rheumatic paralysis cured by the continued use of the hot douche along the affected limb, and in more obstinate cases still on the spine. Visits to the Warm and the Hot Springs of Virginia and the use of the douche there, have produced almost unexpectedly happy results in this disease.

LECTURE CXLIII.

DR. BELL.

GOUT—PODAGRA, &c.—Reasons for regarding gout as a febrile disease—Its affinity to rheumatism—The general or constitutional disturbance precedes the local lesion—*Gouty Diathesis*—Wherein predisposition to gout consists—External habit or physiognomy—Temperament—Modes of living—Excessive repletion and indolence the chief predisponents—Gout a disease of the rich, or of those easy in life who eat much and work little.—The poor drunkard and the rich bibber—Exception in cases of certain menials of the wealthy, and labourers who drink malt liquor to excess—Vexation and strong mental emotions in general—Danger to the man of letters from free indulgence of the appetite—Inherited predisposition—Its real force—Age and sex considered—Paroxysm of gout—Warning or premonition—Disorder of the digestive organs the chief predisposing and often exciting cause—What is the special exciting cause acting on a plethoric habit—Excess of lithic acid in the blood—Proofs derived from chemistry and physiology, and from the pathology of analogous diseases—Important inference—*Treatment*—In acute gout, the remedies antiphlogistic—Sometimes venesection, always purgatives—Colchicum with the alkalies and magnesia—*Modus operandi* of colchicum—Diet extremely simple in acute gout—Convalescence not to be hurried by tonics—Bathing, general and local, and frictions—Treatment of a second paroxysm analogous to that of the first—Change in appearance of the articular inflammation—Tendency to attack the great toe—Suppuration rare—Topical remedies of small value—Cold of doubtful propriety, if not dangerous.—*Chronic Gout*—Its analogy to dyspepsia—Treatment analogous—Case in which direct depletion was required—Chronic gout is seen in females—Analogy to rheumatism—Local treatment of service—Chronic gout more harassing and continued than the acute—Chalky concretions—Sediments in the urine—*Irregular Gout;* its sub-varieties—Admission of atonic or misplaced gout hypothetical—Comparisons of diathesis and diseases—Restriction of term gout to articular inflammation with constitutional disorder—*Prophylaxis*—Conditions for prevention—Hygienic and therapeutical means—Necessity of restricted and regulated diet—The appropriate drink—Exercise and fresh air—Perseverance in prophylaxis.

GOUT—PODAGRA—ARTHRITIS.—Under one or other of these different titles is designated a disease, which, in view of the parts affected externally, has considerable affinity to rheumatism. Both of these are commonly described of late years under the head of diseases of the locomotive apparatus, and mainly of the fibrous tissues of the apparatus; but the arrangement, as it seems to be, is, if not artificial at least imperfect, as only taking cognisance of a part or a local effect of a constitutional disease, the real cause and seat of which are general; being diffused through the blood and deranging the chief functions of nutritive life. Rheumatism should rather be called rheumatic fever, and under the head of fevers I have described its acute form. Gout, also, might without impropriety be similarly classed, since its invasion is always marked with more or less pyrexia, returning in its acute form, at irregular intervals, with paroxysms. To call gout a disease of the fibrous texture implies as limited and erroneous a pathology as to say that remittent fever is a gastro-enteritis, or typhoid a dothinenteritis, because the chief and more constant organic lesions in these fevers are found in the stomach and duodenum, and in the glands of Peyer. Even in the case of one of the most serious and extensive of the phlegmasiæ, pneumonia, you were told at the time, that it is a question, not at all decided, whether

it gives rise to or ensues on the fever associated with it in its course. No doubt, in gout as in the other diseases mentioned, the local lesion, the topical inflammation, proves to be a strong additional source of irritation, and tends not a little to keep up and augment the febrile reaction; but whether we look at it in a mere pathological aspect, or with reference to therapeutical indications, we shall take entirely too restricted a view in supposing that the disease mainly consists in this local lesion, or is to be cured by remedies addressed to this latter. The observation which I made when speaking of the metastasis from the joints to internal organs in rheumatism, is equally applicable to gout, viz., that we must look for a common cause by which sometimes the former, sometimes the latter order of parts is affected, and not suppose the transfer of a local morbific matter from the joints to internal organs.

Before inquiring into the class of subjects, who, from their habit and constitutional peculiarities, are most prone to gout, I will repeat the definition of the disease given by Dr. Copland (*op. cit.*). Constitutional disorder, giving rise to a specific form of inflammation; often favoured by original or hereditary constitution appearing after puberty, chiefly in the male sex, returning after intervals; generally preceded by, or alternating with, disorder of the digestive or other internal organs; and characterised by affection of the first joint of the great toe, by nocturnal exacerbation and morning remission, and by vascular plethora; various joints or parts becoming affected after repeated attacks, without passing into suppuration.

Gouty Diathesis. — The predisposition to gout is disclosed sometimes by the physiognomy of the individual, and by his physiological states, but on these indications we cannot much rely without a knowledge of the commemorative signs, deduced from an inquiry into his habits and descent.

"The gout generally attacks those aged persons," says Sydenham, "who have spent most of their lives in ease, voluptuousness, high living, and too free an use of wine, and other spirituous liquors, and at length, by reason of the common inability to motion in old age, entirely left off these exercises which young persons commonly use. And further, such as are liable to this disease have large heads, and are generally of a plethoric, moist, and lax habit of body, and withal of a strong and vigorous constitution, and possessed of the best stamina vitæ.

"The gout, however, does not only seize the gross and corpulent, but sometimes, though less frequently, attacks lean and slender persons: neither does it always wait till old age comes, but sometimes attacks such as are in the prime of life, when they have received the seeds of it from gouty persons, or have otherwise occasioned it by an over-early use of venery, or the leaving off such exercises, as they formerly indulged to a great degree, and who besides have had voracious appetite and used spirituous liquors immoderately, and afterwards quitted them of a sudden, for those of a thin and cooling kind."

The strumous diathesis is said to give a predisposition to gout; and that they who in early life are in danger of scrofulous deposit are, at a later period, if they have enjoyed ease and repletion, liable to gouty

inflammation. Dr. Prout, perhaps, states the proposition too broadly, although numerous instances might be adduced in its support, when he says: "Thus gout and struma are frequently if not always associated; and the gouty chalk stones of old age may be considered as little more than modification of the scrofulous tubercle of youth, both being alike formed from the mal-assimilation of the albuminous principle." The simple lymphatic temperament, the basis of the strumous diathesis, is not enough, however, to give the gouty predisposition without a strong nervous modification approaching to the irritable. A full corpulent frame of body is the most common in gouty subjects, more particularly of those who procure for themselves without derivation from ancestry this supposed badge of gentility.

As regards the mode of living which predispose to gout, almost universal experience is in harmony with the remark of Sydenham already quoted. Great eaters, free drinkers of fermented liquors, the idle and the luxurious, are the foremost candidates for the articulation badges of "chalk stones." As in the case of most other diseases not of the febrile contagious class, causes of less intensity and application will serve to bring on the disease a second time. It follows almost necessarily that the rich, or those whose situation in life dispenses with active occupation and labour, furnish the larger number of gouty subjects, and transmit to their children a ready predisposition to the disease. Indolence or inadequate exercise and gluttony may, it is true, be met with among the retainers of the titled and the wealthy; and when this is the case, the homely phrase of 'like master like man' is strictly verified. The pampered menials, overfed and under, worked butlers, footmen, and coachmen, in wealthy families in England are not unfrequently sufferers from gout, and furnish another example of the facility with which the externals of gentility, for gouty nodosities has been claimed as one, can be imitated.

As a general rule, however, the poor are exempt from gout, by their urgent necessities preventing the operation of the two causes of luxurious feeding and indolence. Nor does the indulgence in habits of intemperance by potations of distilled liquor bring with it in them the same penalty that wine drinking does in the wealthy. Of the two forms of *arthritis* or articular inflammation, rheumatism is the tax most frequently paid by the vulgar dram and grog drinker; gout, that incurred by the genteel and sometimes the literary wine-bibber. The former, if the disease persists or returns, often is liable to be carried off by seizure at the heart; the latter by that of the stomach, So that on the score of sentiment and association, the poor devil of a whiskey or rum drinker has rather the advantage over his more privileged neighbour who drinks wine and quotes Anacreon and Horace.

In referring to the occasional occurrence of gout among the menials in the houses of the rich, it should be known that their habits in all respects, even to the finishing the bottle of port, or of claret, and of later times hock and champagne, sent from the dinner or supper table, are the same as those of their masters, if we except, perhaps, that they take less exercise than many of the latter. The general exemption from gout which poverty confers by its usual concomitants of simple fare and hard labour is sometimes lost when these are not carried out. They who,

as in the case of some of the porters in London and bargemen on the Thames, indulge in continual and excessive draughts of malt liquors, and especially porter, furnish gouty patients from among their number. It has been observed that the plethora induced by malt liquors is eminently favourable to the development of gout as well as of its kindred disease of renal calculus, particularly of the variety of the lithates. Hence, in England, in addition to the parties just designated, it is found that butchers and innkeepers are liable to gout.

To indolence and intemperance, Cadogan adds vexation, and these three he believes to be the chief causes in the production of gout. In the acute primary form of the disease, the two first place the body in a state of such imminent predisposition that almost any common exciting cause will suffice for its development into open display. In secondary gout, and where the predisposition is inherited, vexation, and indeed any painful impression on the nervous system will contribute largely to the production of the disease. Intense mental occupation and late hours of study have been adduced among the causes; but except as indirectly interfering with the rhythm of the assimilating functions, their influence need not be taken into account. Certain it is, however, that where both stomach and brain are tasked at the same time, the former by excessive repletion, the latter by protracted exercise of the intellect or conflicting emotions, the liability to an attack is greatly increased. Rarely can the man of letters or the devotee of science indulge his appetite with impunity. If he escapes apoplexy or gout, he is liable to dropsy or dyspepsia, with all its proteiform horrors.

Reference has been made to inherited predisposition to gout, owing to the disease having attacked the patient; and in common much stress is laid upon this as powerfully contributing to the gouty diathesis. Scudamore's statistical estimates do not, however, favour this view to the extent in which it is generally entertained. He states, that out of 213 persons afflicted with gout, 84 could not trace it either to the side of the father or the mother. Of the hereditary cases, 62 were derived from the father, 29 from the mother, 14 from both father and mother, 14 from the grandfather. When only one parent has had it, the child or children having the greatest resemblance to that parent will be most liable to it. In estimating the force of inherited predisposition, we must, also, take into account the habits derived from the parent's example, as where the son indulges in the same course of a rich and luxurious living as his father, with perhaps even less bodily and mental activity than the latter manifested, especially if he had been the architect of his own fortune. The one had become luxurious and indolent, a sufferer from plethora after the greater part of a life of activity, and he has the disease late or towards the fiftieth year of his age. The other, exposed almost from infancy to the deleterious influence of undue repletion and indulgence of the palate, with made dishes and various wines, may have the disease at twenty or twenty-five years of age, or even during the period of adolescence. Is it quite logical to cite this latter as a case of inherited gout? Besides, it often happens that the child was begot before the gout or even the gouty diathesis. But, as Mackintosh justly observes, "if the case were somewhat altered, if the father, however gouty he might be,

were to experience a reverse of fortune, and his son were obliged to break stones on the road, or to earn his bread by any other kind of severe labour, then there would be about a hundred chances to one, that, to whatever disease he might be heir, he should never have the gout" (Dr. Morton's edition, p. 828).

The age most favourable to the coming on of gout is between 25 and 50 years. Of 209 cases recorded by Scudamore, 78 occurred between 30 and 40 years of age, and 43 between 40 and 50 years. Rarely does gout occur before puberty, although exceptional examples are not wanting. Of the two sexes, man is by far the greatest sufferer: women are not, however, exempt. The only case of gout which I saw during my twelve years attendance in the Philadelphia Dispensary was of an English woman.

Before I speak of the exciting causes of the disease let me describe to you a paroxysm of the regular gout, in the words of Sydenham, who was himself a great sufferer from the disease. "The regular gout generally seizes in the following manner: it comes on a sudden towards the close of January, or the beginning of February, giving scarce one sign of its approach, except that the patient has been afflicted, for some weeks before, with a bad digestion, crudities of the stomach, and flatulency and heaviness, that gradually increase till the fit at length begins; which, however, is preceded, for a few days, by a numbness of the thighs, and a sort of descent of flatulencies through the fleshy parts thereof, along with convulsive motions; and the day preceding the fit the appetite is sharp, but preternatural. The patient goes to bed, and sleeps quietly, till about two in the morning, when he is awakened by a pain, which usually seizes the great toe, but sometimes the heel, the calf of the leg, or the ankle. The pain resembles that of a dislocated bone, and is attended with a sensation, as if water just warm were poured upon the membranes of the part affected; and these symptoms are immediately succeeded by a chillness, shivering, and a slight fever. The chillness and shivering abate in proportion as the pain increases, which is mild in the beginning, but grows gradually more violent every hour, and comes to its height towards evening, adapting itself to the numerous bones of the tarsus and metatarsus, the ligament whereof it affects; sometimes resembling a tension or laceration of those ligaments, sometimes the gnawing of a dog, and sometimes a weight and coarctation, or contraction, of the membranes of the parts affected, which become so exquisitely painful, as not to endure the weight of the clothes, nor the shaking of the room from a person walking briskly therein. And hence the night is not only passed in pain, but likewise with a removal of the part affected from one place to another, and a continual change of its posture. Nor does the perpetual restlessness of the whole body, which always accompanies the fit, and especially in the beginning, fall short of the agitation and pain of the gouty limb. Hence numberless fruitless endeavours are used to ease the pain, by continually changing the situation of the body and the part affected, which, notwithstanding, abates not till two or three in the morning, that is, till after twenty-four hours from the first approach of the fit; when the patient is suddenly relieved, by means

of a moderate digestion, and some dissipation of the peccant matter, though he falsely judges the ease to proceed from the last position of the part affected. And being now in a breathing sweat he falls asleep, and upon waking finds the pain much abated, and the part affected to be then swelled; whereas, before only a remarkable swelling of the veins thereof appeared, as is usual in all gouty fits." The pulse is generally full and hard, and the tongue loaded and furred.

It has been said that gout sometimes makes its attack without any premonition, in the midst of the fulness of health, and after enjoyment of the keenest appetite. We may receive, however, the description of Sydenham on this point as expressing the real state of things; and add that some deny any warning to have been given because they did not choose to notice it.

Whether as predisposing or exciting, disorder of the digestive organs is avowedly one of the most usual causes of gout. This disorder, itself induced by the circumstances already mentioned, and in part depending on congestion or local plethora, becomes a cause contributing to and exciting into morbid activity general plethora. It stops short of inflammation, which would, by anticipating, prevent the other series of functional disturbances that end in confirmed gout. It is even not violent enough to destroy though it abates appetite, and in order to stimulate the palled sense, new articles of food or common substances with large condimental additions are eaten, with the effect of aggravating the original disorder of the digestive apparatus and of hastening the development of gout.

But after all this description of diathesis and predisposition, and I have endeavoured to make it brief, you will ask what is the actual state of the individual about to be attacked with gout, and what is the special exciting cause. Remembering his general frame and temperament, probable age, and habits of living, and that we see one in whom nutritive life is exceedingly active, who is suffering from general and abdominal plethora, a redundancy of blood and juices, an over-nice balance between the action of the heart and the capillaries, and an already weakened organic nervous system owing to over-excitement, we need not marvel that a comparatively slight exciting cause should bring on violent disease. Constipation, cold, fatigue, external local injury, as by a bruise or strain, strong mental emotions, loss of habitual sleep, common errors in regimen, will severally so affect the nervous system and interfere with the regular capillary action as to bring on a paroxysm of disease. But of what nature shall this disease be? Nearly all the conditions laid down are such as would apply to the causes of apoplexy or pneumonia, even to rheumatism. We have gone as far as physiology will lead us, as far as general pathology unaided by chemistry can point the way, in our progress of etiological inquiry. Can we not advance a step further, invoking chemical aid, and see whether this blood, so abundant or rather redundant, already liable to clog and be arrested in the minute capillaries, giving rise to congestion and inflammation, is not altered in its quality as well as thus morbidly augmented in quantity.

If we look at some of the organic products of gout, we find those formations on the joints commonly called "chalk stones," which are

not, however, composed of chalk, but of soda united to lithic or uric acid. This is no normal secretion, either as regards apparatus or product: it comes directly from the blood, which is charged with this salt, or what is more generally believed with the lithic acid. This latter escapes largely also from the kidneys after a gouty paroxysm, although at the time the urine contained less than it does in health. Here, then, we have proof of the excess of this organic product, which, also, at these times, is believed to escape from the skin, and we should infer *à priori* that there must be the recognised chemical conditions for its large production. Do comparative physiology and pathological phenomena quadrate with what we see in the condition of the gouty individual, and aid us in solving this problem? The answer is satisfactory. Lithic acid abounds in azote; containing from 30 to 40 per cent. of this latter, or more than any other organic substance except urea. It is the result of the introduction and assimilation of the albuminous principle, the most animalized and azotised of the various substances used for the food of man. In the carnivorous mammalia both urea and lithic acid abound, whereas in the herbivorous they are absent. Chevreul tells us, that when dogs are kept for a long period on vegetable food, their urine becomes like that of herbivora, in ceasing to contain any lithic acid or phosphate of lime. (*Müller's Physiology*, Bell's edition, p. 445.) Although it is not yet a point definitively settled how far lithic acid is a secretion from the kidneys or of prior formation in the blood, the leaning of belief to the latter supposition is the more plausible, from the fact that its quantity in the urine is increased by merely taking animal food. One, indeed the chief use of the urinary secretion, is to carry out of the system decomposed and effete animal matters, such as urea and lithic acid. Failing to perform this part, either through defective action of the organ or through excess of these matters in the blood, disease results.

Let us apply these facts to gout. The individual whom we find to be labouring under the gouty diathesis unites all the conditions for the formation of lithic acid. He takes habitually a large quantity of animal food: his chyle and blood are both formed from the assimilation of a large proportion of the albuminous or most azotised principle, but the latter fluid thus surcharged is not subjected adequately to what Prout calls the second assimilating process, for the completion of which active exercise in the open air, to quicken the respiratory process, would be necessary, and a large formation of lithic acid results. This writer, in his admirable work (*On the Nature and Treatment of Renal Diseases*), which I recommend to your careful study, points out the circumstances under which lithic acid is most largely secreted and lithate deposits formed in the urine; and they are precisely identical with those that we have seen give rise to gout, or develop the gouty diathesis.

In brief summary, then, chemistry shows that, in gout, lithic acid is largely secreted in the urine and in the joints. Physiology indicates the circumstances and conditions under which this acid is formed and secreted. The individual just about to have, or who has had an attack of gout, combines the chief conditions for the generation of this acid, conditions under which, with some modifications, are

produced in other subjects, such as the calculus, lithic acid, and its combinations. The children of gouty parents, though they may escape gout, are very liable to urinary disorders, and particularly the lithic acid deposits. The noticeable and distinctive peculiarity, then, in gout, is this large formation of lithic acid. The general phenomena of the disease point to the blood as, 1st, in excess; 2d, as changed in some way, and by its abnormal condition disturbing the functions and modifying the structure of the tissues. The change is a kind of poisoning by the large evolution and undue retention of lithic acid, which proves a general irritant to all the organs. To the lithic acid, then, we look as the *materies morbi*, or at least as indicating by its undue presence the existence of certain diseased actions going on in the animal economy generally, but most manifest in certain tissues.

Useful, I might say all important inferences flow from these premises. As we learn from them how gout is brought on, so we also learn why it may continue; and, more important than all, the conditions for its avoidance, prevention, and cure.

A step farther in the pathology of gout is suggested by the *British and Foreign Review* (vol. xvi.), viz., that lithate of soda is the morbific agent. "This appears to us to be indicated by the fact, that the substance named is that which is separated from the blood in gouty deposits, and still more by the known connexion of gout with biliary as well as urinary derangements, and by the beneficial results of treatment directed to *both* these excretions. Under the influence of particular substances, as we have seen, *lithic acid* has a tendency to accumulate in the blood; and it seems to us quite possible that, so long as it retains its uncombined form, gout may not result. But if, by a deficiency in the secretion of bile, *soda* also be allowed to accumulate, the two will combine and lithate of soda will be formed." In reply to this suggestion it may be remarked, that lithic acid, in combination with alkali, is more soluble and probably more readily secreted than it is alone. Soda, also, is recommended, or at any rate allowed, occasionally, instead of potash to those labouring under excess of lithic acid, without any fears being entertained of a deleterious combination resulting.

Treatment. — Aware that a paroxysm of acute gout runs, for the most part, a regular course, and will terminate if left to itself in a remission if not entire apyrexia and freedom from pain, we shall better be able to devise the remedies and know what curative value to attach to them. Like other inflammations lighted up from any specific cause whose violence we may deem necessary to moderate by venesection, but without hoping to remove it at once or entirely by this means, so may we occasionally, with the same intention, have recourse to the lancet in a first fit of the gout or when it returns with great violence. Leeching the inflamed joint has been recommended, but the results are not encouraging. As a source of irritation, although itself of secondary formation, we may desire to moderate the local inflammation; and on this ground leech or apply cold. The latter practice has been extolled by some; but the cases on record of its alarming and fatal results naturally have greater weight than all the alle-

gations in its favour. Evaporating lotions applied to the part are thought more of than the means of depletion and sedation just mentioned.

Purgatives rank high among the curative means in gout. Dr. Chapman and other experienced and judicious practitioners bear emphatic testimony in their favour. Nothing but false theory, in fact groundless hypothesis, would forbid their use. The selection is not a matter of great moment, provided the more drastic be withheld. Calomel and rhubarb, rhubarb and magnesia, or even the compound powder of jalap, may each on occasions be used. It may be thought preferable to give the calomel alone with some aromatic powder, and, after the lapse of a few hours, rhubarb and magnesia, or the aromatic syrup of rhubarb with magnesia. To relieve the abdominal plethora and moderate and remove congestion of the mucous surface and of the gastro-hepatic circulation, are among the obvious indications in the treatment of gout, and ought never to be lost sight of. Anterior to purging we can readily conceive of cases in which a fit of gout succeeding a full meal of various substances, yet unchanged or imperfectly digested, will require a mild emetic directed simply with a view of emptying the stomach.

The digestive canal relieved of its contents, and the liver and muciparous glands incited to secrete, we may then direct our remedies to the existing lithiasis, and to this end we prescribe some preparation of colchicum, which late experience has shown to exert, at times, a power of increasing not a little the discharge of lithic acid from the kidneys. It must be confessed that this is not always an effect of the article; but that on occasions it seems evidently to diminish the formation of the acid. In either way its operation must be beneficial during the first period of gout. Its good effects are increased by the addition, during the more acute stage of the disease especially, of some neutral salt, such as the sulphate of magnesia, with a view to aid its somewhat uncertain action on the bowels; and also of an alkali or alkaline earth to determine to the kidneys. Scudamore's prescription has been often used both in gout and in rheumatism. It is composed of—℞. Magnes. Sulphat. ʒi. to ʒij., Magnesia, gr. xv. to xx., Acet. Colchici, ʒi. to ʒij., with any distilled water the most agreeable, and sweetened with any pleasant syrup: or with 15 to 20 grs. of Extract. Glycyrrhiz. The wine may take the place of the vinegar of colchicum.

Colchicum has been very erroneously called a specific in gout; whereas it not only fails in all cases to cure if it alone be relied on, but in some even to alleviate the disease; and, moreover, its *modus operandi* is not in contradiction to or inexplicable by the indications to be fulfilled when it is administered. Its effects are sensible and direct; in its acting on the alimentary canal sometimes by causing vomiting and discharge of the bile, more frequently by its purgative operation and its influence on the kidneys. In conjunction with these effects and when given in smaller doses, its power is visible over the nervous system, which it depresses in a very marked manner. I have already, when treating of rheumatism, mentioned its influence in this way, both alone and when combined with tartar emetic. As our design is to produce decided increase of peristaltic action and of intestinal and hepatic secretion in acute gout, we should give the colchicum in wine or

vinegar of adequately full doses, and preferably to the powder, to meet this indication; and that the patient may not suffer from the feeling of deep sickness and prostration that sometimes ensues on its administration, it will be advisable to combine it with some purgative in the manner just recommended. The same indications may be met by calomel or blue mass, or the compound extract of colocynth combined with the acetic extract of colchicum, made into pills.

In the extent of purging as regards dose, and repetition, we shall be guided by the duration and intensity of the paroxysm and the general habit of the patient; in fact, by nearly the same considerations as in any other fever with local inflammation. The diet should be very simple and sparing in quantity; chiefly consisting of farinaceous substances in a fluid state, flavoured in the manner most agreeable to the patient, except that no vinous or spirituous addition should be made either to them or to the drinks, which must be of an analogous character.

Convalescence, often slow where gout is left to itself or to "patience and flannel," is generally expeditious where a suitably energetic treatment has been resorted to; and we need not, therefore, be impatient to accelerate the return of entire health by active tonics, and very nutritious, that is, much if any animal food. Among measures both useful and agreeable, I may specify the warm bath followed by assiduous and somewhat prolonged friction of the skin, or rubbing the surface with a coarse towel repeatedly immersed in warm salt and water.

The recurrence of a second paroxysm after a short yet complete interval from the first, will require nearly analogous remedies as those originally employed, with the exception, unless under somewhat alarming and unusual circumstances of attack, of the use of the lancet. Now, however, recourse to some tonic will more naturally suggest itself than at first, and no one of the class will be found to answer so well as the sulphate of quinia, to which, on account of the somewhat unpleasant action of this substance in the stomach, a minute preparation of opium or of sulphate of morphia may be added.

We are apprised, by the appearance of the inflamed joint, in addition to the signs derived from the gradual decline of the constitutional disturbance, that the paroxysm is going off. The original bright erythematic tint of the skin, diffused sometimes like erysipelas, changes to a shade of purple, the blue veins are seen prominent by the diminution of the œdema, and the cuticle desquamates.

The affinity, on the first attack of gout, between the diseased blood and the fibrous or ligamentous portion of the joints of the foot, and above all of the great toe, is a curious fact, and one of general observation. Scudamore found that the great toe was the part seized in 130 out of 193 cases, in 10 others the gout was limited to the two great toes; and in all, except in 8, the joints affected were exclusively those of the foot and ankle of one or of both legs. If, as rarely happens, many joints become affected in the first attack, its duration is prolonged even to a period of many months.

Suppuration, apart from that induced by the chalk stones, is an unusual termination of gouty inflammation of a joint. I have seen

it both in the fingers and toe in one case, that of a farmer, a man of very large frame and great adipose development. I adverted slightly, in the beginning of the treatment of acute gout, to topical remedies. Little for useful purposes need be said in addition. Warm pediluvia, during even the decline of the febrile period, has sometimes brought back the bad symptoms ; and cold, although it may be borne by the robust, and when the circulation is yet active, will, under opposite circumstances, or of debility and irritability, still farther depress, and by destroying the balance of nervous power and of that of the functions which are all dependent on it, give rise to metastasis and other injurious and dangerous consequences. Giannini (*Della Natura Delle Febbri*, Cap. vii., Tomo i.), I know, believed that in cold bath or douche and Peruvian bark we had all that was necessary for the easy and successful treatment of acute or inflammatory gout ; but plausible as is his reasoning, it seems, at any rate in respect to the cold bath, to be too hypothetical, and not sustained or enforced by adequate experience. Ont he subsidence of the inflammation, the remaining œdema and sometimes varicose state of the veins and weakness of the ligaments may require the use of a flannel or cotton roller of moderate tightness round the limb.

The preventive treatment, or prophylaxis of acute gout, will engage our attention, when we shall have noticed some of the recognized varieties of this disease, and make the application of a knowledge of these to an avoidance of the return of all of them.

Chronic Gout may be either the continuation of the acute gout, but in mitigated violence and with less defined paroxysms, or it may be of primary occurrence, the result of a less decided arthritic fever and inflammatory determination. It is in this form that we may expect to find relative rather than actual plethora, — disease resulting from retention of excrementitial matter more than from the superabundance of that assimilated. In both circumstances we should be prepared for nearly a similar result — the disproportion of lithic acid and of lithate of soda. It would be useless, even if more time were allowed for the task, to detail to you the constitutional symptoms which are represented to characterise chronic gout. These are such as dyspepsia and hepatic derangement would present without any gouty modification ; and such as indicate derangement of the digestive organs, nervous disorders, and sometimes cachexia. The local symptoms consist, among others, of a sense of alternate heat and coldness in the affected part, much increased at night, together with numbness and weakness, cramps of the lower limbs, chiefly at night, also, and when the patient is falling asleep. The surface of the part is either of a pale reddish colour or of a natural or sometimes a purplish hue. It is tender, and suffers from shooting pains along the nerves ; motion is difficult and painful. The bursæ and the sheaths of tendons are more frequently affected in the chronic than in the acute gout, occasioning puffiness and distention. Œdema is generally present and permanent, attended by fulness of the veins.

The *treatment* of chronic gout should be carried out in conformity with the pathological deductions from the temperament, constitution, prior habits, and more or less complex functional disorders, than

by a reference to hypothetical views of a specific disease. In persons of a lymphatic and nervous temperament, possessed of little sanguiferous activity, and brought to a state of indirect debility by prior disorders, we do not think of bloodletting, as in acute gout in a younger and more robust subject. There are cases, however, and I have met with such, in which we must not be deterred from active measures, either by the name of the disease or the apparent feebleness of the patient. I have been called for the first time in the summer to see a patient, of whose maladies I had only heard antecedently, suffering from a great pain of the stomach, vomiting of blood, cold extremities and cold skin generally — pulse frequent and small but not suppressed readily by the pressure of the finger. The ankles were both of them puffed with imperfect gout, as was one of his wrists. I forthwith had a number of leeches applied over the epigastrium, sinapisms to the ankles and wrists, and a simple enema of warm water administered. No medicine was given by the mouth, and no drink allowed but a little gum water. After the leeches had drawn about eight or ten ounces of blood, the vomiting and pain ceased, the skin became warm and a healthy reaction came on, indicated, also, by a fuller and more equable pulse. Little benefit could have been derived from the sinapisms, which did not either redden the skin or produce any sensation of pain. This was a little after midday. In the afternoon the favourite anti-emetic mixture of sub-carbonate of potash with sugar, gum and water, flavoured with oil of mint, and to which laudanum is added, was prescribed. The patient's stomach before quite composed was again disturbed after a dose or two of this mixture, which I am afraid I prescribed in part, owing to the supposed requirements more than the real exigency of the case. A dose of calomel was given in the evening and followed in the morning by rhubarb and magnesia; and in the course of the day the patient was relieved. Common routine treatment, directed more especially in reference to the disorder of the digestive system, soon restored this person to comparative health.

In the early part of the winter, or in the month of December following, this same person had an attack of gout, but differing from that in the summer in the exemption of the stomach from suffering and greater puffiness and pain of the joints. After a laxative, I gave on that occasion the sulphate of morphia, at first alone and afterwards joined to the sulphate of quinia, and the patient was soon quite relieved.

Chronic gout much more than acute is seen in females. I have been called on repeatedly to prescribe for a married lady, the mother of many children, herself about forty-five years of age, in whom the local manifestation was in the ankle, and which, when it first showed itself, was, much to her annoyance subsequently, mistaken by her physician for a sprain. In her case I seldom attempted any but treatment on general principles, and always with a speedy relief of the disease. To a systematic prophylaxis, however, she could not submit. Her food was generally plain and in moderate quantity.

It is in chronic gout that the features, every now and then, run into those of rheumatism; and it is that variety in which colchicum is alleged to manifest most advantageously its beneficial operation.

But although our attention should not be diverted from the evidences of deposit of lithate of soda, either in the joints or in the urine, and of the means more directly calculated to obviate its formation, we are not to lose sight of the requirements suggested by congestion or local determination to an organ, whether this be the stomach, the liver, or the kidneys, over the two first of which respectively leeches, and over the last, cups, are sometimes applied with good effect, and followed by rubefacients and occasionally blisters. In more atonic states of the system, sulphur in laxative doses, the iodide of potassium and sometimes guaiacum are prescribed.

More reliance is placed on local treatment in chronic than in acute gout. The vapour bath, sponging the surface with a strong tepid solution of salt, frequent frictions with a flesh brush, aided by liniments, in some of which iodide of potassium may be made to enter, or painting the part, as in chronic rheumatism, with a little of the tincture of iodine, are among the topical means resorted to.

If chronic gout be less severe in its attacks than the acute form, these, on the other hand, are much more frequent than the latter, so as hardly to allow the patient remission, unless it be in the midst of summer. It is in the chronic state that concretions are most frequently observed, which tend to fix the gout permanently in the joints, by the continued irritation and afflux to which, as foreign bodies, they give rise. They consist, as I have had occasion more than once to state, of lithate of soda, at first in a hydrated form, and a portion of lithate and sometimes still more of phosphate of lime. After repeated attacts of gout, the skin over these concretions sometimes yields, and a discharge of serum and of some of the chalk takes place, attended by a remission of all the symptoms. Soon after the opening is made true suppuration commences, and chalk and pus are discharged from the ulcer, but never, or very rarely, so as to empty the cavity entirely, and allow of the formation of a complete cicatrix. The difficulty of escape is owing to the chalky substance being diffused through the cellular membrane, as in the cells of a sponge.

Besides the amorphous sediments consisting chiefly of lithic acid, which abound in the urine of gouty patients, Dr. Prout states his having seen two or three instances in which large quantities of perfectly white lithate of soda were deposited from the urine. In one case in particular the quantity was immense, and voided, not only mixed with the urine, but in a state of consistency like mortar, especially during the night, so as to produce great difficulty in passing the urine. He suspected the existence of gouty irritation or abscess of the kidneys in these cases.

I shall not occupy your time in describing, after other writers, the varieties of what may be termed irregular gout, some, if not many of which, I believe to be no gout at all. The chief of these are *retrocedent*, *misplaced*, or *retrograde* gout, and *atonic*, *concealed*, or *masked* gout. In retrocedent gout, we are told, that during the paroxysm, whether occurring in the acute or chronic form, it sometimes happens that an internal organ becomes suddenly and dangerously affected, the external disease being much mitigated or having entirely disappeared. And, again, in reference to masked or misplaced gout, it is said that the gouty diathesis may be generated in a

constitution too weak to develop the local affection in the extremities; and when this is the case, various disorders affecting internal organs, most frequently those of digestion and excretion, arise and often assume anomalous or protean forms, with functional or nervous characters, and even congestive or inflammatory states, as in retrocedent gout.

In these varieties it is contended that the gouty diathesis gives a peculiar character to the disorder, which it behoves us to recognise and to treat in a somewhat special manner. But before the proposition can be thus affirmed, it ought to be shown that the symptoms are so distinctive as that no analogous ones can be developed in other diseases in persons in whom acute gout is not even suspected. The diseases occurring in the gouty diathesis are not necessarily gout, any more than all the uterine diseases in a particular female are modifications of hysteria. One man's health may break down after an hepatic disease, another after gout, and both may be tormented with analogous disorders, compounded of congestion, irritation and inflammation in the digestive and nervous apparatus. If we refuse the existence of fibrous inflammation of a peculiar kind as a test of gout, we give up any claim to diagnosis, and may conjecture the presence of gout from deceptive analogies. It will be alleged that, as gout consists in a depraved state of the blood, it is necessarily a general disease, and that fibrous inflammation is only one of its effects or phenomena, and may be wanting without the general and diffused cause being absent. To this we would reply, that the particular condition of the blood constituting lithiasis, or excess of lithic acid and lithates, gives rise to other diseases, a family of the calculous, for example, which, though akin to gout, are not, in common or nosologically, arranged under this head.

But, again, we may meet with plethora, redundancy of blood and juices, which, at particular periods of life, if the habits of the individual are indolent, are followed by a breaking up, as it is termed, of the constitution, and a host of abnormal and morbid symptoms, among which figure most conspicuously those of the digestive and nervous systems. These may ensue on hepatic disease, or on remittent fever or sub-acute gastro-enteritis; but still have no affinity to gout in their special cause, or lithiasis. Or, in another case, a youth may be tormented with pain and spasm of the stomach, palpitations and other nervous disorders, without suspicion, certainly without allegation of gout, unless one of his parents had suffered from this disease; and then this is called wandering or atonic gout. The same symptoms occurring in another person of the same age and similar constitution, but who has no gouty inheritance to talk about, would be called dyspepsia; and yet in these two cases the most acute diagnostical observer would be at a loss to decide wherein consists the difference. Perhaps it will be said that, as the treatment is so much the same, an attempt at special diagnosis is uncalled for. To this I reply, that the treatment ought to be the same, and if it be of the proper kind, or judicious blending of hygienic and therapeutical measures, success will result in both cases; the one of these two individuals will be cured of his gout, the other of his dyspepsia.

It is not, I repeat, sound reasoning to suppose that all the diseases, whether they be acute or chronic, visceral phlegmasiæ or nervous irritation, occurring from time to time in a person of

gouty diathesis, are gout. They may, I grant, be modified somewhat by this diathesis; but so they would be equally in a person of a nervous or of a lymphatico-nervous temperament, or under an acquired constitution from particular modes of life, as where repletion had been great without corresponding exercise. The most that can be granted in the premises is, that, in individuals of a full habit of body, surcharged with blood and juices, and attaining a certain period of life, there will be a general resemblance in their diseases; but we must restrict, it seems to me, necessarily, in order to prevent endless confusion and conjecture, the term gout to that series of morbid phenomena during the progress of which, at some time or another, the fibrous system is affected with a peculiar inflammation. In the very large majority of cases, it is the articular fibrous system that is thus seized. There are times, however, when we can readily believe that the fibrous tissue of the kidneys may be similarly affected, and in this way add to the disease of these organs, the functional derangement of which already figures so largely in gout. Instances are related of substituted structural change by inflammation or abnormal deposit in other organs, as the eye and even the lobe of the ear; and some allege that the brain or spinal marrow and different nerves have occasionally been the seat of a similar transfer. Dr. Graves (*Clinical Lectures—Notes by Dr. Gerhard*) speaks of gout having seized on the spinal marrow, and also of gouty neuralgia, gouty grinding of the teeth. Is it necessary to invoke the aid of gout to explain why adult subjects should occasionally grind their teeth, when children are allowed this privilege without its being attributed to any such source?

In the case of the lady affected with gout, to whom I referred a little while ago, hemiplegia came on within two years past after exposure to cold and humidity, while superintending her outdoor affairs. She, at times afterwards, made various complaints closely resembling those that occur in wandering or misplaced gout; but, although remembering her gouty diathesis, I suggested to another, and afterwards prescribed myself the most approved antiarthritic remedies, including the early use of sinapisms and other irritants to the extremities, no articular disease has been evinced. This patient is now able to walk about, with the assistance of her cane, in the regular enjoyment of all her mental faculties and senses,—a result which, according to the old hypothesis, could not have been observed without the fixation of gout in the extremities, or a converting of the irregular and atonic into the regular form of the disease. The lancet and topical bleeding had been freely resorted to for the hemiplegia, evincing, as she did, morbidly augmented action of the heart.

Prophylaxis.—The preventive is the most important as it is the most successful, and yet by far the most difficult part of the treatment of gout. Under this title I shall include not only regimen or the hygienic, which is the chief division, but also those remedies which, during the interval or in chronic gout, may be supposed best adapted to prevent a return of the gouty paroxysm. The conditions for obtaining success in the chronic and prolonged form, are the same as were requisite in the active treatment of the acute variety of gout, viz., to

restore the healthy proportion between the activity of the functions of assimilation and supply with those of disassimilation and waste; in other words, that effete and excrementitial matter be carried out of the system by means of depuration and excretion with an energy and regularity proportionate to their formation. These conditions are applicable to plethora, actual and relative, in nearly all its forms, whether we qualify it with the term gouty or not. In gout, primary and acute, the disproportion consists for the most part of the excess of supply, the undue amount of nutritive matters assimilated, which oppress the organs and in a greater degree the capillary system of all of them. In this process of excessive assimilation, there is also not only increase of blood, a too active hematosis, but also of certain elements which, although found in health, soon by a little excess generate serious diseases. Uric and lithic acid are of this kind, and the latter in a more especial manner we find to be developed under these circumstances. Excessive in quantity, irritating in quality, the blood then is soon retained and unduly determined by a slight cause to any tissue. Why it is more especially directed to the fibrous we are not well taught. That a weakened state of the part and of its vessels will invite this morbid determination we are, however, well assured; as where a sprain or a pressure of a tight boot has been followed in those of a gouty diathesis with an attack of gout in the ankle. It has hence been inferred, that the reason of gout selecting the fibrous tissue of the feet in preference to other parts is owing to their long continued daily exercise, and too generally pressure by means of tight boots or shoes. The experiment, we believe, has not been made to ascertain whether a person going barefooted from infancy, but whose appetite has been continually indulged and who is crapulous in his propensities, may escape from podagra or arthritis in the foot.

In early life and especially when the body is still growing, the adjustment between the supply and waste of the substance of the tissues and organs is comparatively easy; as the capillaries are continually relieved by the diverticula for the purposes of nutrition to all parts of the frame, in addition to the throwing off of superfluous and effete matter by the excretions. But when the maturity of manhood is reached, there is no longer nutritive deposit, except of the adipose and cellular tissue, which, so far from invigorating, only oppress the organs and interfere with their functions, and consequently there is now a still more delicate balance between waste and supply, and greater risk of its being destroyed. So long as active exercise is taken, so long will the pulmonary and cutaneous depurations aid those of the kidneys and bowels, and diminish the oppression caused by the superabundant aliment and over activity of assimilation. But the least cessation of exercise in addition to stimulating nutriment destroys the balance, and gout, or apoplexy, or nephritis with calculus, or hypertrophy of the heart ensues. Individuals in the apparent fulness of health and vigour of life, rioting as it were in the enjoyment of their animal feelings, and the obscure though pleasing sensations from the extreme activity of organic life, are like the athletæ referred to by Hippocrates. Rest from great muscular exertion is with them a period of danger and disease, and but a prelude to, it may be death, unless they forego the

indulgence of the appetite and take less of those nutritive matters from which too much blood is elaborated.

But not only does this fluid by its excess now cause plethora, but it is, also, an irritant, in virtue of the lithic acid which enters into it, and is unable to find exit. Nor are the processes of assimilation gone through, when much animal matter is consumed for food, without an excess of lactic acid, which is an irritant to the digestive system, and it may be afterwards to the economy in general when it finds entrance into the blood. There is reason, also, to believe with Prout, that other unnatural and poisonous principles are developed in conjunction with the lactic acid; to which in part, as well as to this latter, many of the secondary consequences of mal-assimilation are to be referred. For a while the appetite is still unimpaired and nutrition active, although new and morbid products are formed during assimilation; and hence many, taking appetite and the absence of any dyspeptic symptoms, as far as the stomach is concerned, as a test of their privilege to continue the full enjoyments of the pleasures of the table and even of large eating of gross aliment, deny the necessity in their case of restrictions. Some of them will, it is true, confess derangements of the secondary class of digestive functions, as excessive acidity at the cæcum and colon, associated with diarrhœa and colicky pains; and others, although they admit that it is not without inconvenience that they eat and drink immoderately, still so long as their bowels are free and fæcal evacuations large, they escape for a while from any great penalty, and even profess to feel the better for their indulgences.

Sooner or later, however, at the turn of life, the balance between supply and waste is lost by the undue accumulation of blood and juices in the body, if the individual continue his former course of repletion and forego his customary exercise and active occupations; and gout gives no very gentle warning of his error and infliction for its continuance. The question now comes up: will he heartily and determinately adopt and persevere in a course of regimen and treatment calculated to bring his system back to the healthy standard; or will he, with Turkish apathy and belief in fatalism, persevere to the end in a continuance of the course of temporary self indulgence by which his infirmities are increased and his usefulness abridged?

The first indispensable step towards a real cure of gout is a restriction of the quantity and stimulating quality of the food, and especially of those albuminous principles, including fibrin, from the assimilation of which we have seen that lithic acid was so abundantly generated. We suppose now that the person is convalescent from a paroxysm of the disease, and but slightly if at all annoyed by its sequelæ. His appetite therefore is good, and the privation of the customary stimulus of abundant and nutritive aliment will be followed by feelings of discomfort and languor, perhaps even of faintness. It will be desirable, therefore, for a while to keep up, in degree, the stimulus of distention, by food abundant enough in quantity but of reduced quality, in its containing more gelatin than fibrin and albumen. The white meats, and particularly poultry, will therefore be substituted for the darker ones in which osmazome abounds; and, in place of compound sauces and various condiments, a single article of the latter class will be retained, such as

black pepper, or cayenne, or ginger, according to the predilection and experience of its agreeing with the stomach.

The use of animal food in quantity, even though it be of reduced strength, and with the addition of a condiment, should be regarded as merely introductory to a diet largely vegetable, and in which meat is rather to bear a condimental proportion than to constitute a prominent part. An immediate transition from a diet mainly animal and highly seasoned to one purely or chiefly vegetable, is but illy borne even by the rapidly assimilating stomach of a gouty individual, and hence the propriety of a gradual change somewhat in the manner which I here indicate. From the white meats the subject of prophylactic regimen should descend to eggs, if idiosyncrasy do not prohibit the use, and to milk, pure or diluted with water, and of such a temperature as will be most grateful to the stomach. If acidity prevail, it will be better to take the prescribed antacid separately than to spoil the flavour of the milk by admixture with it; and hence I do not recommend lime water to be added to this nutritive, yet only moderately stimulating article of food. Milk is the best substitute for purely animal food, and one that is the most easy to procure, and the quality of which is readily determined. "In milk, therefore," says Dr. Prout, "we should expect to find a model of what an alimentary substance ought to be—a kind of prototype, as it were, of nutritious mattters in general." In recommending it as a substitute for the fibrinous and albuminous meats, it is not supposed, however, that it is wanting in these principles or contrasts with animal food. It is animal food and food for animals designed by nature expressly for their use. It consists of the four staminal principles that represent the food of man. Besides water, milk contains a saccharine principle; caseous, or shortly speaking, an albuminous principle. It has the advantage of being a compound of these in such proportion of strength as to convey nutriment without unduly fatiguing the stomach in the first stage, or digestion of the bowels in the second stage. To its use must the gouty invalid, or he who has the gouty diathesis, endeavour to bring himself; if not prevented by insurmountable idiosyncrasy or an acquired constitution nearly as prohibitory.

With milk will be associated vegetable substances, composed of the amylaceous, farinaceous, and the glutinous principles, as experience may indicate. Sometimes the amylaceous, such as rice, sugar, arrow root and potato, indian or oat meal, will present adequate variety as regards taste, and yet simplicity as respects proximate principles, while they furnish less nutritive matter than the next division, or the glutinous combined with the amylaceous. The best, most generally diffused and for the greater part of mankind the most wholesome example of the latter, is the farina or flour of wheat variously prepared. With milk and the bread of wheat flour all the wants of the most exacting nutrition are amply supplied; and to such a degree will they furnish nutriment to the system, that restrictions may be necessary on the score of quantity, even of those so generally recognised as simple articles of food. Stomachs differ in the readiness of digesting the raised or leavened and the unleavened bread or biscuit; although, as a general rule, the former best agrees with the majority. It should never be eaten fresh from the oven, nor until twelve hours at least

after it is baked. Nor on the other hand should it be kept beyond the second day, or until it is hard.

Coming down to a narrow and readily understood basis of diet, every step beyond this can be easily measured, and if proved to be a false one retraced or not repeated. Trials may justifiably be made of the various vegetables brought to table on condition that they are well boiled; and if the habit of the invalid or the subject of regimen be very full and plethoric, it will be in a measure necessary that repletion to a certain extent should consist of some of these, and for the reason that they are watery and possess in comparison of their bulk weak nutritive properties. A substitution of these for the bread and the use of a small quantity of milk may be necessary, as a means of indirect reduction of extreme grossness of frame and accompanying plethora.

In thus indicating the outlines of food in the prophylactic regimen for the gouty diathesis, or to prevent the returns of acute and the continuation of chronic gout, I but give advice applicable to the many. Exceptions offer to every specification that may be laid down. Thus, for example, among the white meats, veal sometimes disagrees with the dyspeptic and the gouty, but this very disagreement is a security against excessive hematosis, and may be overcome by using very small quantity of the article, and it alone as respects meat. So, also, milk, for a while, even to those who are eventually most benefited by it, is sometimes especially oppressive to the stomach, and interferes with the completion of the requisite intestinal changes. The suspension of its use for a short time, or its dilution with water, or mixing with it a few grains of some fecula, as of rice flour or arrow root, will often remove the difficulty and allow of its continued use. Among the common vegetables brought to the table and in most general use, potatoes will not seldom disagree with the dyspeptic and the gouty, and are of necessity abandoned by invalids of this description. As illustrative of the vagaries of gastric solution and subsequent assimilation, I may mention that I have seen a larger quantity of lithic acid deposited from the urine of a young physician of the dyspeptic class, who was at the time on a diet of milk and bread and potatoes, than was deposited in the urine of an old gentleman, for whom he was then prescribing in a paroxysm of chronic gout.

In another description of the gouty class, in whom plethora is only relative and dependent on defective excretions, a restoration of the latter to their normal standard will authorise a more liberal diet than in the class previously supposed; but even here the quality must not be stimulating, nor the quantity at all oppressive by its bulk. A small portion of animal food once a day will not in these cases be incompatible with the rules of prophylactic regimen; provided that no congestion or inflammatory action ensue, and that exercise be kept up with regularity. I have more than once, in the hints on diet just given, alluded to quantity as one of the requisite circumstances to be carefully studied. To enforce your attention to this point, I cannot do better than repeat the advice of Dr. Prout, in his treatment for the lithic acid diathesis and deposits in the urine, which is so strictly applicable to its kindred disease of gout. The entire section on

lithic acid deserves your careful perusal and attention. The author, under the head of *Amorphous Sediments*, had just stated his opinion of the paramount importance of avoiding all those circumstances which have a tendency to aggravate the disease; and he continues in the following words: "Of these circumstances errors in diet, from their being most liable to be constant, are of the chief importance; and the error of *quantity* in diet is of infinitely more importance than the error of quality. Any stomach may digest a *little* of anything; but no stomach can digest a *great deal* of any thing. This is a maxim that ought to be universally borne in mind where diet is concerned; and, in particular, is of the very first consequence in the present diseases. I do not mean that individuals subject to these affections should indulge themselves with a little of whatever comes in their way; such a license, from the modes in which the term a *little* would be construed by different individuals, would be exceedingly dangerous; on the contrary, they should abstain altogether from things which manifestly disagree with them, and which must be unwholesome to all; such as heavy and imperfectly or overfermented bread; hard-boiled and fat puddings, salted and dried meats; acescent fruits; and (if the converting powers of the stomach be much debilitated) from soups of every kind, &c. In general, also, malt liquors and wines, particularly when of an acescent quality, should be avoided. Simple attention to these rules with respect to diet and exercise; the ensuring a due performance of the cutaneous functions by wearing flannel, particularly about the loins; the preserving a regular state of the bowels; and perhaps the occasional use of alterative medicines, are all that are commonly requisite in this form of the complaint; and will scarcely ever fail to prevent its terminating in serious consequences."

These directions embrace nearly all the hygienic advice that you will be required to give a gouty invalid. If persevered in they will be followed by success, but the period of trial must be longer than the appetites of the gourmand will generally admit to be necessary, and hence an explanation of his adverse experience to the value of regulated regimen.

The dietetic regimen of the gouty invalid would be very incomplete without especial regulations on the subject of drinks. Writers on gout indicate according to the fashion of the day, and perhaps their own predilections, the wines that are best adapted, as they think, to the disease; admitting the while that other kinds are injurious. In this way nearly all have been allowed and all condemned. At one time champagne and the Rhenish wines were particularly prohibited, from their tendency to produce acidity of stomach and act injuriously on the kidneys; and Madeira and Sherry were those selected for the invalid. Now, however, we find some writers advocate the former as often innocuous if not positively beneficial in gouty habits. The change of sentiment is rather unfortunate as coincident with the large imitation and adulterations of all the light wines. In fact, the charge of spurious mixture is applicable to all the wines drunk both in Great Britain and the United States, as I have elsewhere (*Regimen and Longevity*, Chap. xiii., on *Drinks*) fully shown on competent authority. With the

almost universally recorded evidence to show that wine drinking is, next to excessive eating, the most powerfully contributing cause of gout, and equally strong experience to prove that abstinence from it is one of the chief and indispensable conditions for cure, it must seem strange that the general doctrine of the necessity of substituting water as the only fitting drink is not more distinctly and uniformly affirmed. I need not here repeat my opinion so recently and decidedly expressed on this point at the conclusion of my last lecture, when laying down the hygienic conditions of the cure and prevention of rheumatism; but would intreat you to scan it fairly and fully, and I am sure you will reach the same conclusion with myself.

Concessions of the allowance of wine and sometimes distilled liquors are supposed to be required in cases of old and protracted chronic and irregular gout; on the plea of the anomalous and distressing sensations and symptoms that would ensue on their entire prohibition. But the experience of the last twenty years must have greatly diminished, if it has not entirely removed any fears of this nature, by its showing not only the impurity, but the positive advantages of complete abstinence, even though it be sudden, in a host of chronic and complicated disorders induced by wine and spirit drinking. The temporary substitution of opium, camphor, and ammonia for these deleterious drinks in cases of atonic and retrocedent gout, will obviate all the danger apprehended from the withdrawal of the latter. Malt liquors are, in some respects, more noxious in the gouty diathesis, than wines or ardent spirits, and their use in any form ought not to be allowed. Sydenham admits, even while allowing considerable latitude in the common forms of gout, that the only prospect of restoration to health, in the more aggravated and protracted varieties, is procured by entire abstinence from the whole class of fermented liquors. "But though a person," he tells us, "who has the gout mildly and only at intervals need only use small beer or wine diluted with water, this degree of the disease not requiring a stricter regimen: yet when the whole substance of the body is in a manner degenerated into the gout, it cannot be conquered without a total abstinence from all kinds of fermented liquors, how small and smooth soever they be." It requires no great perspicacity to see that the abstinence so urgently necessary in the worst forms of the disease, would, if early adopted, prevent these from being reached, and insure earlier comfort and exemption for the gouty invalid.

Tea and coffee are apt to disagree with the gouty, and ought to be abstained from. Common chocolate is still worse.

The late Dr. Gregory was a notable evidence of what might be accomplished by a firm adherence to a regulated, without its being an ascetic regimen. He conquered by this means the force of hereditary predisposition to gout, which had existed in his family four generations, and of which his father died early. He himself, indeed, was seized with the disease at a very early age; and yet, by systematic regimen, he overcame all these disadvantages, and enjoyed for a long term of years full health, and was "any thing but a starveling."

Exercise is an important, almost indispensable condition for the performance of certain depurating functions, so as to allow of the plainest food being taken without suffering by the gouty individual.

If entirely deprived of exercise he cannot promise himself exemption from the disease until he has reduced his diet to the lowest standard compatible with the absolute wants of the system. The kind and degree of exercise must be regulated by the circumstances of the patient and his bodily powers. Alternation of kinds is the better plan, with a preference always for walking unless the limbs refuse their office: nor must a stiffness of the joints be received as adequate exercise. Sudden changes of temperature, particularly from warm to cold, are detrimental, and at all times the operation of a moist air is to be shunned. Cold and moisture are especially inimical to the gouty.

Dr. Dunglison gives his personal experience of the value of exercise in the following lines:—"In chronic gout, succeeding a severe attack of acute gout in the author's own person, he determined to see whether the morbid catenation could be broken in upon by a thorough change of all the influences surrounding him. With this view, he left the city (Philadelphia) with a friend, travelled to Boston, and crossed the country to Albany; returned home at the end of a fortnight perfectly restored, and remained free from any regular paroxysm of the disease for upwards of three years."—(*The Practice of Medicine*, &c., vol. ii., p. 602, 2d edition).

The therapeutical measures of a preventive kind will not engage us long. The chief indication for the invalid suffering from wandering gout, or desirous to prevent its attacks, is to procure a healthy state of the digestive organs. With this view he must watch the two series of processes in primary digestion; the gastric and the intestinal. That which most interferes with the former in this case is acidity; in the latter costiveness, or deficient or depraved biliary secretion. Long experience has sanctioned the use of the alkalies in acid stomach, whether this be of a dyspeptic or of a gouty character. Of this class potash is generally selected. Dr. Prout prefers the carbonate to the *liquor potassæ*, unless the patient be incommoded by the carbonic acid extricated from the former. In almost all instances, he associates the potash with a few grains of nitre; from the sedative effects of which on the morbid irritability of the stomach the utmost benefit is often derived. I agree with him in believing that when alkalies are given as antacids they are best given alone; and if tonics are required the two may be directed in alternation. Prone as many of the vegetable bitters are to become acid from the mucilage and sugar, which last, some of them, like the gentian, contain, we should not give them in any quantity or in large infusion in very acid stomachs. Some of the bitter principles divested of extractive and mucilage are preferable. Dr. Prout often gives mineral acids or some bitter between the meals, and to the same patient alkalies after meals. If the kidneys are tardy or deficient in their function, and we desire a diuretic effect, the alkalies may be often advantageously combined with a vegetable acid; such as the citric, tartaric, or malic acids, the two latter of which, by the way, are, when in fruits, especially unfriendly to the gouty stomach.

Alkalies do not appear to exert a curative influence of a permanent kind on lithic acid deposits; although they give often great and speedy

relief from the more urgent symptoms by their effects on the acid and the unnatural matters resulting from deranged assimilation. It follows, therefore, as Dr. Prout judiciously remarks, that alkalies to be beneficial, with the view of preventing lithic acid deposits, must be so administered as to counteract acidity at the moment of its development; and that their use must be daily and constantly repeated for a long time. On an average, perhaps, three or four hours after a meal will be found most appropriate. From ten to twelve grains of the carbonate of potash will be sufficient to counteract the acid residuum of the meal. Potash is preferred to soda on account of the greater solubility of the potash lithates; but soda is more grateful to some stomachs. Magnesia, less serviceable in stomachic acidity, is preferable in the cases of acidity of the cæcum and colon. There are cases in which the alkalies cannot be taken in any form, however strongly their use seems to be indicated. They produce great nervous and particularly cerebral disturbance. The addition of ammonia will sometimes enable the fixed alkalies to be borne by the stomach. Potash again disagrees with certain individuals who can take soda or magnesia with impunity. I often direct the union of carbonate of magnesia and bi-carbonate of soda with advantage. At all times we must shun the use of alkalies in large doses, and select an appropriate time for their administration. Much epigastric heat and a dry tongue contraindicate their employment.

There are some mineral springs, such as those of Vichy and Mont d'Or in France, into the composition of which the alkaline and magnesian carbonates enter, that have acquired great reputation in chronic gout. The water of the Sweet Spring, and of Bath, Berkley Cy., in Virginia, has seemed to me to possess analogous virtues.

While thus attentive to the condition of the stomach we must not overlook that of the intestines, and if they evolve much acid we should administer the alkaline correctives, and if disposed to constipation give appropriate laxatives, such as sulphur, a favourite article with some gouty invalids, rhubarb and magnesia with ginger, &c. The drinking of sulphur waters has, at times, a happy effect in these cases. Evidences of hepatic derangement, a dry and yellowish or brownish tongue will call for the blue mass with extract of taraxacum at night, and a laxative mixture of some kind in the morning. In more sthenic states of the system, in which there is some febrile action with digestive disorder, the wine of colchicum combined with a saline laxative or an alkali will do good, and in some cases prove auxiliary to the blue pill. As regards dose and combination of the colchicum, I coincide entirely in opinion with Dr. Barlow (*Cyclop. Pract. Med.*), who thinks that the time will yet be reached when this article and its different preparations will be given in minute doses with immediately insensible but ultimately beneficial results, such as are now obtained from antimony. As a corrective to enfeebled states of the digestive system, and an alterative whose action is sometimes directed to the liver and mucous secretions, iodide of potassium with a vegetable bitter merits a share of our confidence.

Individuals of a lymphatic temperament who have suffered long

from gout are liable to fall into a cachectic state, which will be greatly benefited by some chalybeate preparation. The iodide of iron is worthy of trial in such cases.

But however active and essentially beneficial may be any one remedy or combination of remedies, and however unquestionably recuperative and preventive a regulated regimen in gout and the gouty diathesis, each and all will be of little avail without perseverance in their use. Again I borrow the language of the experienced Sydenham on this point, part of which I have long and repeatedly employed without being aware at the moment of its being sustained by such competent authority. "But amongst the remarks I proceed to communicate, in the case of the gout, this is primarily and chiefly to be attended to, namely, that all stomachic or digestive remedies, whether they consist of a course of medicines, a regimen or exercise, are not to be entered upon in a heedless manner, but to be persisted in daily with great exactness. For since the cause in this and most chronical distempers is become habitual, and in a manner changed into a second nature; it cannot reasonably be imagined, that the cure can be accomplished by means of some slight and momentaneous change made in the blood and juices by any kind of medicine, or regimen, but the whole constitution is to be altered, and the body in a manner framed anew."

That I may not incur the imputation of dogmatism or of undue stress on the importance of dietetic measures and regimen, and at the same time furnish an additional answer, if any be needed, after Sydenham's express declaration, to the cavils about the unfavourable results of trials made by different individuals, I shall conclude this lecture, and the series, by a quotation from Dr. Prout, an able physician, and learned chemist, a man of sobriety of thought, and matured experience. His remarks on hygiene or gravelly complaints, and more particularly the lithic acid deposits, are strictly applicable to gout; and they have additional weight, because they apply to chronic diseases in general, and to polysarcia and various degrees of obesity and plethora. On this ground, as well as their adaptation to some of the forms of dyspepsia, I have enlarged somewhat more on the score of regimen in gout, than owing to the comparative infrequency of the disease among us I should otherwise have done.

"It cannot be too strongly impressed upon those who suffer from gravelly affections in middle life, that the *cause* of these affections lies deep in the constitution; and that to counteract their distressing efforts, perseverance in the appropriate diet, regimen, and medicine, is absolutely necessary. It is absurd to look for permanent relief in these complaints, by attention to regimen and medicines for a few days or weeks. In obstinate cases, an adherence, more or less strict, according to circumstances, to the principles above stated, should be adopted for months, or even for years, to insure success. This will be scarcely thought irksome by those who affix a just value on health. By a few sensualists it may be considered a species of slavery and sacrifice of enjoyment, too great to be endured for any *future* good whatever."

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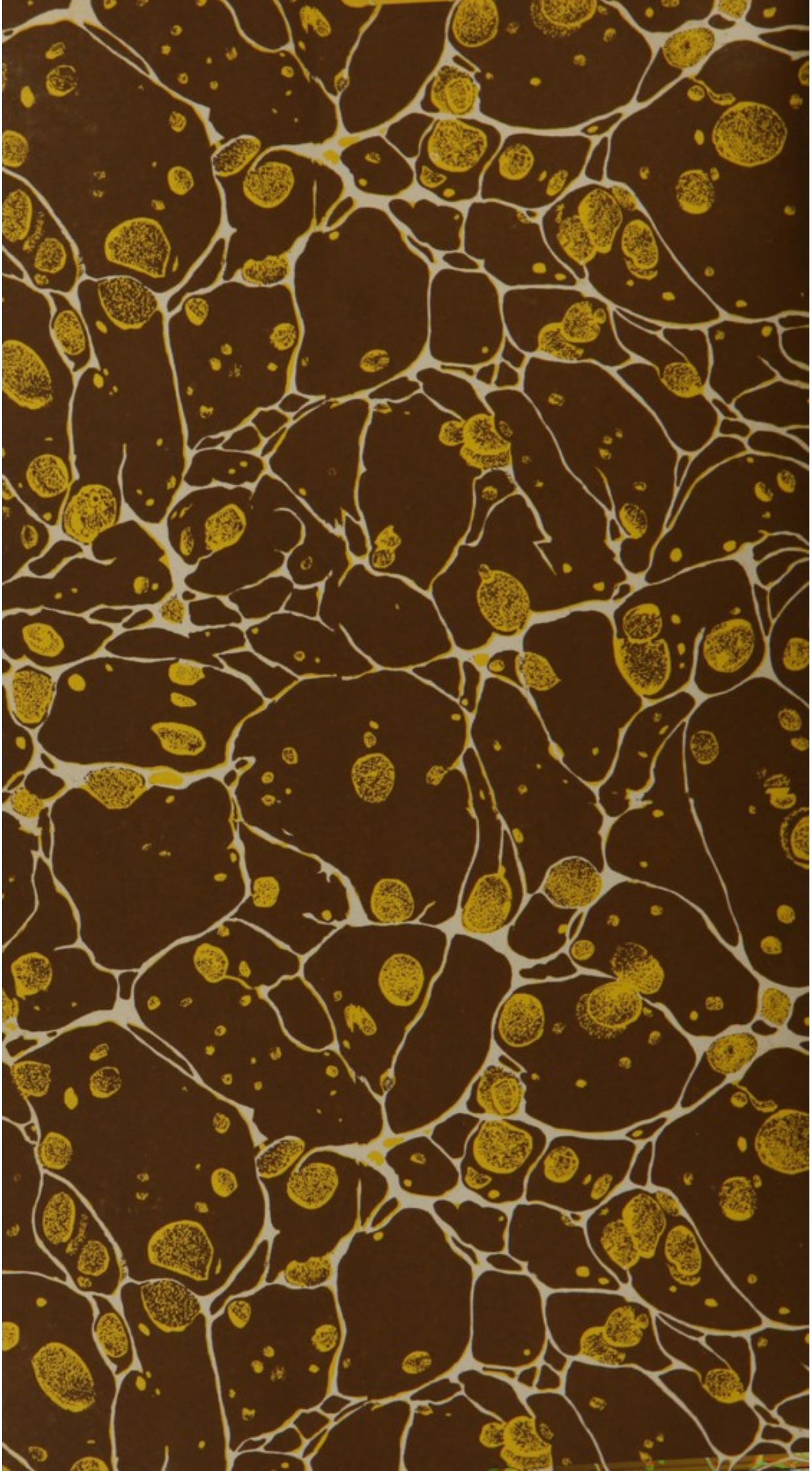

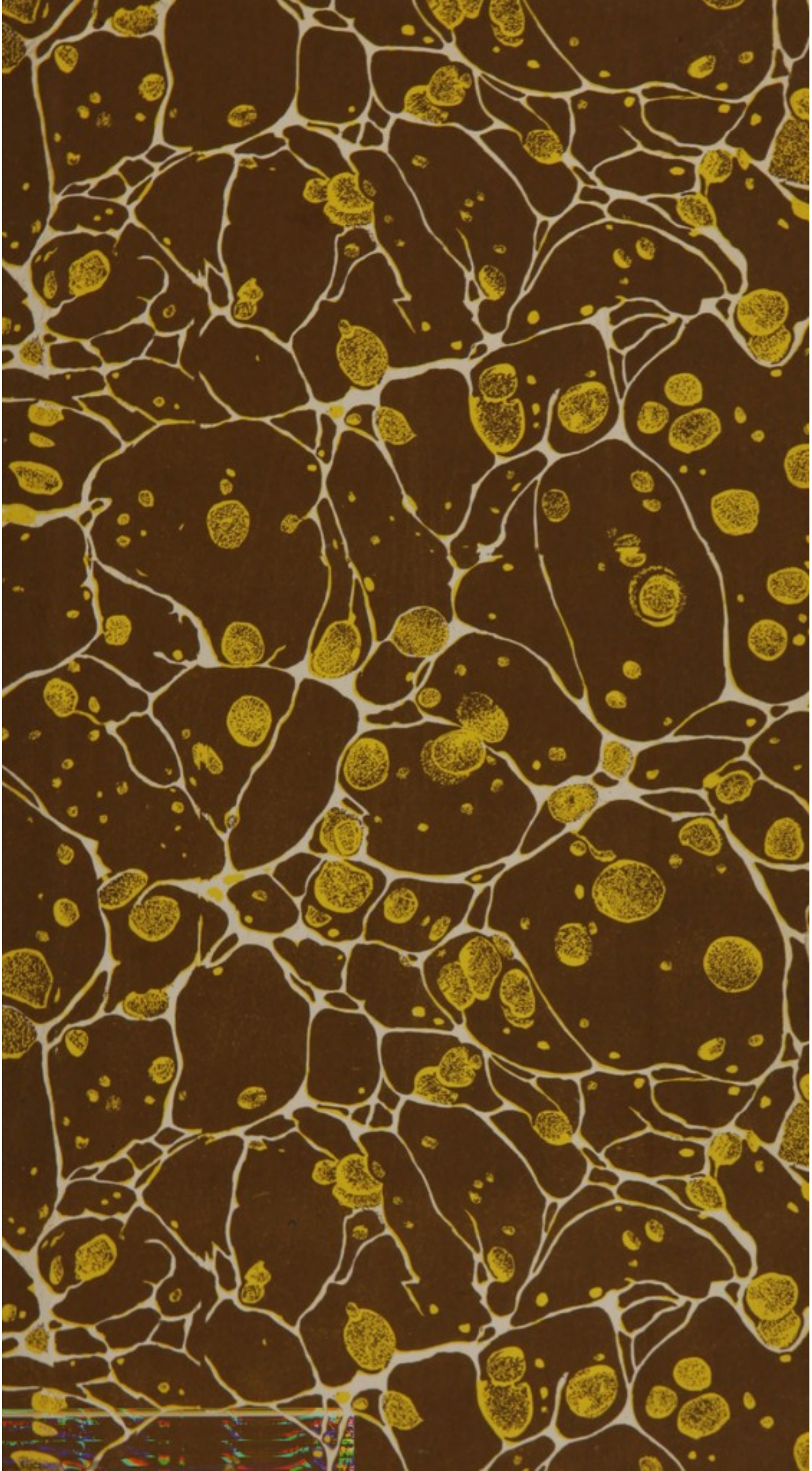

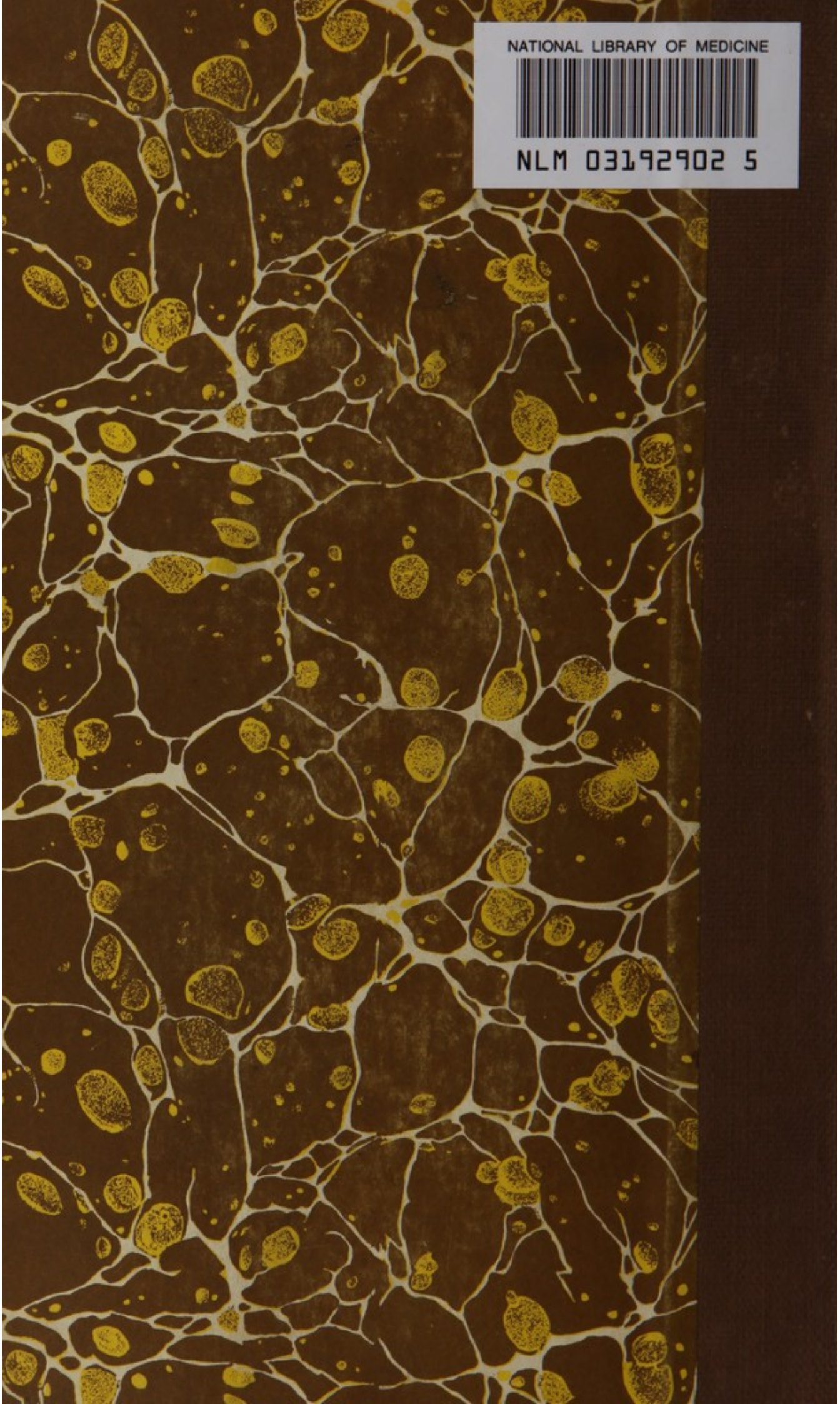
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