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PRACTICAL OBSERVATIONS

ON

DISEASES

OF THE

LUNGS AND HEART.

BY

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Dedicated

TO THE

RIGHT HON. SIR JAMES R. G. GRAHAM, BART. M.P.

&c. &c. &c.

Not so much because he—*justum et tenacem propositi virum*—could, for his country's good, act cordially with Russell or Peel, and relinquish office at the dictates of conscience, nor because he is *Uom che all' alta fortuna agguaglia il merto*,—as that I wish to subscribe my mite of gratitude for the efforts which he made for the amelioration of my Profession at a time when he had abundant cares of State to occupy him; and to express my admiration of his uniform promotion of that which, after food and raiment, is the great desideratum—the education of the people, which he is still fostering by taking a share in the management of the Metropolitan University, one of the greatest boons ever bestowed by a Government on a nation, and, amongst all the lay institutions founded since the Christian era, one of the greatest means, under Providence, of advancing the cause of religion and morality.

A. B.

ON DISEASES

OF THE

HEART AND LUNGS.

ON AUSCULTATION.

In the annals of medicine nothing appears more extraordinary than that, until the beginning of the present century, no person should have thought of applying the ear to the chest, for the purpose of ascertaining how far the actions of the lungs and heart were in a natural or deranged state; and Laennec is as much immortalised by this simple but valuable improvement as Harvey by his discovery of the circulation, Jenner by vaccination, or Stromeyer by subcutaneous tenotomy to cure distortions. To denominate this a simple improvement may appear strange to many, who have fatigued themselves by reading the prolix descriptions of the varieties and complications of auscultatory signs, which have been given in books and published lectures, puzzling to such a degree those who have not learned in the right way (which is easy withal), that even now we find some practitioners of the old school candid enough to confess that they fear they cannot accomplish it.

Cui bono to give a description of the sounds of the voice, or of the breathing, or heart, to the extent of

two, three, six, or more pages, to any person, unless, like Robinson Crusoe, he were living alone? inasmuch as, to know what the true sound is, he has only to apply his ear to the chest of any healthy individual of his family.

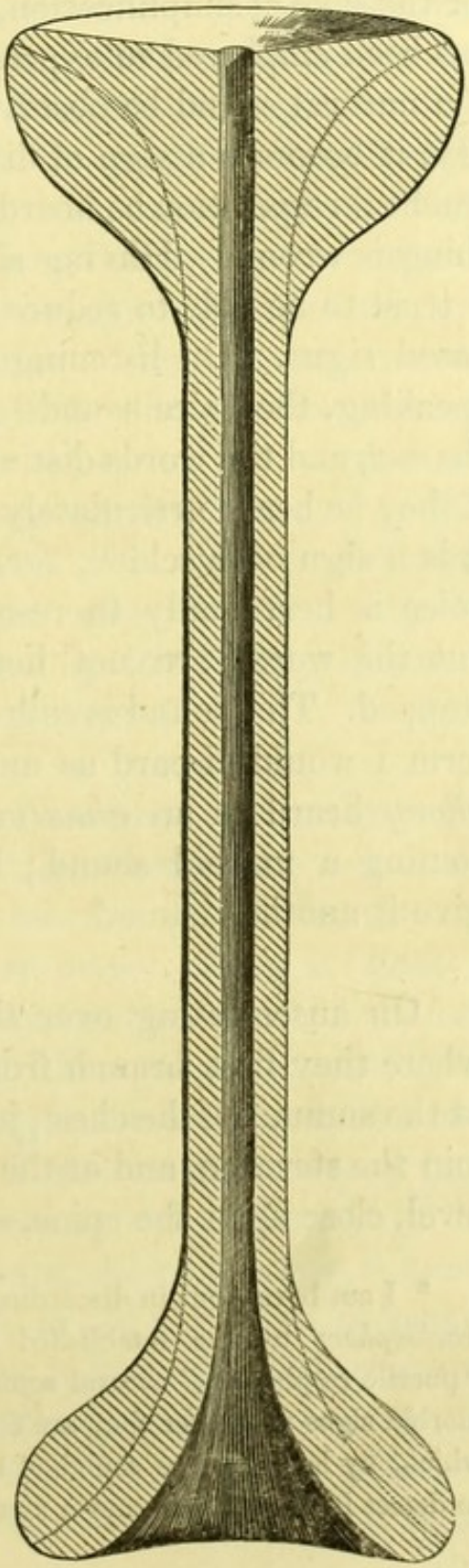
If we take, for example, a New Zealander, or any other person who had never heard a dog bark or a cock crow,—how could we make him understand by any description in words, without an imitation, what the sound resembles? To a person who has never heard the sound of a common gong, describe it until he says he thinks he understands you; then let him hear it, and he will tell you that it is very unlike what he had imagined.

I will not therefore attempt (what Locke has long ago told us is impossible) to describe simple ideas of sense,—the natural sounds heard in the chest; but merely direct where the ear or stethoscope* is to be placed, and enumerate the different sounds of the breathing, voice, and heart. By this means the natural sounds are almost instantaneously learned, and a person as readily distinguishes an unhealthy deviation as he perceives the change in a person's voice from its natural state to hoarseness, or the altered tick of his watch when out of order,—that is, if he know its proper tick,—for he may have never attended to that any more than to the sounds of the chest.

Of the natural sounds in the air-passages, there are three only to be learned: those occurring respectively in—1, the windpipe (larynx and trachea); 2, the bronchial tubes; and 3, the spongy lung.

On applying the ear or stethoscope to the trachea, the respiration is heard as if it were blowing

into the ear, and much louder than would be supposed from listening to the air passing in and out of the



* It is unnecessary to take up space and time in describing the circumstances under which one is more convenient than the other: "instinct" is sufficient guide. The stethoscope which I use is Laennec's, pared down, so as to be much more convenient to carry: his obturator is unnecessary, as the flat end may be applied to the heart. From four to six inches is quite sufficient length. It is not necessary that it should be hollow, as it is well known that it is as a solid that it conducts the vibrations of sound; but it is made so from usage, and is consequently lighter.

Stethoscopes thus simplified are now sold at the principal instrument-makers. Some are made still lighter and neater-looking (as shewn by the dotted lines in the section of the stethoscope), but they are easily broken.

mouth; this is *tracheal respiration*, which I mention, not as a new term, but because I purpose to use it, for the sake of simplification, instead of another which has been employed to express a morbid state. Thus, if a natural sound be observed in an unnatural locality, it becomes a sign of disease; for if the noise of tracheal respiration be heard down in the chest, something is wrong. Having simplified the stethoscope, I trust to be able to reduce the nomenclature of diseased signs. On listening upon the trachea during speaking, the voice sounds as if it were passing into the ear, and the words distinct: this is *tracheophony;* if they be heard articulately on any part of the chest, it is a sign of mischief; for, in the natural state, the voice is heard only to resound, through the chest, but the words are not heard if the other ear be stopped. This sound is called "*pectoriloquy;*" which term I would discard as unnecessary: it is *tracheophony* heard in an *unnatural* position, thereby becoming a morbid sound; but it is unnecessary to give it another name.*

On auscultating over the large bronchial tubes where they first branch from the trachea,—that is, at the summit of the chest, just where the collar-bones join the sternum, and at the back, at a corresponding level, close upon the spine,—the sound of respiration

* I am borne out in discarding the term "pectoriloquy" for *tracheophony* by the established usage of "broncophony" and "puerile respiration," natural sounds which are acknowledged as morbid signs whenever they are found in a wrong place. Besides which, by learning the sound of tracheophony, we are prepared to detect it when it becomes a morbid sign.

("*bronchial respiration*") is heard as much smaller as might be calculated from the diminution of the tube; but still a tubular sound, not spongy, such as the healthy sound of respiration from the lungs over all the rest of the chest; hence if *bronchial respiration* be heard in any other position except those two described, something is wrong. The sound of the voice, *broncophony*, over the upper extremity of the sternum, and at the same level on the back, opposite, is somewhat similar to that on the trachea, allowing for difference of size of tube; but *there is not articulation.* At the summit of the sternum no words are distinguishable, but only resonance. In tracheophony the sound of the voice, in listening over the trachea, is heard more distinctly with the ear which is applied than by the other; bronchophony is very much the reverse.

Over the remainder of the chest where the respiration can be heard, that is, where there is not too great a thickness of substance above the ribs, as at the shoulder-blades or breast, there is what is called the natural *respiratory murmur* of the air reaching the ear through the spongy texture of the lung,—not to be described, but to be learned in a moment by listening to it. There are three natural gradations of this, according to age: in young children, say until about three years, the respiration is much louder than in the adult; in old persons it is weaker than in the adult. Now if any of these respective degrees or gradations of sounds be *misplaced*, it is an evidence of some mischief, as will be shewn in the descriptions of disease. For instance, if in an

adult or old person the respiratory murmur be heard as strong as in a child (which is therefrom called *puerile* respiration), it shews that something is wrong; or if in an adult or child it be as weak as in an old person, the same conclusion follows. But it must be observed that there are so many circumstances which cause the respiration to be heard weaker than usual, both in adults and children, that we cannot depend upon this variety of negative evidence so confidently as we can upon the positive symptom of too loud (puerile) respiration, where that is found to exist.

The natural respiratory murmur is heard chiefly during *in*spiration, which in the adult occupies about one-third of the time of each act of respiration; that is, there is about one-third occupied by inspiration, rather less than one-third by expiration, and then rather more than one-third pause or rest before the next inspiration.

This statement must be modified for different ages and for different parts. Thus, in the child, the lung murmur of expiration is heard nearly as long as the inspiration, on account of the short distance the sound has to be transmitted by the solid parietes of the chest; in adults generally, the sound of expiration does not last so long as the inspiration, and is much weaker, and in some even healthy persons is scarcely perceptible. This, however, applies strictly to the spongy-lung murmur, and must not be confounded with any degree of bronchial sound when a bronchial tube is near enough to be heard. In the trachea the strength of sound of inspiration and expiration is nearly equal; in the bronchial tubes

the sound of expiration is much weaker, and does not last more than about half as long; in the lungs, its duration is scarcely one-fourth. It is the sound produced by the current of air passing through the larynx which is heard in the trachea, bronchi, and lungs. In the lungs, in the healthy state, the sound is transmitted in the direction of the current during the entire inspiration; the current of expiration being propagated in an opposite direction prevents the sound from being heard except just at the commencement. This statement will be illustrated hereafter by the phenomena of disease, as when the lung is solidified; for instance, when the expiratory lung murmur is prolonged in the adult, it is a morbid sign.*

* I do not here enter into any discussion upon the subject of "*consonance*," simply because I confess that, however amusing, I have not yet found any utility in it; and I will just give a couple of quotations, and leave it to the reader to judge whether such subject-matter will ever tend to assist practical medicine.

"Let two flutes which are in unison be placed near each other, let a certain note be produced on one flute, and the intensity of the sound will be increased by the *consonating* vibrations of the air contained in the second flute, in a proportion dependent upon the distance between the two instruments."—*On the Physical Diagnosis of the Lungs and Heart.* By Herbert Davies, M.D., p. 85.

"If consonance be admitted, how can intensification of sound within the chest be accounted for? Dr. Walshe has offered the ingenious explanation, that such intensification occurs from reflection of the waves of sound towards a focus. The same idea had been less carefully expressed by Blakiston, who speaks of sound increased by reverberation, and by Skoda and Weber. But Dr. Walshe has given this hypothesis a *locus standi*, and has, we think, made out a strong case for it. But we are not satisfied that it can be considered other than a secondary cause of *intensification* of sound, and we question if it can be applied to more than a limited number of cases."—*British and Foreign Medico-Chirurgical Review*, April 1852.

SOUNDS OF THE HEART.

The natural sounds of the heart are nearly similar to each other; the first occurs with the beat (systole) of the heart, the second immediately after. They are caused by the valves, which, being membranous, each time they resist the reflux of the blood, are thrown into a state of sudden tension, which produces sound.

On first perusing, thirty years ago, Laennec's assertion, that the second sound was caused by the auricles, I perceived that it was erroneous, as being inconsistent with the successive actions of the heart, acknowledged by physiologists from the time of Haller, and fully confirmed by experiments on animals,—viz. that the auricles first contract; then, following continuously, as it were vermicularly, without any interval, the ventricles contract; and that subsequently there is a period of relaxation, or cessation of action, in each part, during the diastole* between

* During diastole the muscles of the heart are flabby, and yield to the pressure of a probe, whilst during systole they are felt to resist or rather repulse it. The heart being a forcing pump, it is merely necessary to apply one hand over it, and the other to the pulse, to be satisfied that the beat of the heart ("impulsion") depends upon the firm bulging of its muscles in systole, exactly similar to the sensation felt by applying the hand to the cheek whilst the jaws are firmly closed, and the muscles alternately relaxed and put in action, as in mastication. The heart remains constantly in contact with the ribs, and does not *strike* but *presses* against them. See E. L. Bryan's ingenious experiment in refutation of M. Majendie's opinion (*Lancet*, Feb. 8, 1834). Professor v. Kiwisch agrees with M. Bryan and myself as to the causes both of the sounds and impulse of the heart; as to the latter, his words are: "Wenn wir demnach unsere Fingerspitzen in den entsprechenden zwischen

each systole. I was thus satisfied, from the repose of the muscle, of the *impossibility* of the auricles having any thing to do with the second sound, there being no action of either auricles or ventricles going on at the moment, for it was at the time of relaxation of both.

Dr. Hope, in the first edition of his work on the heart (p. 49), endeavoured to prove that this second sound was produced by the "ventricular diastole," and "the blood shooting with instantaneous velocity from the auricles into the ventricles;" although, as he set out with acknowledging that the second sound takes place at the moment that the auricle is relaxed, the blood at that time could be only flowing into the ventricle gently from the veins through the auricles, as it always does at that time; for the ventricles are partly filled in this way before the auricles (which are never empty) inject the blood into them, so as to distend them.

It was evident, therefore, that there was no cause in existence at the moment to produce the second

rippen Raum legen, so fühlen wir nicht, wie fälschlich angenommen würde, das Anprallen der Herzspitze an die Brustwand, sondern wir empfinden die Erhärtung und Schwellung der anruhenden, fixirten Herzwand."

Pr. Valentin distinctly agrees with me as to the sounds. "Das Spiel der Ventile mancher hydraulischer Vorrichtungen führt zu deutlichen Tonbildungen. Bedenken wir nun das der erste Ton mit der Systole oder dem Schlusse der Venösen Klappen, der zweite dagegen mit der Diastole oder der Schliessung der halbmondförmigen Klappen zusammenfällt (§ 587), so können wir vermuthen, dass *die beiden Herztöne, Ventiltöne sind*, die von den Schwingungen der angeschlagenen gespannten Klappenhäute herrühren."—*Grundriss der Physiologie des Menschen*, dritte Auflage, 1850, p. 198, § 607.

sound, except the sudden tympanic tension of the ventriculo-arterial (sigmoid) valves; or, in other words, that the sound was entirely valvular; and having established that cause as "sufficient" for the second sound, I ventured, upon Newtonian principles, to assert it as the cause of the first sound, and can prove it to be so, the difference in form of the auriculo-ventricular valves and surrounding attachments accounting for the slight difference in duration and tone of the sounds. In health there is no "*bruit musculaire;*" the cause of the first sound being slightly longer than the second consists merely in the difference of the forms and attachments of the valves. The semilunar valves being inserted into circular rims, and themselves quite free, are tightened instantaneously; the ventriculo-arterial valves, with irregular margins, and attachments to carneæ columnæ, are not so instantaneous in the check, and therefore the sound is a little longer and less sharp. An idea of this may be given by striking on the table with the tips of three fingers firmly touching each other at the points, in the form of the semilunar valves; the sound will be sharp and instantaneous: but when the fingers are allowed to separate ever so little, it is impossible to strike with them so as to produce this single sharp sound; and this illustrates the cause of prolongation of the first sound.

These opinions, which I had often discussed with friends and pupils, appeared to me such self-evident propositions, that, until I found Drs. Hope, J. C. B. Williams, and others, labouring to establish erroneous explanations, I did not think it necessary to publish mine. At last I made them the subject of

a communication to the Hunterian Society, 9th Feb. 1832, together with some practical observations, to shew that pathological alterations confirmed my explanation. This was published in the *Lancet*, 19th May, 1832.* Subsequently M. Rouanet brought forward a similar explanation in his thesis, which was noticed in the *Journal Hebdomadaire*, Sept. 1832, and copied into the *Medico-Chirurgical Review*,

* I here subjoin short extracts from the simple statement of the original communication, and after a lapse of twenty years have still to support my opinions against Gendrin, Skoda, Williams, Joy, Carpenter, Blakiston, &c.:

"Upon applying the ear, or stethoscope, to the chest of a person in health, at that point where the heart may usually be seen and felt to pulsate—that is, between the cartilages of the fifth and sixth ribs on the left side, you feel the 'beat,' accompanied by a sound, *as if*† the sound were produced by a blow against the ribs, and immediately after, a sound, rather shorter and weaker, appearing more distant, *as if* produced by the falling back of the body which gave the blow. . . . Now these phenomena are caused by the ventricles and the valves, for, contrary to the opinion of the immortal Laennec, the auricles have nothing to do with the production of the sounds; the push is caused by the swelling up of the ventricular muscles in their systole to expel the blood; the first sound is caused by the tension produced in the shutting of the auriculo-ventricular valves, and the second sound is caused by the tension produced in the shutting of the ventriculo-arterial valves. The cause here assigned might be thought inadequate to the production of the sound heard; but the little instrument used by gamekeepers to call partridges may be heard at least at the distance of a quarter of a mile, though consisting only of a bit of bladder stretched over a thimble, a membranous expansion which is five or six times less than the valves which act together in the heart, and which would give a much louder sound if not surrounded by soft parts. . . . This

† It is this deceptive sensation which has led Majendie and others to think that the heart leaves the parietes of the chest, and returns at each beat.

April 1833, as well as an extract from my essay. Mr. E. L. Bryan published a similar theory (*Lancet*, January 1833); but when he became acquainted with my priority, he very candidly wrote an acknowledgment, together with a critique on the "Report of the Dublin Committee of the British Association" (*Lancet*, Dec. 26, 1835, and Feb. 27, 1836).*

In giving the above explanation to my class, I was in the habit of exemplifying how the sound was produced, by a strip of paper about two inches long and half an inch wide suddenly stretched, the sound of which was heard all over the theatre. Dr. Hope subsequently mentioned, in his Appendix, 1835, his having applied a piece of tape for a similar purpose, and yet denominated my opinion "erroneous," and remained unconvinced.

Dr. Hope instituted a number of experiments, as

is a simple, unsophisticated explanation of the causes of the beat and sounds of the heart; and you will find that the morbid signs are all explicable as alterations of these."

The analogy of the mode of producing sound just alluded to is perfect. When sound is produced by the membrane of a drum or tambourine, it is done by a blow; but the sound of the partridge-call is elicited by the pull of the string, the knot of which is always in contact with the membrane; and, moreover, this membrane is, in its ordinary state, flaccid, not tight like a drum-head,—so that the sound is produced by bringing it from a state of relaxation to tension, as is the case with valves.

* Mr. E. L. Bryan's statement is,—"Any flexible solid suddenly brought from a state of relaxation to a state of tension vibrates, and its vibrations are sonorous or not—*i. e.* audible or not—according to its physical structure. At the commencement of the systole of the ventricles their auricular valves are flapped into play; at the instant of their closure, the whole substance of the ventricles and the valves are suddenly brought into a state of tension, and then consequently vibrate."

is well known, with the endeavour to support his opinion, that both the first and second sounds were caused by the "motion of the contained fluids;" "the vibratory collision thus occasioned amongst the particles of blood producing sound." This cause, however, he relinquished for the bruit musculaire; and at last he was compelled to acknowledge, in his Appendix, 1835, that the cause of the first sound might be "possibly partly valvular."

In the edition of his work published 1839, he still adhered to the opinion of 1835, except that he quite acknowledged that the first sound is not merely "possibly," but actually partly valvular. But he coincided with the "Report of the London Committee of the British Association for the Promotion of Science," in the addition of bruit musculaire (*Medical Gazette*, Dec. 10, 1836).

Now, I maintain that the first sound, as well as the second, is entirely valvular, and deny that any part depends upon muscular noise ("bruit musculaire"); for when there is simple hypertrophy (increase of muscle and muscular action), the cavity of the ventricles being diminished, there is diminution of sound, although more of the condition necessary to the supposed bruit musculaire. This contradicts his opinion, and confirms mine; inasmuch as it is the valves being encroached upon, and their having less blood to stretch them, which prevents their producing the usual sound. Again, when there is moderate hypertrophy, with proportionate enlargement, the cavity remaining the same, there is not appreciable increase of sound; though, if he were right, the quantity of muscle being increased, there ought

to be increase of sound. My explanation accounts for the sound here remaining the same, as the valves are in their usual relative condition. Again, when the heart is enormously enlarged by hypertrophy and dilatation, in which case there ought to be enormous first sound (if bruit musculaire were a cause), there is none, or scarcely any;* because the opening is so dilated that the mitral valves cannot act. Thus we have pathological confirmations of my opinion.

In his last edition, 1839, Dr. Hope endeavoured to shew that he was not ignorant of the valvular theory in 1830. He did not, however, understand it to the last; he there speaks of the valvularity of the second sound being confirmed by his experiments, as if he had not been labouring to overset it by his experiments, and as if I had not published the valvular theory in opposition to him, when he was experimenting to establish the erroneous opinion which he afterwards relinquished for mine: his successive publications prove the fact. He says (p. 13), "that the sound was *not* attributable to the retrocession of the semilunar valves, I entertained a strong presumption." What was to have prevented him, as well as myself, from having a perfect certainty that it *was?*

I proved the *impossibility* that the second sound could proceed from any other cause than the valves; and Dr. Hope had exactly the same data to reason upon.

In his chapter headed "ERRONEOUS THEORIES"

* As the left ventricle is usually the diseased part, the tricuspidal valve remains still capable of giving some sound, though embarrassed.

Dr. Hope states that my theory of the first sound is imperfect, because I do not add the bruit musculaire. This I deny: the valvular "cause" is "sufficient." I have accounted for the difference of sound by the difference of shape of the auriculo-ventricular valves; their attachments are different; they are set in stronger rims; the sigmoid valves are merely attached in a tube, as it were; whereas the auriculo-ventricular have a firmer and less regular attachment to the parietes of the ventricles, which being in systole at the time of tension, altogether a flatter and longer tone is produced. Again, and above all, as stated above, the sound is inversely as the muscular action, for when there is plenty of muscular action from hypertrophy, there is no first sound if the valves cannot act; hence *necessarily* it is the valves, not the muscles, which produce sound.

Having been the first to publish the valvular explanation of the sounds, I am bound to confute the assertion of Dr. Williams, "that I hold the same opinion as that in print by Dr. Elliott, and of which he says I was a *later* advocate:"* the fact

* *Lectures on the Physiology and Diseases of the Chest*, &c. &c. By Charles J. B. Williams, M.D., F.R.S., 1840.

My principal object is to establish what I consider the truth of a fact valuable to the profession for diagnosis. I believe, however, that my opinion of the valvular theory—still disputed by some professors and writers on physiology—was then for the first time "in print" when it appeared in the *Lancet*. Dr. Carswell, it appears, had spoken of a part of it (for he got no farther than the semilunar valves), rather as an inference from an accidental case of disease than as a physiological induction; and I had spoken of it to my clinical pupils, Drs. Frampton, Little, Macbraire, Mr. Hamilton, &c. years before.

The writings of Dr. C. J. B. Williams have justly so considerable

being, that I proved the second sound to depend on the *tension* of the *valves*, produced by the backward pressure of the blood upon them *from the arteries*; whereas Dr. Elliott asserts, that the second sound depends upon the blood flowing *from the auricles*, which he even puts in italics; so that my demonstration is, that the sound is caused by the *valves* in *holding* the blood on the one side, whereas the "opin-

a circulation, that I cannot permit his assertions to pass unanswered. He has paid me the compliment to mention my name in several works, but has, unfortunately (*hinc illæ lacrymæ*), uniformly misrepresented my opinions, which I cannot account for, as they are written in plain homely English, not "wrapt in the obscurity of a dead language," like those of Dr. Elliott. But I do not despair of converting him at last, as in the *London Journal of Medicine*, April 1850, he says,— * * * "hence these (the heart and its valves) in their usual transition from slack to tight in systole and diastole, still produced their natural sounds. [Then, in a note.] This is my explanation of the natural sounds, inferred from the experiments before referred to. The ventricles with their valves, at each systole, are suddenly tightened on the contained blood, and thus produce the first sound," &c. This looks as if he were coming round from his opinion given at p. 206 of the Lectures, 1840, "that the cause of the sound must be in the solid structure of the ventricles" (*bruit musculaire*); and (p. 304), "*that the first sound is produced by the muscular contraction itself*, may be considered as proved by Obs. 8 and 9 of Experiment 1," &c. And again (p. 207), "the muscular contraction of the heart produced systolic sound, for we had the heart out of the body, without its blood, *without valvular action*." He cannot back out of this, "*litera scripta manet*;" and I do not quote his opinions without giving his words.

In his *Principles of Medicine* (2d edit. 1848, page 305), speaking of "the rigors often experienced at the commencement or increase of inflammation," he says: "Dr. Billing plausibly ascribes this to the system sympathising at the death of the part which is under destruction by the suppurating process." Begging his pardon, this is exactly the opposite of what I had stated, viz. that the

ion" of Dr. Elliott, on the contrary, is that it is caused by the *blood flowing* in on the opposite side, and he uses the word "verrit" as expressive of the sound produced by sweeping or brushing along. Again, so far from attributing the second sound to any thing but the rushing of the blood, he (following Dr. Hope) attributes the sudden nature of that sound to the rapid and vehement (as if relaxation could be vehement) diastole of the ventricle; and its abrupt termination ("*abruptam*" in italics) to the instantaneous impediment, which the sigmoid valves offer, to that motion of blood to which alone he refers as the cause of sound. Thus the only allusion he makes to the valves is, not as producing, but as cutting short the sound; and so far from

suppurating process is for the *restoration* (*not destruction*) of parts which have been destroyed by inflammation; and, in fact, in the passages to which he alludes* I was combating the prevailing erroneous opinion, of suppuration being a part of inflammation, and pointed out that it is not till after inflammation has done mischief that suppuration, as a part of the granulating process, comes in to *repair* the damage. And I instanced the rigors which accompany that destruction which takes place on the spreading of a carbuncle as an example of *rigors* being produced by *inflammation*, but not by *suppuration*, which does not occur till some time after the rigors; and what he has misunderstood is where I shewed that the accumulation of pus in an abscess by *distension* produces fresh inflammation, and thereby destroys the soft parts next the surface, so as to let the pus escape, at which time fresh rigors occur from the *death of parts*, just as in carbuncle, but *not from suppuration*. It is true the *suppuration* produces the *pus*, which gives rise to no rigor if on an *open surface*, but which, if pent up and accumulating in an abscess, causes, by *distension*, *inflammation* and *rigor*. Dr. Williams might as well say that the *baker* filled the man's stomach because he made the *bread:* that might seem "plausible."

* *First Principles of Medicine*, 1841.

considering the valves to be the cause of sound, he is evidently puzzled (as we may infer from the expression "fatendum est") to account for the sound ceasing when it does, "though the blood continues to flow into the ventricles after the sound has stopped," which my explanation of valvular sound renders perfectly clear: the passage shews that he looked only to the flow of the blood, and not to the valves, as the cause of the sound. In fact, so far from originating the opinion of the sound depending on the valves, he does not advance that as his opinion; and in his thesis there is no originality, but a professed compilation and adoption of the opinion of others—Drs. Hope, Williams, &c.

The following is the passage from Dr. Elliott's thesis:—"Nobis igitur (me judice) concludendum est, sanguinem a ventriculis agitatum et in arterias immissum, primum sonum cordis efficere: secundumque a sanguine pendere in ventriculos, dum horum fit diastole, ex *auriculis* influente. Hoc plane confirmatur a phænomenis quæ in vitiis valvularum cordis observantur. Naturam soni secundi *subitam* et *abruptam* oriri credo a diastole ventriculorum tam repente et vehementer inchoatâ ut sanguis vi magnâ auricularum parietes transcurrat: nec non ab impedimento quod in corpore sano fere instanter valvulæ præstant sigmoideæ sanguini, qui in ventriculos, dum horum fit diastole, ex arteriis vult refluere. Post sonum secundum quidem fatendum est adhuc plus sanguinis ventriculos inire: hic autem, ut annotat Hope, ventriculorum parietes (jam multo fluido distentos nec ultra ab illo fricatos) haud verrit, sed cum sanguine jam illic congesto, sese in silentio

commiscet nec aliquid interea soni ab auriculis editur, quippe quæ sanguinem quem impellunt accurate usque sequuntur. Motum igitur sanguinis, tam a diastole quam a systole ventriculorum effectum, sonorum cordis præcipuam esse causam credendum est: quod ab observationibus quibusdam Doctorum Bertin, Williams, et Hope, singulari in modo confirmatur."

The London Committee of the British Association (including Dr. C. J. B. Williams), appointed to investigate and report upon the subject, appeared at last to agree with me as to the second sound, but make the unphilosophical addition of bruit musculaire to the true cause of the first (see *Med. Gazette*, Dec. 10, 1836, and Dec. 2, 1837). I say they appeared to agree with me, so far as acknowledging the valves to be the cause of sound; but they do not seem to adopt the true principle, which is, that it is the tympanic tension which produces the sound. This I judge from the expression in the Report, that "it is impossible that the auriculo-ventricular valves should close with a *flap*, in the same way as the sigmoid valves." They speak as if the surfaces of the valves flapping together produced the sound, like the click of a solid valve; and moreover, in conformity with this, in the republication of the same opinion in the *Cyclopædia of Anatomy and Physiology* (art. Heart, p. 616), edited by Dr. Todd, one of the committee, my statement is misrepresented, by saying that the first sound is referred by me to the rapid *approximation* of the auriculo-ventricular valves; than which nothing is farther from my opinion, which is, that both first and second physiological sounds depend solely on valvular tension.

M. Bouillaud (*Traité Clinique des Maladies du Cœur*, 1841), though he agrees with me and M. Rouanet in the main, makes, as he says, some slight modifications; for instance (page 151), he considers as an "element" in the first sound the thrusting (*refoulement*) of the sigmoid valves against the parietes of the arteries! and he says (what I can scarcely believe) that Rouanet (like the London Committee) thinks, that when the sigmoid valves close, some sound is produced by their surfaces meeting* ("*claquer*"). Straight surfaces meeting suddenly might clack, but the parts of these curves must meet in succession, as wheels of a machine work upon each other, and quite softly; the firm tension and sound do not take place until after they are quite closed.

Notwithstanding the proofs that have been given as above stated, it is plain that considerable difference of opinion still exists amongst those who think on the subject; and some professors are unable or too indolent to make up their minds, contenting themselves with saying that the question is not decided; and, in fact, that the question is still not generally understood, or *sub judice*, may be inferred from a patient compilation, (*opus cit.*,) just

* I have not seen the thesis of M. Rouanet, but the quotation from it in the *Journal Universel et Hebdomadaire*, Sept. 1832, p. 427, does not so express it: "Aussitôt que les ventricules commencent à se contracter, le sang pressé de toutes partes, jette les valvules mitrales et tricuspides contre les orifices auriculo-ventriculaires, et c'est à ce choc qu'est dû le premier bruit du cœur, ou le bruit sourd. . . . . Les artères distendues repoussent le sang contres les valvules sigmoïdes, et de là le second bruit du cœur, ou le bruit clair."

published by Dr. Herbert Davies, in which he gives, amongst others, the notions of Dr. Skoda, his magnus Apollo, with two remarks of his own, which I consider untenable. The passage is so remarkable, yet entertaining withal, that I must transcribe it. The italics and marks of interjection are not in the original, but here employed to denote the parts from which I dissent. He says: "This skilful auscultator" considers,

1. "That the right and left ventricles, *the aorta, and pulmonary artery,** combine in the formation of their sounds.

2. "That of the systolic sound, one portion (!) is due to the ventricles, and *the remainder (!) to the origin of the great vessels.*

3. "That, in a normal condition of the heart, the synchroneity of the causes which produce sound in the heart and large vessels *causes the two portions to be blended* together into one sound.

4. "That, in disease, a separation of the two portions respectively due to the right and left side of the heart becomes evident to the ear. Thus, in organic disease of the *aortic valves, their first* and *second sounds* are replaced by a double murmur; but normal systolic and diastolic sounds may be heard over the valves of the pulmonary artery, and a normal systolic sound [I imagine due to the *stroke* of the heart *against the ribs.*—Dr. H. D.] over the apex of the organ."

* He has indeed shewn some "skill" here in finding a fifth element (the aorta and pulmonary artery) of the sounds of the heart: this surpasses the ingenuity of Hope, Williams, Majendie, the British Association, and innumerable writers on this subject.

In this paragraph I object to "their first and second" sounds, there being but one sound attributable to the aortic valves, and to Dr. H. Davies' parenthesis; moreover there is not always a "double murmur," but sometimes a single "bruit de soufflet."

5. "That the ventricular first sound is due to *the stroke of the apex* of the heart against the chest* wall, the sudden tension of the auriculo-ventricular valves, and the impulse of the blood upon their tensile surfaces during the closure of the orifices to which they correspond. [To these causes, I believe the *bruit musculaire* should be added.—Dr. H. D.]

6. "That the *arterial first sound* results from the suddenly increased *tension of the coats of the aorta and pulmonary artery (!) produced by the shock of the blood impelled upon them.*

7. "That the *ventricular second sound* is either the second sound propagated from the semilunar

* As it happens, E. L. Bryan has shewn in the papers referred to that the *apex* of the heart *never touches* the chest-wall, and the *side* of the heart *never quits it.*

I must, however, give in Skoda's own words the kind of *un*proof that he offers: "Wenn man am Kadaver an der Innerfläche der Brustwand mit dem Finger oder mit der etwas fest gedrückten Herzspitze, &c., anschlägt, so hört man durch ein aussen angesetztes Stethoscop entweder ein Klirren, oder einen Schall, der von dem gewöhnlichen ersten Herztone in nichts abweicht." (*Ueber Perkussion und Auscultation*, p. 187.) Which I translate: "If the inner surface of the chest in a dead body be struck with the finger, or with the apex of the heart firmly compressed, &c., a sound or clink is heard through the stethoscope applied outside which in no respect differs from the ordinary first sound of the heart." Would a schoolboy have perpetrated such an imbecile sophism?

valves, or the *result of the shock of blood against the ventricular walls*, and THE SUDDEN DISENGAGEMENT OF THE APEX OF THE HEART FROM THE OPPOSED PERICARDIUM!"

"Credat Judæus Apella" such an untenable hypothesis! Here is another element of heart-sound; a sound like the drawing of a cork, or, as some persons, when they hear a thing which excites compassion or regret, apply the tongue to the palate, and withdraw it with a sound of SUDDEN DISENGAGEMENT.*

"Complex as this theory may appear," says Dr. H. Davies;—but my reader will exclaim, "Ohe jam satis!" I recommend, however, the perusal of Dr. H. Davies' version of Gutbrod and Skoda's "sky-rocket" theory of the motion of the heart.

The causes of the natural sounds of the heart assigned by Hope are *two:* 1. The motion, and

* After all, though I have quoted this alleged cause of sound on the faith of Dr. H. Davies, I cannot find it in Pr. Skoda's work (*Abhandlung über Perkussion und Auscultation*); there is a passage in Zehetmayer's *Hertzkrankheiten* containing the expression,—"Dass das plötzliche Losreissen des Herzens von dem Pericardium, während der Diastole ein Moment zur Erzeugung des zweiten Tones beitragen könne, will ich nicht in Abrede stellen." Perhaps Skoda made Dr. D. a confidant of this valuable discovery *vivâ voce*, or perhaps he thought it too good a thing to attribute to any one but his favourite Skoda. I feel somewhat chagrined that such opinions should issue from my old school of the London Hospital, of which Dr. H. D. was a pupil; but according to the old adage, you may lead a horse to the water, but cannot make him drink. Or if he did drink, the *jugis aqua fontis* of his Alma Mater was muddled by admixture with that of the Danube; and yet in my youth I found the Professors of Vienna as clear-headed as any to be met with elsewhere.

collision between the particles, of the contained fluid,* and (2.) bruit musculaire (he acknowledged at last a soupçon of valvular sound).

Dr. C. J. B. Williams, *two:* (1.) Majendie's pit-a-pat; and (2.) bruit musculaire (he also coming round to a little bit of valvular sound).

* Since the above was printed Dr. Leared has just promulgated his opinions, which seem to me a mere modification of Hope's old original "collision of particles of the blood," which Hope himself recanted in the Appendix to his Second Edition, in deference to the refutation of Bryan. With respect to the first sound, Dr. L. says, "Subsequent to the elastic reaction of the aortic walls, which we must suppose does not occupy the entire period of the diastole of the ventricle, the column of blood in the upper part of the aorta attains a state of momentary repose. This column, in a normal state, is (as has been said) under considerable tension, it is perfectly isolated from the contents of the ventricle by the semilunar valve. When systole occurs, the valve, with its superposed blood, is forcibly thrown forwards by the vigorous propulsion of blood from the ventricle; concussion (?) now ensuing between the active and passive portions of blood, a sound is produced on the same principle and from the same cause as in my experiment; and this, *cæteris paribus*, is the essential element in the normal first sound of the heart."—*Dublin Quarterly Journal of Medicine*, May 1852.

In another place he speaks of the blood assuming "a conical configuration," and "being thrown into an opposite shape." But fluids do not assume shapes except the shapes of their containing vessels, whether those be conical, square, or round; and he does not seem to recollect, that (unlike the stiff valves in his experiment), the sigmoid valves float as flaccid and passive in the outflowing stream of blood, as the long leaves of a water-plant waving in a running stream. And moreover, there is no *concussion* when the blood from the ventricle *pushes* forward the blood in the artery.

He also, when speaking of the second sound, evidently falls into the error of Barry, in attributing an *active* agency to the *passive* diastolic relaxation of the ventricles.

Dr. Todd goes with Dr. C. J. B. Williams and Dr. Clendinning (Report of Committee of British Association).

Dr. Latham, *one:* Bruit musculaire. A more philosophical hypothesis,—for he does not advance it as more—rejecting that "intricate piece of physiology" which would make "the first sound a compound of three sounds." (*Clinical Lectures*, vol. i. p. 8.)

Dr. Blakiston, *four:* (1.) Bruit musculaire; (2.) "tightening" of auriculo-ventricular valves; (3.) Majendie's stroke of the heart against the ribs; (4.) collision of the blood against the orifice of the aorta and pulmonary artery. (*On Diseases of the Chest*, 1848.)

Dr. Walshe, *four* "*essential* causes" of the first sound, besides "various subsidiary causes." (1.) Muscular action (*bruit musculaire*). (2.) Valvular tension. (3.) Forcible shock of fluid against resisting membranes, *i. e.* "the projection of the ventricular blood against the orifices of the large vessels, the flattened valves (M. Bouillaud's *refoulement?*), and the bases of the columns of the blood they contain, combined with the sudden extension of the arterial coats beyond." (4.) "Impulsion of solids against solids (heart's apex against the chest-walls) indubitably increases the first sound, and gives it, in peculiar cases, a *knocking* character." Dr. Walshe evidently thinks that

> The heart in the thorax "goes knickety knock,
> Like a pebble in Carisbrook well."—*Rejected Addresses.*

Apropos, there is a striking remark of E. L. Bryan, that if the heart jumped about in the chest,

as described by Majendie and others, it would be quite inconsistent with the wisdom of the Maker, and a torment to the possessor of such a troublesome inmate. Whereas he demonstrates that, on the contrary, by the vermicular, peristaltic, succession of change of bulk of the auricles and ventricles, the actions of the heart in health are effected with a smooth unobserved motion in the pericardium, the whole bulk remaining the same by the compensating alterations in that of the parts.

Dr. Walshe tells us, with respect to the sounds of the heart, that from the time of Laennec to the present day, at least twenty-nine theories have been proposed in its explanation; and from the laboriousness of his work I doubt not he is correct; but what a libel on the brains of the profession! (*On Diseases of the Heart and Lungs*, 1851.)

Dr. Kirkes, 1851, assigns *seven* causes at least: (1.) Bruit musculaire assisted by (2.) valvular tension, which may act as a "sounding-board!" and other secondary considerations; (3.) Majendie's blow; (4.) the pressing back of the semilunar valves (M. Bouillaud's *refoulement*), and (6.) rush of blood; (7.) the sound (*bruit musculaire*) of the *auricles!!*

The valves a sounding-board to the bruit musculaire! Thus, according to his ideas, the sounding-board of a piano-forte would give the notes, *assisted* by the wires. (See *Handbook of Physiology*, 1851, by Dr. Kirkes, *assisted* by J. C. Paget, F.R.S.) So true the maxim that two heads are better than one; as they have managed to scrape together seven causes of sound. What a noodle Newton must seem now-a-days, for having said (*Princip.* lib. iii.; reg.

phil. i.) that "more causes than are true or sufficient ought not to be assigned."

Dr. Carpenter, 1851, *three* causes: (1.) Majendie's blow;* (2.) bruit musculaire; (3.) rush of blood through the orifice of aorta and pulmonary artery. (Dr. C. ignores the auriculo-ventricular valves, though he acknowledges the second sound to be entirely due to the semilunar valves. Nay, he stands almost alone, for he goes so far as to say (page 343), that "The natural movements of the mitral and tricuspid valves seem to be effected with *perfect freedom from sound!*")

Dr. Joy (*Library of Med.* iii. 262): Bruit musculaire for the first sound, valvular tension for the second; but adds, that this sound may be *reinforced* by the *diastole of the ventricles.* In my opinion, if it required reinforcement, it would not get it from a muscle during relaxation, whatever sound a muscle

* *Manual of Physiology*, by W. B. Carpenter, M.D., F.R.S., F.G.S., &c., 1851, p. 343—"The first sound is certainly in part due to the impulse of the heart against the thoracic parietes; as is proved by the fact, that when the impulse is prevented, the sound is much diminished in intensity." Of course it is diminished, if the heart be forcibly held away from the parietes of the chest; the sound will not then pass through the intervening air in addition, with the same intensity to the ear as it did through the solid parietes only; and even Majendie admits, that at the time of the first sound the heart is in contact with the parietes. Dr. Carpenter proceeds to say that the dependence of the first sound upon the *striking* of the heart is proved also "by the circumstance that, when the ventricles contract with vigour, the greatest intensity of the sound is over the point of percussion" (*impulsion*). Who ever doubted this truism, which has nothing to do with the argument, and moreover (Dr. Carpenter's *percussion*) being an *un*truism, is nihil ad rem. Two sophisms in half-a-dozen lines!

may produce during contraction. This is equivalent to the untenable assertion which Sir D. Barry made, that the diastolic *relaxation* of the heart had an *active* influence in carrying on the circulation. Such absurdities do men fall into from neglecting the very elements of natural philosophy and logic.*

Having from facts established since the time of Haller, deduced my theory by logical argument *à priori* and upon Newtonian principles, I have never sought for experimental confirmation. The onus lies upon those who oppose it, and they do not agree; each has different fancies not worth combating, and I have enumerated them only to let my readers see their incongruity and untenability.

On the other hand Mr. Brakyn (*Lancet*, 24th

* It is this conviction which induced the Senate of the University of London to insist upon these subjects preparatory to graduation in medicine. The College of Surgeons have been gradually raising the tone of their qualifications; and to the College of Physicians it is due (by putting a premium upon the education of a gentleman), that the profession has not quite dwindled into a trade, and the University of London has lent its best support to these views. If a surgeon does not know a little of the nature of the momentum of falling bodies, he will scarcely be aware that there is more danger from a pebble the size of a walnut falling on a man's head in the shaft of a mine or of a deep well, than from a blow of a brick-bat in a mêlée on the level ground. And it is necessary to understand the hydrostatic paradox (Bramah's press) to be able to estimate the force which acts in distending an aneurismal sac, and also in the circulation of the blood (See the author's *First Principles of Medicine*). A mere smattering of pneumatics, hydrostatics, &c., the very elements of natural philosophy, would have prevented Barry and other friends of ours from talking nonsense about "suction," "active dilatation," "increased arterial action" in inflammation, "the sounds of the heart," *cum quibusdam aliis*.

Nov. 1849) made an ingenious apparatus, by means of the heart of an ox and a flexible tube and bladder, which demonstrates the sufficiency of the valves to produce sound with fluid or air, but does not afford any proof as to whether the living heart produces any sound besides, any "bruit musculaire." But Mr. G. B. Halford, house-surgeon of the Westminster Hospital, (since the above was in type, *Lancet*, 26th June 1852), by experimenting on animals (dogs and donkeys) deprived of sensation, the heart exposed, and the circulation still going on, shews, that whilst the blood was admitted into the heart, the sounds were heard. He goes on to state:

"The superior and inferior venæ cavæ and the pulmonary veins were now compressed between the fingers, and the heart continuing its action, a stethoscope was again applied, and neither first nor second sound was heard. After a short space of time, the veins were allowed to pour their contents into both sides of the heart, and both sounds were instantly reproduced. The veins were again compressed, and all sound extinguished, notwithstanding that the heart contracted vigorously. Blood was again let in, and both sounds restored. All that is claimed for the above experiment is its exemption from any rude interference with the mechanism of the heart's action. The cavities of the heart are untouched, there is no finger thrust into the auricle or ventricle, no hooking back of valves;* in fact, not one source of sound substituted for another. Both sounds are destroyed and reproduced by the same means; the

* As in the experiments of Drs. Hope and C. J. B. Williams.

strongest argument for their both depending on the same cause, which is simply the backened current of the blood, first against the auriculo-ventricular, and second against the ventriculo-arterial valves."

Mr. Brakyn's experiment *proves* that the valves acted upon by fluid produce sound; even this has been denied by M. Gendrin, and others. Mr. Halford's sagacious experiment *proves*, besides, that when the fluid is prevented from acting on the valves, there is no sound, though, as muscular action is going on, there would be, if that were the cause; and I give the benefit of *petitio principii* to those who contend for other causes, more especially to M. Gendrin, who does not state accurately even the time of the sounds. He agrees with Hope and Elliot, and compares the second sound to that of the *marteau d'eau* (*Maladies du Cœur*, 1841).

But (though I deny it) granting for argument sake that there be some sounds usually accompanying the valvular (the true, necessary, and only) sounds of the heart, these other sounds would afford no assistance in diagnosis; it is only whilst the valvular tic-tac is normal that we can be satisfied all is going well; as soon as that is interfered with, we suspect something is wrong; whilst a tune on the pianoforte is going on, the rumbling of a carriage in the street, or conversation in the room, does not produce any distrust of the instrument; but if a note does not sound, or if we hear a wire rattling, something is wrong. The engineman of a steamer smokes his pipe in tranquillity so long as he hears the tic-tac of his engine, though the wind and waters, and men and ropes, and chain-

cables, may be rattling around; but let him miss but one tic, or hear the whiz of an escape of steam, and he is up on the *qui vive* immediately.

When first combating the anti-valvulists, one of my illustrations was, that, for argument sake, supposing that (which is not the case) there were any other sound normally accompanying the valvular sound, it would have nothing to do with the forcing-pump-like physiological or diagnostic phenomena, any more than the *drone* of a Scotch or Irish bagpipe has to do with the melody. Now the Calabrian piper has discarded this relic of barbarism from his instrument, and plays his tune without any drone (*bruit musculaire*). Perhaps the animals which Halford experimented upon were Italian, as their hearts gave no bruit-musculaire drone.

The sound of the valves alone affords a sure guide to diagnosis, and an easy guide to E. Bryan and myself, and others who trust to them: those who allege other sounds, acknowledge that there is great difficulty of diagnosis—we do not. This gentleman, long after he was a qualified and an accomplished practitioner, paid me the compliment of attending my clinique for many months, and I never met with a more rapid or certain diagnosticator than himself, and partly because there is no person with whom I have had the pleasure of being acquainted who possesses such an intuitive perception of the truths of physical science;* with

* It is not often that one has the opportunity of acquiring such a friend, and not long since I had the satisfaction of saving his life; as the case is very *apropos* of the present treatise, I may here mention it. His brother, Dr. Bryan, came to me one evening in

him all seems instinctive, from the phases of astronomy down to the leverage of a crow-bar.

Percussion is another means of ascertaining the state of the viscera of the chest. Plessimeters and other instruments have been invented and proposed for this purpose, but are utterly unnecessary. The proper mode is to lay one finger flat and firmly over the part to be investigated, and then fillip on that finger with one, or tap with the points of two or three fingers of the other hand; every part where there is

great alarm, and said he feared Edward was dying, and in a most anomalous state, from a sudden attack of difficulty of breathing, without previous warning or apparent cause. I found him lying on his back with great pain in the chest, and respiring moderately, but with coldness of the surface, and a sensation of extreme oppression, which I attributed to the want of action of the heart, which was scarcely beating with sufficient power to produce perceptible pulse at the wrist. The first thing that struck him and those about him was the idea of spasmodic cholera, of which there had been some cases in the neighbourhood. He was perfectly in his usual sound senses, and though convinced he was dying, an opinion in which several medical men who were present concurred, he was not at all alarmed; he even made us smile through our anxiety, by his apt illustration, as he told me he felt as if his heart and lungs were of stone, like the Comandatore in *Don Giovanni*. He did not appear to me to be labouring under any disease enumerated in nosologies, but like a person who had been poisoned; there was a tendency to retch, and a sense of relief from bringing up the slightest quantity of fluid or gas from the stomach. I gave him some tartar emetic, as the action of vomiting, besides relieving the stomach, has a tendency to restore the circulation, an effect witnessed in ague. Upon asking him what had occurred, whether he had eaten mushrooms, or other possibly poisonous substance, he went on to relate, that after dinner, to amuse his nephews, he had been shewing them fireworks; that whilst swinging about some of these with coloured light he had

lung (except just at the lower edges, and especially on the right side, on account of the liver), ought to sound nearly as hollow as an empty cask, the spongy texture of the lung being filled with air. But in proportion as the lung becomes denser from disease, either through being loaded with blood by inflammation, with dropsical fluid, or with tubercles, &c., the sound on percussion becomes duller.

CATARRH.

In considering diseases of the lungs, we begin with the simplest, or rather the lowest degree of departure from the normal state, *catarrh* of the lining membrane of the air-passages, or common

fully inhaled the vapours, which did not at the time attract his attention; for the symptoms had not come on until after he had returned into the house. Hence I judged that the strontian (a poison as virulent as arsenic* or oxalic acid), with the sulphur, carbonic acid, &c., resulting from the exploding fireworks, had been inhaled and absorbed from the bronchial surface. But what was to be done? He said, "This cannot last much longer." After some consideration, I said, "If you let me bleed you, it will take off the load from the heart, and your pulse will rise." I will not repeat his complimentary answer: he was bled, with immediate relief, the pulse rose, and he rallied; but months elapsed before he recovered the effects of the poison. We should now much regret his having retired from the ordinary practice of his profession, if he had not devoted his powerful mind and kind disposition to the treatment of the insane.

* I may here add a case of arsenic taken in by the lungs. A housekeeper in a large establishment finding that one of the servants had a paper of white arsenic for the purpose of killing rats which infested his room, very prudently took it from him, but ignorantly threw it into the fire: as the draught in the chimney was not good, the grey garlicky fumes came into the room, and instead of throwing open the window and retiring, she stirred up the fire, at the same time again inhaling the fumes. This produced frightful dyspnœa and cough, followed by sickness and faintness. I ordered a number of leeches to the scrobiculus cordis, and afterwards a blister, and administered morphia freely: she soon rallied, but was annoyed for some months by faintness and irregular action of the heart.

cold of the chest: this, when aggravated, is called *bronchitis;* and when the minute vesicular structure of the lungs is implicated, *peripneumonia notha.* These represent likewise the different states or gradations of epidemic catarrh or *influenza,* which, like the sporadic or accidental disease, is sometimes mild, sometimes unmanageable. Catarrh is in reality mild bronchitis; that is, an inflammation of the membrane of the bronchial tubes, though in a minor degree; but it has been usual to draw an artificial line of distinction between catarrh and bronchitis because the treatment is different,—catarrh, which is a mere *local* disease, being benefited by liberal diet; bronchitis, on account of the higher degree of inflammation and the *constitutional* fever which accompany it, requiring an anti-febrile regimen.

Catarrh is not produced by application of mere cold to the respiratory passages—as by the continued breathing of frosty air, for instance—provided the healthy circulation of the blood be kept up by exercise; but if the person be chilled at the same time, as by sitting in an open carriage without sufficient clothing, catarrh will result; or, under any circumstances, the continued breathing a damp and cold atmosphere will lower the vital tone of the membrane so as to induce inflammation. If the chest be excessively chilled, either from the simple cold alone, or still worse, if the surface of the skin and the clothes be damp from previous perspiration, or wet by rain, the probability arises, that besides merely catching a cold, viz. catarrh of the membrane of the nose and of the bronchial tubes; pleurisy, or peripneumonia, inflammation of the lungs, or severe bronchitis, will be induced. The

feet being wetted, and afterwards allowed to remain wet and cold, is a well-known cause of catarrh and of quinsey; not because there is any direct communication or sympathy between the feet and the fauces, but because cold feet, above most things, brings on that chilly, reduced state of the frame by which the nervous energy is diminished to a degree favourable for the production of inflammation, and then the cold air applied to the fauces and bronchi acts deleteriously upon them.

When the vital energy of the membrane has been in this way over exhausted, if the individual rest for some time in a warmer atmosphere—more especially if the warm air of our open fires be incautiously inspired,*—the vessels of the membrane become over injected, red, and swollen: this is the first step of catarrh, which may pass off in an hour or two, or further symptoms may follow. In this stage a sense of uneasy dryness in the parts affected,

* Many persons think they have caught catarrh from exposure out of doors in very cold weather; whereas it is this subsequent application of heat to a chilled membrane which produces the mischief: precisely analogous to the cause of chilblains, which, it is well known, are produced by bringing the hands or feet too suddenly near the fire after exposure to cold. The lungs are naturally adapted to breathe cold air without injury; but the sudden application of artificial heat, by running to a fire and breathing heated air, produces a chilblain state of the air-passages. Medical men often suffer from this cause, being obliged to undergo frequent changes of atmosphere in entering the heated rooms of patients in winter: these evils, however, may be partly obviated by turning the back to the fire. It must, however, be observed, that either chilblains or catarrh may be produced by the depressing effect of long-continued cold, without subsequent extra heat; as I mentioned above, when speaking of the catarrh from damp cold.

nose, fauces, and chest, sometimes amounting to pain, is experienced: we can see up the nostrils and into the fauces, and thereby judge of the state of the bronchial membrane lower down, though it be out of sight. Medical men are not usually called to patients at this early stage; but learners may watch for it in the members of their own families, or amongst fellow-students. If the ear be applied to the chest, the sound will be as yet but little altered; or if appreciable modification exist, it will consist of some diminution of the respiratory murmur, from the swelling of the membrane, and an occasional slight "*rhonchus sonorus*" or "*sibilans.*"*

The amount of *cough* is very uncertain, being often rather in proportion to the number of branches of sentient nerves irritated than the amount of inflammation; nor can we in any case estimate the danger or severity of disease by the quantity of cough; for frequently there is a noisy troublesome cough which is of little consequence; whereas, on the other hand, in some most dangerous inflammations of the lungs little or no cough is present.

* Almost all these auscultatory terms are derived from Laennec, with slight modification, and will be explained as they occur, by which means they will be more easily remembered than if given in a list unconnected with the pathology. "Rhonchus sonorus" is a slight croaking sound, like snoring, when not loud: it arises from swelling of the lining of the tubes, which narrows them, while, at the same time, a little extra formation of mucus or of pituita causes a partial obstruction of the tubes at certain points, through which the air forces its passage and produces the vibratory sound. The "rhonchus sibilans,"—hissing or wheezing sound,—is produced in the same way, but in smaller branches of the tubes, hence a more acute sound.

Slight catarrh will frequently pass off after a night's repose. Bathing the feet at bed-time, or a warm bath, if convenient, is useful; and some warm drink, with a small portion of fermented liquor, such as wine-whey or negus, according to the usual habit of the patient as regards diet. Neither should this be reduced, nor should we countenance more stimulants than usual, or bronchial inflammation may be superadded, with shivering and hot dry skin, in fact, feverishness. If the natural appetite for food remain, it ought to be satisfied, as a natural desire for food is evidence that fever does not exist; and keeping the stomach empty, or loading it with slops, more especially with tea, will lower the nervous energy, so as to deprive the vessels of the bronchial membrane of that normal strength which would restore them and consequently the membrane to the natural state; or, in technical language, produce resolution of the incipient inflammation. If, either from the severity of the cold, or from bad management, by too much stimulant, or the reverse, the catarrh or bronchitis continue, instead of going off by resolution, the membrane will begin to throw out mucus abundantly in some parts, remaining still unnaturally dry in others; then the *rhonchus* becomes *mucous*, the mucus in the tubes producing bubbles. There is frequently heat and pain in some part of the chest, equivalent to the heat and pain which is felt in the membrane of the nose, with cold in the head; part of which is dry, part "running;" but this is not a dangerous symptom, nor requiring antiphlogistic treatment, if not accompanied by febrile symptoms. In catarrh or bronchitis the sound on *percussion* is natural.

The *expectoration* in catarrh is *mucous*—that is, an increase of the natural secretion of the parts, which is gelatinous but not tough, without much taste, and inclined to become opaque; in bronchitis it is *pituitous*, an exudation of sero-albuminous tough glairy slime, transparent and saline; but inasmuch as catarrh and bronchitis run into each other, the expectoration is frequently a mixture of mucus and pituita;* in peripneumonia notha, too, it is a mixture of both, whereas in true pneumonia it is a very scanty and tough pituita, which, besides being saline, from the salts of the serum of the blood, partially loses its transparency, and has a rusty colour imparted to it by the red particles of blood which are extravasated by the inflammation.

When febrile symptoms are present, the disease assumes the state of bronchitis, or influenza, or feverish cold: there is chilliness, loss of appetite, pains in the back and limbs, and other feverish symptoms; a dry swollen state of the bronchial membrane, exactly like what occurs in measles; which must be treated by bleeding, or leeches, and blisters to the chest,

* I speak the language of the obvious properties of the expectorated matters, discoverable by the unaided senses of sight and smell. Microscopic observation of the existence of mucous-corpuscles, epithelial matters, &c., most important for the minute pathology of the subject, at present lend no aid in clinical observation. The increased alkalinity of morbid secretion from mucous membranes now proved by chemical analysis explains the well-known irritating quality of these secretions. The glottis in acute stages of bronchitis, like the upper lip in schneideritis, or common cold in the head, is irritated by the *acridity* of the secretion due to the presence of an increased quantity of alkali and salts.

more or less calomel, saline* antimonial medicine, with morphia or other opiate, to allay pain and keep down the pulse, quiet the cough and facilitate expectoration. This treatment must be pursued notwithstanding appearance of debility and weak pulse, which occurs in influenza, and even if the disease passes on into the aggravated state called peripneumonia notha; in which the lips become livid, and the patient is almost suffocated by copious frothy expectoration, mixed with viscid pituita, producing great exhaustion by the harassing efforts to cough it up: this state calls for the free use of mercurial and antimonial medicine. The lung in this state of disease becomes highly congested, producing a certain degree of dulness on percussion; and in addition to the sonorous, sibilant, and mucous sounds in the bronchi, a fresh sound will be heard, "*crepitation*" (like that produced by throwing salt in the fire, or by rubbing a lock of hair between the finger and thumb close to the ear), which is caused by the very minute bubbles of air in the over-charged lung. This is rather a desperate state of affairs; and, in addition to the remedies above mentioned, we must endeavour to relieve the internal congestion, by increasing the circulation on the surface. The vapour-bath is a powerful means; and as the patient is generally too languid to employ it in the erect posture, Armstrong's plan of putting a light frame over the patient under the bed-clothes, and introducing the hot air from an Argand lamp by a tin

* According to my experience, sulphate of magnesia is preferable to any of the salts of soda or potash.

tube, is highly efficacious, and can be persevered in for a long time without fatiguing the patient.

When these cases prove fatal, the bronchial membrane is found highly injected, and sometimes softened; and the lung, when cut into, is dark, gorged with venous blood; and yellowish froth oozes abundantly from the cut surface, sufficiently accounting for the suffocating state of the patient.

Catarrh, from being often renewed and neglected, or from constitutional or local debility, becomes permanent, or degenerates into *chronic catarrh;* this, with some persons, seems almost habitual, and causes apparently little inconvenience to themselves. And an almost catarrhal state is not unfrequently produced by much loud exercise of the voice, as we may sometimes perceive in public singers; but the latter is rather a forced extra secretion than disease, and does no harm; not so chronic bronchitis, which if neglected, spoils the voice.

Nothing is so efficacious and agreeable as opium for relieving catarrh, whether cold of the head or chest; a quarter or half a grain of opium, or equal parts of Dover's powder and compound squill pill, made into five-grain pills, about every fourth hour. Purgatives and low diet will aggravate common catarrh, for the reason adduced above. Popular saws are frequently dangerous to adopt as axioms in medicine, but there is great truth in the trite adage, "Feed a cold, and starve a fever."

Chronic catarrh, being a mere relaxation of parts, is cured by good living, animal food, and fermented liquor in moderation, with tonic medicines and the

balsams. Opiates, if they agree with the patient, are efficacious in chronic as in recent catarrh, and may be combined with other medicines to prevent their producing constipation. Chronic bronchitis, which is known by a tougher and more difficult expectoration, with febricula, requires rest, moderated diet, salines, antimonials, and diaphoretic expectorants, including opium, as the above-mentioned pills, blisters, and other counter-irritants; and some mercurial, repeated daily, is required to subdue the chronic inflammation in the bronchial capillaries. Little judgment can be formed from the expectoration, as there is often in chronic bronchitis an enormous quantity of catarrhal mucous expectoration superadded.

The terebinthinate gum-resins, and balsams, which have been found useful in the catarrhal states of the urethra and vagina, have the best effect also in catarrh of the bronchial tubes, and none more so than Venice or common turpentine, the efficacy of which is increased by combining it with powdered senega-root in pills. The senega has as much influence on the capillaries when circulated to them as ipecacuanha; and as it is less emetic, it can be given in larger quantity.

The balsams and cubebs are useful expectorants in catarrh; guaiacum and ammoniacum are preferable in bronchitis; but it is difficult to cure bronchitis perfectly without a cautious use of mercurial medicine; and upon every febrile exacerbation, recourse must be had to occasional doses of antimony.

Various kinds of linctus have been resorted to at all times for the relief of the tickling in the fauces; but a mixture of compound infusion of roses, or

water with sulphuric acid, alum, gum mucilage, and syrup of tolu or lemon, sipped frequently, will be found more efficient. When the fauces, uvula, and epiglottis are in a state of relaxation and irritation, a strong solution of nitrate of silver, a scruple or more to the ounce, sponged over the parts by a probang affords great relief.

We find occasionally, during convalescence from catarrh of the schneiderian membrane, that small semi-dried crusts of lymph are blown from the nose, with a speck of blood on the surface at the place at which they were attached, and causing a slight sensation of soreness by their removal. Now precisely similar little scabs or crusts are coughed up from the tracheal or bronchial membrane; and frequently the exact spot can be pointed out by the patient. Sometimes these crusts, from having a wider attachment, cannot be easily detached from the bronchial tube by coughing, and remain fixed for a considerable time, until the part gradually heals; the little mass becomes then loosened and is expectorated.

Sometimes a plug is formed, and a decomposition with fœtid odour arises before the plug is got rid of, which after severe bronchitis is extremely offensive, almost as bad as from gangrene of the lung. It sometimes happens that, in chronic bronchitis, this plug is for a long time detained by renewals of exudation of plastic lymph, and completely obstructs the tube; and when this occurs, mucus and air accumulate behind, producing dilatation of the bronchial tube; and if the inflammation has been communicated to its substance, and thus softened it, permanent *bronchial dilatation* is induced; for in that case,

even after the local bronchitis has entirely subsided, and the plug been softened, or dissolved and expectorated, the tube never recontracts to its original size.

Sometimes, in rare instances, calcareous concretions like the ossifications in the arteries or heart are deposited in the lungs and expectorated, these give rise to a kind of asthma, and most distressing cough, with pituitous expectoration, and sometimes hæmoptysis.

Independently of recent cases of inflammation in the chest, as cough is a symptom of consumption (tubercular disease of the lungs, to which the term consumption is properly restricted), it always produces, when long continued, an anxiety in the minds of friends; but cough may arise from a variety of causes which only medical men can ascertain, and which even some of them often fail to distinguish, from not having paid sufficient attention to auscultation; besides which, young practitioners are often not aware of the variety of circumstances which may produce a long continued cough. I have been consulted for severe coughs of some duration, in more than one instance, which I discovered to depend upon a cause at first sight insignificant, as, a chronic inflammation, with hardened wax, in the ear; and though most persons are acquainted with the fact, that irritating the internal part of the ear will produce coughing, these cases had previously passed through the hands of several medical men without this cause being detected, although a degree of deafness existed, which attracted my attention. Chronic enlargement of the tonsils, and accumulation of a white curdy matter in their ducts,

will produce cough; and a relaxed elongated uvula, it is commonly known, induces a most distressing continued cough: and in all these coughs, when long continued, the membrane of the larynx and trachea, inflamed by mechanical irritation, gives out extra mucus, thus producing expectoration, with occasionally even streaks of blood.

Such cases occur both in males and females, giving rise to suspicion of consumption; but the most common cause in females is hysteria, often so slight that scarcely any, if any, discoverable irregularity or derangement of the functions of the uterus is evident, and yet the resulting morbid sensibility of the bronchi and larynx, produces cough, with alarming symptoms, not merely expectoration, as in the cases just alluded to, and which is chiefly from the continued mechanical irritation of the cough, but also spitting of blood, the occurrence of which gives additional cause of apprehension of consumption. The mode of treatment of the former cases is obvious to all medical men as soon as the cause is discovered, according to the old adage; and, as to the latter, I have found no difficulty in curing this imagined consumption by directly attacking the primary disease with such remedies as turpentine, iron, cubebs, aloes, quinine, assafœtida, &c.; and anodynes, with squills, &c., to allay the morbid sensibility of the bronchi and larynx; at the same time supporting the strength by animal food and fermented liquors, which are too often forbidden, from the practitioner supposing the symptoms to depend on inflammation, instead of attributing them to the true cause, morbid sensi-

bility; and, on that account, not only resorting to low diet and antiphlogistic medicines, but also to frequent bleeding by leeches or otherwise, which makes the patient more hysterical, and increases morbid sensibility.

I have cured the harassing coughs of some neuralgic patients by large doses of sulphate of quinine; the first relief being sometimes as decided and nearly as rapid as if it had been effected by an opiate.

I have seen a young female who had been reduced by diet and medicines, including salivation, for a cough and loss of voice, which was attributed by several practitioners, some of them of note, to chronic laryngitis, but which was nothing more than what I call an hysterical cough, and which gave way to tonic medicines and a generous diet, with exercise in the open air—the patient having been unnecessarily shut up for nearly two years from the air of heaven and human society. There is no more common error than that of excluding the air from patients who have that kind of cough which is connected with what is called spasmodic asthma, especially those cases which depend on chronic (Laennec's dry) catarrh, and which I find are curable much more quickly provided the patient be sent out to take exercise in the open air even in winter. The cold air is wrongfully accused, and the patient prevented from going into the cool air again, which would have relieved the symptoms.

A medical friend of mine had a continued troublesome cough, causing anxiety on the question of consumption, and consulted me; amongst other points upon the necessity of using a close

carriage instead of his cabriolet. I cured him by merely advising him to turn his back to the fire whenever he went into a patient's room, which was frequently the case, he being in extensive practice; and by recommending a more generous diet, as he had been living rather low through the fear of inflammation.

EMPHYSEMA.

The disease of the lung denominated emphysema consists in what might be called an extravasation of air. It produces a kind of asthma, and when it exists to any extent is very distressing and harassing, by preventing the individual from active occupation or exertion. On examining the lung after death, it assumes the appearance of air beneath the membrane, like the veal which is blown by butchers. This disease is produced by rupture of the sides of the air-cells during violent exertions, or coughing in whooping-cough, or whilst the bronchi are partially plugged, as above described, by which air gets into the cellular tissue of the lungs; and when there, there is nothing to press it back again, as the air thus introduced balances the atmospheric air in the passages.* When emphysema is large, it diminishes the function of the lung, both by occupying its space and compressing it, and produces permanent dyspnœa, increased upon exertion. When emphysema is suspected, it is easily detected by auscultation and

* I must refer the student to writings on morbid anatomy for the description of the different forms of emphysema that have been described. In practice we may safely include them under one head.

percussion; the *respiratory murmur* is, of course, *diminished*, and upon *percussion* the sound is rather *louder*, there being more air; whereas in other diseases, as pneumonia, when the murmur is weaker, the sound of percussion is at the same time and spot *diminished* by congestion; whilst in catarrh or bronchitis it is natural. Thus emphysema is the reverse of other affections as regards auscultation and percussion; the disease here being a superabundance of air which does not pass, there is consequently less sound in the passages—less respiratory murmur on listening, though more resonance on percussion—being just the reverse of pneumonia and other diseases of the lungs. There is one unnatural sound which will occur in both cases, *i. e. puerile respiration* in the *sound parts* from the extra demand made upon the function of these parts.

Emphysema can be relieved only by rest and general attention to the health, including *gentle* exercise, sailing in fine weather, an easy carriage, or, more especially, riding on a quiet horse.

CROUP.

We frequently find in bronchitis, as might be inferred, that the tracheal membrane also is inflamed, and is tender on pressure. In these cases there is a formation of semi-scabs of condensed mucus, like those already described, which are coughed up, more especially after sleep, and their form is seen if thrown into water. A little higher degree of inflammation in the trachea and larynx constitutes croup; that is, a layer of inflammatory lymph (diphtherite) is thrown out, which on a serous membrane would be-

come organised and permanent, as in pleurisy or peritonitis; but being exposed to the air and to the moisture of the part, it almost immediately loses its vitality, and is detached and expectorated; it sometimes, however, causes suffocation, because this "false membrane," being much tougher than condensed mucus, becomes impacted in the rima of the glottis, and cannot be forced backwards or forwards by the inspiratory or expiratory efforts: besides which, in croup, the muscles of the larynx are in a highly irritable and spasmodic state. I have seen masses of the mucous clots of bronchitis or catarrh expectorated with ease, four times as large as the shred of false membrane of croup which had caused suffocation. This statement will account for the alarm always felt about croup, and its being called a treacherous disease;* there being, in fact, often no urgent symptoms, the slight febricula not exceeding that of common bronchitis. But the croupy cough, or peculiar hoarseness, warns the experienced practitioner of the precarious state of the patient.

A leech or leeches, according to the age of the patient, a blister across the trachea,† and frequent inhalation of warm vapour, is the best mode of detaching the morbid formation, with repeated doses of ipecacuan or antimony to check the inflammation, enough to produce sickness at first, and subsequently slight nausea. Mercury is useful also for this pur-

* In addition to which, sudden death from laryngismus stridulus—to be hereafter described—has been mistaken and placed to the account of croup.

† In order to save time, it is well to put on the blister, and apply the leeches close to the edge of it immediately.

pose; but the business frequently is decided, favourably or otherwise, before mercury can produce effect; there can, however, be no objection to it simultaneously, as it may act in time to be of use. I wish merely to impress on the mind the rapid and uncertain nature of the case, and the necessity for primarily using speedy remedies.* There is, perhaps, scarcely any disease of which it may be more truly said, "Cita mors venit, aut victoria læta."

PNEUMONIA.

The natural transition is to pneumonia, or real peripneumony. The state of lung formerly described (p. 39) was denominated peripneumonia notha (spurious), because, besides the difference in symptoms, however high the inflammation appeared to run, it did not produce solidification of what is called the substance of the lung, but was confined to the surfaces of the air-vesicles and tubes—the lung in fatal cases of peripneumonia notha appearing like a sponge full of frothy fluid; whereas in pneumonia, the inflammation is in the areolar tissue of the lung, and thickens the membranous partitions of the vesicles until these are obliterated, the spongy texture becoming more and more gorged and heavy ("the state of *engouement*," engorgement), until at last it is rendered solid like a piece of liver, from which it is said to be *hepatised*. Instead of a watery or mucous fluid being

* One speedy remedy, about which there has been endless disputation, is tracheotomy. I have had it performed twice successfully; but in these cases a doubt always remains on the mind whether it has been absolutely necessary or not: no rules for guidance can be given; the practitioner must depend upon his own judgment, or consultation.

thrown out on the surface of the vesicles and tubes, as in bronchitis and peripneumonia, there is a very viscid semi-transparent pituita, partially stained of a rusty tint by the colouring matter of the blood, sometimes in small quantity, sometimes more copious, according to the extent and degree of the inflammation. In the beginning, whilst the air-cells remain partially open, and only "gorged," the air passing through the narrowed passages obstructed by this tough pituita, causes crepitation similar to that before described; and as the lung becomes more solidified, this crepitation, of course, diminishes, until it ceases entirely; and then the sound that is heard is bronchial respiration, the solidified lung conducting to the ear the sounds from the bronchial tubes, which were inaudible in the healthy spongy state of the organ; and there is dulness on percussion.

If the inflammation be cured, or subside, before the structure of the lung be damaged—that is, if it have gone no farther than engorgement, not to extreme hepatisation,—the swelling of the partitions subsides; and as the cells are thus re-opened, the air begins to pass, and *returning crepitation* ("*rhonchus crepitans redux*"), a sign of a recovering state, is heard. But if the disease have reached extreme hepatisation, that is, if the structure of the lung be destroyed by adhesive inflammation of the parietes of the cells, the local mischief is permanent, and there will be permanent dulness on percussion; and though the *patient* may perfectly recover, and the rest of the lungs may perform the function necessary to life, none but bronchial sounds will subsequently

be heard in that part of the lung, unless a portion between the hepatised part and the ear had only reached the stage of engorgement; in which case, upon recovery of the part, natural respiratory murmurs, though weak, will again be heard. Whilst a portion of the lung remains totally or partially impervious to air, the remainder of the lung which is healthy is more expanded at each respiration than usual or natural; consequently, the respiratory murmur is there heard louder than natural (puerile), which is a collateral evidence of disease in the other part, and therefore puerile respiration always excites suspicion of mischief. It occasionally happens that in a depressed state of constitution inflammation of the lung terminates in gangrene, causing an intolerable fœtor of the breath, and commonly proving fatal; but if the portion of mortified lung be very small, it may be expectorated, the part cicatrise, and the patient recover; or, by a slower process, a part hepatised may soften into Laennec's purulent infiltration, and be expectorated, and still life preserved. It should also be mentioned, that the majority of instances of gangrene in the lungs are not preceded by painfully acute inflammation, but rather by a low congested condition of the part.

Although we have, above, clearly enough laid down a distinction between peripneumonia and peripneumonia notha, the treatment must be in all respects the same.* There is no danger of confound-

* Thus, take a sketch of one of these cases from the *Clin. Journ.* Lond. Hosp. 1835.

Oct. 10th.—D. C. æt. 18. A groom. Ill four days with sharp pain of right side of chest; dyspnœa and cough, with difficult ex-

ing these diseases with each other; but severe cases of pneumonia have been mistaken for fever of the typhous character, on account of the prostration of strength, lividity of complexion, and absence or slightness of cough; for in some most serious cases of pneumonia brought into hospital, or even in private practice, the patient may be found complaining of neither pain nor cough; and therefore auscultation should never be neglected in cases apparently of simple fever, especially with typhous* symptoms,

pectoration; extensive crepitation on right side; puerile respiration on the left; sleeplessness from pain; headache; complexion livid; pulse 120, weak; thirst, anorexia; tongue nearly natural. Diagnosis: pleuro-peripneumony. Ordered to a warmed bed, and V.S. Antimonii potassio-tart. g. $\frac{1}{4}$; ex aquæ ℥j, omni horâ. Haust. anod. si opus fuerit.

11th.—Was sick in the night, and afterwards slept several hours, without Haust. anod.; less cough; still pain in side, and dyspnœa; P. 130, fuller; B. confined.

Ordered—Haust. cathart. statim.
Hirudines xx. lateri, quà dolet.
Contin. antim.

12th.—No pain, feels only weak; cough still troublesome, but expectoration more free; B. relieved; P. 90, soft; tongue clean; skin soft.

13th.—Convalescent; P. 84; crepitation ceased, but respiration slightly bronchial.

* For instance, a man brought into the hospital during the prevalence of a typhoid epidemic.

Nov. 20th.—Twelve days ill; incoherent; lying supine; P. 120, weak; eyes dull and heavy; complexion inclining to livid; skin dry, but not warmer than natural, with petechiæ; tongue brown and dry, white on the edge; respiration moderate, in fact apparently typhus; *no cough*, but *crepitation* in some parts, with rhonchus sibilans, and sonorus, in others; B. confined. Diagnosis: complication of pneumonia, with the prevailing epidemic.

any more than in measles or other diseases known to affect the lungs.

The value of auscultation is great also in chronic, or in latent peripneumony. I was consulted by a patient who had been ill about two months; he had all the nosological symptoms of advanced consumption,—cough, expectoration yellowish white with a little blood, night-sweats, emaciation, some pain in the side on deep inspiration, &c. Thanks to Laennec, I was able to discover immediately that it was not consumption, but hectic fever from neglected peripneumony; and, notwithstanding the debility, I adopted pretty active treatment—free leeching of the side, and saline antimonial medicine, with milk and vegetable diet, which soon cured him.

A gentleman engaged in an active business had been for many months affected occasionally with symptoms resembling what is called angina pectoris; difficulty of breathing, or rather sense of distension in the chest, causing him to stop suddenly, from a feeling of distress, sometimes with pain, and making him, when it attacked him in a sitting pos-

The imminent indication being to relieve the lungs by depletion, notwithstanding apparent debility, ordered V.S. ad xvj. Haust. cath. statim, et postea mist. sal. antimon. 4tis horis.

21st.—Much relieved, and moves about in bed; speaks distinctly, but still delirious, and has begun to cough (*the absence of cough on the previous day having been* attributable to insensibility of the sensorium, and to the oppressed and languid circulation); P. 90, strong. Skin hot. B. no relief. Rep. V.S., Haust. cath. et mist. salina antim.

22d.—All symptoms relieved; more cough, but with free expectoration; head clear.

25th.—Convalescent. Thanks to Laennec!

ture, get up and walk about, from painful restlessness. He had only occasionally a slight cough, looked well and florid, but was getting irritable and anxious, and could not sleep, from uneasiness in the region of the heart, which was increased by a deep inspiration, or by sneezing. The pulse ranged from 84 to 100, firm, rather hard; the tongue pale; he had no feverish languor; and notwithstanding the above symptoms, and that he could not stoop to lift any thing from the floor without pain, he felt well and strong, he said, if it had not been for the bleeding, purging, and other antiphlogistic treatment most judiciously adopted by his medical attendant, who called me in to enforce compliance by his patient, who was a near relation, and was rather surprised at my inculcating more "drenching," and a number of leeches to be applied at intervals of forty-eight hours for a week. This case was one of "latent" pleuro-peripneumony of the left lung (there was rhonchus crepitans, bronchophony, &c.), which had continued in a chronic state from an acute attack six or eight months before: he was soon relieved by the active antiphlogistic treatment. These cases occur not unfrequently in hospital-practice, in artisans who have returned to their work too soon after acute attacks; and are almost always cured by bleeding, sedatives, calomel, antimony, and salines; often even after extensive dropsical symptoms have set in.

HÆMOPTYSIS.

This, though often arising from a congested or inflammatory state of the lung, is so commonly asso-

ciated with Phthisis, that it will be more conveniently considered along with that disease hereafter.

PLEURISY.

We have next to consider pleurisy—the inflammation of that serous membrane which covers the lung and lines the chest, smooth as the polished diamond, and lubricated with a slight moisture, little more than vapour, conditions which afford to motion the greatest freedom from attrition. Damp cold, as in the former instances, will produce inflammation of this membrane; the instantaneous effect of which is, disturbance of its essential function, viz. the secretion of the fluid necessary for maintaining softness and lubricity of the membrane—the fine exhalation, is stopped, as in the first symptoms of cold of schneiderian or bronchial membranes; the dried membranes rubbing against each other, begin to produce sharp pain of the sentient nerves; and a *friction sound*, which does not exist in health, may be heard on listening at the painful part. This rubbing sound thus produced does not in general last many hours, as the neighbouring parts throw out an extra quantity of moisture: this effusion, an effort of nature as it were, gives relief, and helps to prevent *adhesion* of the inflamed surfaces, which often results from the exudation of inflammatory plastic lymph at the spots inflamed; and this lymph being moist, there is thus usually but a short period during which the dry, rubbing sound exists. It does, however, occasionally happen that a coarser rubbing, heard and mentioned by the patient, continues for several days. The action of breathing, too, causes so

much pain, that the difficulty of hearing the rubbing is increased by the patient taking every precaution to breathe by the diaphragm without moving the ribs. This constitutes one of the distinguishing symptoms of pleurisy; the patient lies doubled up on the pained side, trying to prevent its motion and to resist coughing, on account of the suffering which that act produces; the cough is consequently short and moreover without expectoration, as the interior of the lung is usually unaffected at the commencement; at a later period, some mucus is expectorated, accompanied occasionally with streaks of blood derived from the parts of lung which have been implicated by the close contact of the inflammation. This trifling escape of blood is seldom taken into account, and by the ancients was even thought a favourable symptom. Prompt and active antiphlogistic treatment, as above described, is equally necessary here, and even a more free exhibition of morphia with antimony than in the other cases mentioned, and a poultice applied while the leech-bites are bleeding.

If the pleurisy has been severe and extensive, the effusion of serum—which is an effort towards cure—becomes excessive, and the fluid accumulating in the cavity of the chest, compresses the lung, suspends its function, displaces the heart, the diaphragm with the organs attached beneath it, and distends the thoracic parietes. Sometimes there is pus mixed with the serum; and Laennec, who had a notion that there was always more or less pus, gave the name of *Empyema* to this state of effusion accompanying pleurisy. However, this term makes distinction between the collection of serous fluid thrown

out in this way, and the serous effusion of Hydrothorax. Thus, when we hear the word empyema, we infer the collateral circumstances of pleurisy and not of Dropsy, to which genus Hydrothorax belongs.

As soon as any ascertainable quantity of fluid is thrown out, a new auscultatory symptom is usually found; that is, if there be broncophony arising from increased density of the lung caused by compression by the fluid—or by co-existent pneumonia of the surface of the lung beneath the inflamed pleura, this morbid sound of the voice is accompanied by a tremulous rattle, like the sound made by the performer of punchinello, or somewhat like the bleating of a goat, or rather kid, from which the term *Ægophony* is applied to the symptom. As the fluid compresses the lung (sometimes with a thick layer of inflammatory lymph in addition), a comparatively solid conductor of sound is produced over the bronchial tubes, sufficient abnormally to conduct the voice, and the vibration of the fluid causes the bleating; but as these two conditions do not always concur on the same spot, ægophony is not always detected.

The height to which the fluid fills the chest may be ascertained by percussion. When the damage is extensive, so much fluid is sometimes thrown into the cavity of the chest as quite to fill one side, compressing the lung, and causing that side to *bulge* out larger than the sound side. Thus the practitioner combines with the practice of percussion the use of the senses of sight and touch, to determine the physical derangement of parts. This large quantity of fluid will in many cases be gradu-

ally reabsorbed; but much patience is required, and there is difficulty in supporting the strength of the patient. Sometimes from nine or ten months to two years, or more, are required to get rid of all the fluid; and I have heard ægophony twenty months after the pleurisy, though the patient ultimately quite recovered. In this case, the side has not *shrunk* much, and the slowness of cure has proceeded rather from debility of constitution than from the amount of lesion; but commonly, after the whole of the fluid has been reabsorbed, as the surface of the pleura has become rigid from plastic inflammation, the lung does not re-expand to its original dimensions, and that side of the chest is left smaller than the other.

In some cases, whilst the lung was compressed, the pleura has become so thickened and condensed as not in any degree to re-expand by the efforts of unassisted nature; and such patients may be seen with the side quite collapsed, producing a laterally curved state of the spine, some of these individuals enjoying tolerably good health with little more than one lung.*

Sometimes during pleurisy, at the lowest part of the pleura, where the sac assumes a narrow wedge-shaped form, a considerable quantity of lymph is thrown out, which, not becoming entirely organised, may lead to suppuration in that position. The abscess thus formed may either point externally, or make its way through the lungs, and the patient recover. I have witnessed both fatal cases and recoveries of this kind, some of them very tedious, pro-

* Dr. Little has re-expanded such a case by appropriate treatment.

ducing harassing cough, emaciation, and hectic, leading to apprehension of tubercular consumption; but though we may have all the symptoms, including muco-crepitation, the situation is a pretty certain guarantee against tubercular deposit, as in that disease the part affected is almost certainly at the apex of the chest.

The operation of tapping the chest is sometimes performed, but is a much more hazardous and unpromising operation than paracentesis abdominis, and should not be done unless as a last resource, and when there is apparently danger of suffocation. As mentioned above, much patience and perseverance are required in supporting the strength of the patient by regulation of diet and tonic medicines; no active means can hasten the removal of the fluid; and, especially, any empirical attempt to promote absorption by a too free exhibition of mercury, will do more harm than good, by breaking down the constitution.

WHOOPING-COUGH

is a specific disease, which, save the absence of eruption, bears a close analogy to the exanthemata, more especially to measles; it is a specific fever, however, with a specific local internal bronchitic affection, equivalent to the tonsillitis accompanying scarlatina, or the pyeritis of continued fever. Like all diseases which are combinations of fever and local inflammation, patients may die before the peculiar character of the disease is developed; or it may escape notice from slight or anomalous varieties. Thus, sometimes in scarlatina maligna no rash is seen; when small-

pox is raging, some patients will die of collapse or other cause before the rash appears; on the other hand, small-pox may be so slight that it would have escaped notice were it not that other children in the same family having the disease, it was sought for and detected. Similarly, children may die of this disease of the lungs before they have arrived at the stage of whooping; and, on the other hand, I have seen children with the peculiar state of disease of whooping-cough with the exception of the whoop, when the others of the family whooped strongly.

The way in which the disease comes on is peculiar, shewing constitutional affection. The cough does not usually begin, like a bronchitic or catarrhal cold, in the daytime; but the patient being rather languid and uncomfortable through the day, begins in the evening to cough for some time in a dry, unsatisfactory manner. The sleep is usually disturbed in the early part of the night, but rest is obtained towards morning; during the following day, and perhaps a third, the same thing ensues, the cough not coming on till towards night; afterwards it occurs in the daytime, and sooner or later the peculiar whoop is heard. It will be found that the degree of illness is in proportion to the bronchitic symptoms; if they are severe, with much cough and dyspnœa, there will be hot skin, head and back ache, and other febrile accompaniments. The state of disease consists of dry bronchitis, like that of measles; and the danger resides in the liability of the inflammation being communicated to the vesicular texture of the lung, producing pneumonia.

These symptoms are most effectually checked

by an emetic, and kept down afterwards by expectorants, selected from the class of emetics, in small doses; in fact, the same treatment as for bronchitis or influenza. Children who have predisposition to cerebral disease will have it developed by the combined influence of fever and obstructed circulation. The spinal cord may also suffer in this disease; for, like all fevers, it is accompanied by so much disturbance of the nervous system, that some have been inclined to class it with the neuroses. The derangement of the nervous system requires that tonics should be administered as soon as the first febrile stage has passed off; and frictions along the spine have been long established as efficacious. The tonic effect of change of air is as remarkably beneficial in this disease as in ague or remittent, yet neither ague, remittent, nor whooping-cough, belong to the neuroses.

The state of the air-passages in whooping-cough is unnaturally dry; but it has been said that the fit of coughing terminates with an expectoration of an abundant pituitous matter, which is not correct; for the glairy fluid which is thrown off does not usually come from the *chest*, but from the fauces and salivary glands, and frequently from the œsophagus and stomach, when the cough produces retching and vomiting. The violent succession of expirations is caused by a sensation of wanting to expectorate, as the state of dryness and irritation of bronchi produces the same feeling as if an irritating powder or fume had been inhaled. The whoop is merely the long, violent redrawing the breath after the chest has been emptied of all the air that can be expelled; just as a kind

of whoop is produced, when a person has a violent fit of coughing from salt or other acrid matter, during deglutition, "going the wrong way" into the windpipe. It is easy to satisfy oneself that the glairy phlegm does not usually come from the chest; for in most cases, at no period, not even just before the cough comes on, nor during the cough, can any mucous rale be heard in the chest. During the cough no sound is heard except the whoop; for the rapid cough accompanies expiration, no chest-sound exists, and the inspiration being a whoop, that alone is heard. But after the fit of coughing is over, the respiratory murmur is again perceived, with no morbid sounds except those belonging to bronchitis, such as rhonchus sibilans; and no mucous rale is perceived until a later period of the disease. A muco-pituitous expectoration then often exists, seldom abundant, apparently affording relief when, as it is said, the cough becomes loose.

LARYNGISMUS STRIDULUS.

This is a convulsive disease of infancy, which has been sometimes called spasmodic croup; it is, however, totally different from croup, which has been already described. It has also been denominated the crowing inspiration of children. In laryngismus stridulus there is no inflammatory or diphtheritic state of the larynx; the disease is in the medulla oblongata and nervous centres; it is, in fact, a species of tetanus. In the attack, which is always sudden, or at least with such slight disturbance of the health of the child as not to have excited sufficient anxiety to cause the parent to apply for medical

advice, the child seems uneasy, begins to cry, and gives a long deep inspiration like the whoop of whooping-cough, at the same time stiffening and throwing itself back in a state of opisthotonos, and generally turning in at the same time the great toes and thumbs. This, of course, produces alarm; and in some instances the child dies in a state of asphyxia (like the asphyxia of tetanus,) before the medical man can arrive; and many of these cases have been set down to the account of real croup. This is no more a disease of the larynx than it is of the great toes, which are simultaneously affected with spasm. It is like croup, not even necessarily complicated with cough, for it is the muscular structure of the glottis which is thrown into spasmodic action, causing contraction of the rima glottidis; and the acute sound is the long-drawn breath during the tetanic spasm. When the child, as is often the case, has a recurrence of the fits, the strain of the glottis causes it to be hoarse, and to cough a little; but this cough is a secondary consideration.

It has been said, by Dr. Marshall Hall, to be an epileptiform disease; but it is not so: there are not clonic spasms as in epilepsy, but a tonic tetanic opisthotonos. An analogy has been drawn between the whoop of laryngismus stridulus and the scream which sometimes accompanies an epileptic attack; but those who have heard both will acknowledge the difference.

The disease, like epilepsy, has been attributed to all the sources of irritation which produce reflex spasm; and doubtless, like tetanus, it has been produced by various exciting causes in a predisposed constitution; but no one has ever developed the na-

ture of that obscure predisposition which causes one person to be affected with locked-jaw for example, in consequence of a cause which in numerous other cases produces no such effect.

Doubtless, teething, worms in the intestines, exposure to extreme cold, and other circumstances which irritate the nervous centres, bring on laryngismus stridulus; there is no one specific cause, any more than one specific cause of tetanus or epilepsy; and, moreover, no precise organic change in the nervous centres has been demonstrated to belong to laryngismus stridulus any more than to tetanus or epilepsy. In moderate cases, the child's intelligence is not diminished; nor is disease of the lung, of the larynx, or air-passages, a necessary part of laryngismus stridulus, though sometimes concomitant.

The treatment of the disease consists in soothing and supporting the child (usually from six to sixteen months old); in avoiding to irritate it with purgatives or other active medicines; in giving moderate mercurials, if the liver require them; a little castor-oil, if the bowels are confined; in fact, merely what the constitution seems to demand; and, especially if there be much restlessness, the use of some anodyne, such as syrup of poppies, Dover's powder, or morphia. If any tooth is distinctly presenting, it should be liberated; but we should by no means "lance the gums freely"—a common expression—which extensive cutting adds to the irritation of the nerves. In weak children, some solution of iron, with the syrup of poppies, is often indicated; but the treatment above all should be soothing, combined with tonics, nourishment, and *ne quid nimis* of active medicines,

blisters, or leeches; too much or too hot bathing is exhausting, but repeatedly putting the legs up to the knees in warm water is very tranquillising to the nerves. So also gentle and continued friction along the spine with some anodyne liniment.

Some children have congenitally an extremely narrow glottis, and, when affected with even a slight cold, make a kind of crowing or whooping noise. I have met with several instances which gave great alarm to the parents, from an apprehension of croup, until the cause was explained. In one instance, the occurrence of these attacks lasted till the age of six years, gradually, however, diminishing in force as the larynx grew larger.

HEART.

The heart, like all other parts, is liable to inflammation, which occurs much more frequently than was detected before the discoveries of Laennec. It is sometimes, like the lungs or pleura, attacked with inflammation, merely accompanied by pyrexia; but there is generally more or less acute rheumatism produced by the same cause, just as pleurisy and acute rheumatism are sometimes simultaneously produced by the same causes.

The predisposing causes of rheumatism and inflammatory disease, and inflammation of the heart in particular, are hereditary and certain climatorial and local influences, habits of diet, occupations, &c.

The exciting causes of inflammation of the heart are the same as those which immediately precede an attack of acute rheumatism—cold and damp, as before explained. Heart-disease is often ascribed to

metastasis; but though this may occasionally be the case, in general the limbs and heart are simultaneously affected; the apparent succession of the external and internal phenomena is due to the fact that the acute rheumatism in the external muscles and limbs is so painful as to mask the state of the heart; and therefore it is necessary always, in cases of acute rheumatism, to auscultate, and make special inquiries as to the state of that organ, in case it should also be inflamed. On the other hand, I have been called to cases of cardiac inflammation where the heart-affection attracted the whole attention, the co-existing rheumatism having been comparatively so slight that it was not mentioned until inquiry was made about it. But heart-inflammation may happen without rheumatism, as well as rheumatism without it.

The parts inflamed are—sometimes the muscular structure causing carditis; but more commonly the investing membranes, inflammation of the external serous covering analogous to the pleura, giving rise to *Pericarditis;* and that of the internal lining, including the valves, producing *Endocarditis.*

When the external membrane is inflamed, a *rubbing* sound is at first produced, as in pleurisy, which, as observed in that disease, in general soon subsides, and for the same reason. This rubbing sound may be detected at various periods, from six to thirty hours, and later, after the attack. A slight rubbing sound or murmur may also accompany the systole in a variety of cases where the heart is pushed out of its natural position by empyema, tumors, curvature of the spine, &c.

When the internal membrane is inflamed, a systolic *murmur* accompanies Endocarditis as uniformly as rubbing noise accompanies Pericarditis, and lasts longer. (*See Dr. Latham's valuable Clinical Lectures*, vol. i. p. 98.) And the exocardial rubbing is sometimes coexistent with the endocardial murmur.

The treatment of acute inflammation of the heart is, when early commenced, most simple and perfect: rest in bed, rigid diet, leeches followed by a large tepid poultice; calomel, or other mercurial, every four hours; tartar-emetic, 1-16th of a grain; and acetate of morphia, 1-4th of a grain, every hour at first; moderate attention to the bowels, but not disturbance of the patient by active purgatives. This treatment will generally subdue the disease within twenty-four hours; but perfect rest must be rigidly enforced for eight or ten days, to prevent return of the symptoms, and to guard against the organic diseases which sometimes result.

In order to use morphia with confidence, and in the mode in which it will prove efficacious, it is necessary to have had experience of its powerful antiphlogistic effects; for instance, in severe acute rheumatism, in pleurisy, peripneumonia, pericarditis, and in peritonitis, the last a disease as dangerous as any of the preceding, on account of its secondary consequences, the adhesions of the peritoneum, which may destroy life after the first urgent symptoms have ceased.

No medicine at all equals acetate or muriate of morphia in pericarditis or endocarditis. It allays the pain and inflammation, and subdues the pulse, which are the first requisites. I have found persons

who doubted its efficacy in acute rheumatism merely because they had not used it with sufficient freedom. It should be given in frequently-repeated full doses, until it conquers the pain. Small doses given every fourth or sixth hour do not in the least check the disease; and then as the pain, or other symptoms increase, the practitioner will begin to doubt whether the morphia is not even doing some harm. It ought to be administered in doses of one-fourth or half a grain at least every hour; if half a grain does not produce any effect after the fourth or fifth dose, a grain should be prescribed each time; but then an interval of two hours may be allowed after the second dose: eight or ten grains will be often taken before pain is subdued and sleep obtained. It is unnecessary, nay injurious to disturb the patient by purgatives until the urgent symptoms are subdued. Antimony combined with the morphia will relieve all febrile symptoms and the inflammation without purgation.

One reason why formerly inflammation of the heart was not more frequently detected is, that it seldom in the first instance proves fatal as an acute disease, though it may lay the foundation for the most distressing and fatal chronic cases of difficult breathing and dropsy. When much lymph is thrown out, *adhesions* of the pericardium ensue, which embarrass the action of the heart, causing uneasiness, and palpitating, violent action. Those adhesions, however, are less distressing and less fatal, when uncombined with disease of the valves, a state which too often is induced at the same time, their lining endocardial membrane becoming inflamed simultaneously with

the pericardium. Another reason is that the primary results of the endocardial inflammation were often overlooked, being merely plastic thickening of the membrane, or little *warty excrescences* of organised lymph, which spoil the shape and action of the valve sometimes even from their first deposition, their irregularity causing the edge to turn over so as not to hold the blood.

The valves diseased are usually those of the arterial left side, the mitral and sigmoid; which, after they have been damaged by inflammation, become like arteries incrusted or deformed, with bone-earth *concretions*,* which render them rigid, destroying their function, sometimes by keeping them from closing, sometimes by narrowing the passage, or both.

When the mitral valve is diseased, permitting *regurgitation*, the result is congestion of the lung and dyspnœa, either severe and permanent when the organic disease has advanced, or only occasional upon using exercise or exertion when it is slight.

When the sigmoid valves are diseased, *hypertrophy* of the left ventricle of the heart succeeds, induced by the extra work thrown upon it, either through the constant regurgitation of the blood into it when the valves do not shut, or from the difficulty of sending the blood forward when the valvular space is contracted by concretions.

* Those white concretions which are found in the heart and arteries and in the bronchi are nearly of the same chemical composition as bone, and are not of the nature of the gouty deposits called chalk-stones, in which there is a considerable proportion of uric acid. It is not, therefore, on account of the chemical, gouty, or rheumatic constitution that rheumatism tends to heart-disease, but because it produces an extra liability to inflammation in that part.

In either case, as the ventricle is not sufficiently empty to be ready for the reception of an adequate quantity of blood from the auricle, the auricle cannot send the blood freely into it, and consequently the blood is kept back in the lungs, causing congestion, dyspnœa, asthma, and cough. These symptoms uniformly accompany disease of the valves of the heart, which induces also congestion of the liver, kidneys, and other viscera, and corresponding disturbance of their functions. And if the regurgitation be very free, a *double pulse* will be felt at the wrist,—one from the auricle, the other from the ventricle; for, as the blood falls back from the aorta into the ventricle, the ventricle not being as empty as it ought to be, the jet from the auricle is communicated into the aorta, and so the impulse onwards to the wrist; the false weak pulse from the auricle preceding the true pulse from the ventricle. In such cases, if of long standing, the auricle will be found hypertrophied.

A degree of hypertrophy of the ventricle is produced in some persons by desultory violent exertion, as in occasionally lifting heavy weights, not in artisans who are constantly using powerful exertion. This effort, the breath being held at the same time, temporarily obstructs the circulation, by which the valves of the heart are strained; and though no pain be perceived, an irritability of the organ is induced, which brings on a permanent over-action, and which will, if neglected, end in hypertrophy. In every instance I have found that the patient has recovered from this state by carefully attending to the caution given him to avoid making these over-exertions, even

in cases which had gone so far as to produce some dyspnœa and impulsion of the heart; in the worst of which, a combination of digitalis with morphia greatly promoted the cure. I have had several cases of amateur rowers who had brought on this state by desultory over-exertion, which scarcely ever happens to a waterman trained from youth.

There are palpitations and irregular actions of the heart depending on innervation, and not necessarily associated with change of structure, though in many instances the two co-exist; the commonest is mere palpitation, or extra rapidity of action; the simplest cases of this occurring in persons in good health, but of an excitable nervous system, whether good or ill-tempered; this is the lowest degree, and scarcely to be denominated disease; but when persons of this temperament become even slightly deranged in health, these palpitations become a serious addition and prominent symptom, and sometimes are the most complained of by the patient, and not unfrequently distract the attention of the attendant from the real disease, whether that be hepatic, uterine,* renal, intestinal, or other, asthmatic breathing

* One of the most common and annoying symptoms of irregularity of the uterine functions is "pain in the heart," accompanied by a hard frequent pulse, and which has been sometimes attributed to an inflammatory state, but is a purely neuralgic sympathy, and moreover is generally not in "the heart," though the hand be placed there to point out the position of the pain, but in the cardiac orifice of the stomach close to the heart, associated with flatulence and globus hystericus, and is relieved by tonics, stimulants, emmenagogues, &c., which cure the perhaps latent uterine malady. A similar "pain in the heart" occurs in males from dyspeptic neuralgia.

is produced, and the stethoscope is often employed as unprofitably as unnecessarily; to which I have elsewhere alluded. This is a mere ill-directed innervation, a morbid sensibility of the weak part. It is said every one has a weak point physically as well as morally; and thus we find some persons, when slightly ill, get rapid action of the heart; others have tender bowels, and, if exposed to cold or fatigue, &c., will have diarrhœa, others increased micturition, others colic, others headache, or sick-headache; all of them in fact neuralgic affections, occurring most commonly as sympathies in hysteric females and nervous men; and it is not necessary that either these males or females should be delicate-looking persons; they are often robust, but with a "weak point." Anti-hysteric and tonic remedies are those most generally indicated to correct this constitutional tendency.

We have now to consider an opposite state of innervation. In the preceding, we have had the nervous influence in excess,—too much steam; on the other hand, we find the machinery of the heart and pulse sometimes flagging from deficiency of nervous influence; in which case, every now and then the muscles make a pause, causing intermission of the pulse. This intermission occurs with all states of the heart, sound and unsound; because, as it depends on the nerves, we may have an intermitting pulse with a perfectly sound heart, when the system is debilitated by any cause either of internal organic affection, or disease produced by external causes or circumstances; or by some drug, such as digitalis, colchicum, green tea, &c. Intermission of the heart is no evidence whatever of disease of the organ; and

many persons who have been subject to palpitation in early life, become at an advanced age liable to intermission on account of the facility with which their nervous system is exhausted; and several persons have been brought to me with supposed "fatty" disease of the heart (a fashionable complaint just now), the organ being lazy, and which only required tonics and extra allowance of wine to restore it to regular action, which I need not say would not have removed the fat in about a week, if that had been the cause.

I have found more persons misled by impulsion of the heart than by any other stethoscopic sign. In many cases of phthisis I have been referred to, in consequence of apparent hypertrophy of the heart, which depended merely upon the increased perceptibility of the heart's action (somewhat increased in reality by the progress of the disease) from the excessive thinness of the parietes of the chest. Other patients have fits of palpitation of the heart from dyspepsia, &c., during which the impulsion is so great as to mislead the practitioner, if he have not opportunities of ascertaining, that for weeks, during the intervals of the attacks, the action of the heart will be perfectly normal.

With respect to hypertrophy of the heart, there has been much misconception as to strong impulsion being an unerring symptom. During violent action of the heart which is not at all hypertrophied, the impulsion will sometimes be so strong as to force up the head with violence when applied on the stethoscope, or to cause that part of the chest to heave up the dress of the patient at each pulsation: this is the case with

nervous and hysterical patients; and this violent action will subside, so that the beat of the heart will not be stronger than natural; whereas when the extra impulsion is from real hypertrophy (enlargement), the impulsion is permanent, and the pulse with it unnaturally strong; on the contrary, with the nervous palpitation, the pulse will be found weak during the time that the impulsion is strong, and when the palpitation with strong impulsion subsides, the pulse becomes fuller; the reason being, that during the palpitation the heart has not time to be filled so as to fill the artery at the wrist, though acting with such violence as to give strong impulsion. Thus many misstatements and errors of diagnosis have occurred, from supposing that "impulsion" is a certain sign of hypertrophy; whilst on the other hand, hypertrophy, when combined with fatty degeneration, atony, or relaxation of muscular fibre, is unaccompanied by impulsion.

A hysteric constitution in females and the nervous temperament in males will produce impulsion sufficient in many instances to deceive the practitioner, if, as is often done, the patient merely be once shewn to him for an opinion; and medical men ought to be cautious of thus committing themselves. The best way of enforcing this precept will be by a few examples.

A young lady, æt. fifteen, in a distant part of the kingdom, became affected with cough, violent action of the heart, and subsequently dropsical swellings. The physicians who saw her considered her the subject of disease of the heart, and sent her up to London for further advice. She was *shewn* to

two highly talented physicians separately, who each confirmed the opinion, and gave little or no hopes of her recovery. Her ordinary medical attendant called me in to see her. I found her with short breath, short cough, emaciated and dropsical, even in the upper extremities and face. There was very strong impulsion of the heart; but I could not trace any previous acute rheumatism or other of the usual sources of hypertrophy of the heart at such an early age, and therefore discarded the idea, and set down the case as one of hysterical palpitation, with dropsy from debility; and prescribed tonics, such as chalybeates and quinine, in small quantities, so as not to oppress the stomach, a generous diet, and immediate resort to exercise, gestation in the open air. Upon this plan she rapidly recovered, and has continued healthy for some years.

A married lady was brought to me, not to ascertain the nature of her complaint, but to try if I could suggest any relief or remedy for hypertrophy of the heart, which another physician, who had not alleviated her symptoms, declared the case to be. I ascertained, in the first instance, that she had been about a dozen years married, without children; suffered from headaches, tormina, constipation, and other symptoms of hysteric indigestion, for which she constantly resorted to purgatives, and of which the physician had rather prescribed an addition, instead of trying to wean her from the bad habit. With much difficulty I prevailed upon her to forego the temporary relief of purgatives, and to persevere with slight tonics, with terebinthinate medicines. Before long, the result was, that her health improved, she

became pregnant, and lost the symptoms of hypertrophy.

A young friend of mine, in consequence of a life of over-exertion in study, pleasure, business, and dissipation combined, brought on such violent action of the heart as would have induced most persons, from the mere impulsion, to have pronounced it hypertrophy. His dress could be seen to move as he sat at table. This state, which had lasted from about the age of nineteen to twenty-four, subsided without medicine, merely by a more regular mode of living. At present, being aged thirty-five, the pulse and action of the heart are perfectly normal.

A gentleman, æt. twenty-six, consulted me under similar circumstances, but much out of condition, having been on low diet, and taking active purgatives by the direction of a physician, who declared the disease hypertrophy of the heart. He was very nervous and low-spirited, and had neuralgic pain in the chest. I allowed him to take animal food and fermented liquors, and prescribed carbonate of iron, during the use of which the action of the heart was quieted, and the other symptoms subsided.

These cases would of course have required different treatment, had the heart been really diseased, instead of being merely sympathetically disturbed in its function.

With Cruvelhier, I am inclined to doubt the existence of a permanent simple or "*concentric hypertrophy.*" Persons who have died under the circumstances here stated (the pulse having been smaller than normal) will of course have the cavities of the ventricles unnaturally small, the cavities being less

capacious than natural during nervous palpitation, and thus, from the natural expanse of muscle coming into a narrower space, the muscular parietes become disproportionately thicker and solid, causing the deceptive impulsions above alluded to. I am not therefore inclined to acknowledge the existence of hypertrophy, unless the cavities of the ventricles be at least of a normal size. When this is the case, if the parietes be thickened, there must be increase of matter —real hypertrophy; or if the cavities be enlarged and the parietes as thick as usual, there is evidently an increase of matter—enlargement,* hypertrophy with dilatation.

We have now to consider how *enlargement* takes place. It is true that, like the muscles of the legs of dancers, or of the arms of smiths, the muscles of the heart will become enlarged by constant extra work, such as is produced through diseased valves; but this is a slow process, and it requires another condition to produce the great enlargements of combined hypertrophy and dilatation. Diseased valves will exist for a long time combined with what may be termed a mere increase of healthy muscular fibre; but when there is disease of the muscles, the symptoms become aggravated, and this commonly oc-

* *Enlargement* of the heart may be ascertained by *percussion*. In the natural state, the sound is that of a solid, over a space which may be ascertained by placing the left hand over the heart, the tip of the middle finger corresponding with the bottom of the sternum, the wrist pointing to the left shoulder: if the solid sound extend beyond the space covered by the fingers, it may be suspected that the heart is enlarged; if it be much beyond it, there can be no doubt of the fact, unless the dulness proceed from solidification of the lung.

curs, sooner or later. This disease of the muscular structure may be produced by acute rheumatism, or by the other sources of cardiac inflammation; but without that, there is the tendency upon every over-exertion, and all exertion is over-exertion with such patients, to a sub-inflammatory state, spreading from strained valves, or from old adhesions, &c. It is well known that inflammation, however slight, weakens the tissue in which it exists,—there is a *degeneration* of tissue; the parts thus weakened give way and are dilated; the heart begins to enlarge by dilatation.

Now ensues *hypertrophy* in addition. If the patient repose and the symptoms abate, this weakened part recovers its tone, and the dilated part will then become properly nourished and as thick or thicker than the other, and thus permanently enlarged. Every person of experience will confirm the truth of my statement, of having found enlarged hearts perfectly sound and firm in their muscular structure. This, however, is not always, nor commonly the case; the degenerated part mostly remains degenerated, in which case it is always softer than natural, though varying in *colour*. If the disease have been recent, the muscle will be found, like all recently inflamed parts, of a dark red; if an old case, the heart, like other parts where inflammation had existed (such as a cicatrix, &c.), is paler than natural, of different shades of intensity of colour, varying from *red* to *pink* and *yellowish;* all these tints being producible by the colouring matter of the blood, independent of the *fatty* matter which is often found infiltrated or deposited, and which will be hereafter explained.

Many enlargements of the heart originate in defect of the valves, either with or without an aneurysmal state of the aorta; the defect of the valves, as above described, producing a necessarily excessive over-labour of the ventricle, and consequent enlargement of its muscular fibre. These enlarged hearts are commonly found to be covered with old inflammatory organised lymph exudations, more or less adherent to the pericardium. Some pathologists have believed that these adhesions tended to produce hypertrophy. Doubtless these adhesions took place at the same time that the valves were inflamed and damaged; but it will be found that, if the valves be sound, adhesions of the pericardium constantly exist without enlargement. The adhesions produce irregular action and palpitations, but not that steady over-action which induces hypertrophy. The pulse, when adhesions alone exist, is rather weaker than natural, whereas with hypertrophy it is stronger; with adhesions, the pulse, whilst irregular, is weak, and only during violent action becomes regular, and for a time strong, unless indeed it be rapid. In this case, though the heart be felt at the chest to give a strong and deceptive impulsion, the pulse is weak, because, as above mentioned, from the *frequent* violent contractions of the heart, the ventricle is not allowed time enough to relax and fill to its usual extent, so that enough of blood is not admitted for transmission onwards into the arteries. Consequently the pulse is weak, whilst the heart is over-acting; precisely as in simple over-action from nervousness, hysteria, exhaustion from running, or any sympathetic palpitation of the heart, when the pulse has

become too rapid,* sufficient blood not being sent to the brain becomes the cause of faintness or actual syncope, or alarming lipothymia. This, too, is the simplest origin of the blood being kept back in the lungs,† and is the cause of that short, single, unsatisfactory cough, which, to the practised ear, announces that the person who gives it (even a stranger in a crowd) has the pulse quick and weak, from the heart beating violently without being filled each time. This is the simplest example of *heart-cough*, and the most transitory.

This phenomenon may occur even in the healthiest individual, as just stated, from exhaustion from running, dancing, or other exertion; with or without faintness or syncope. This is the cause of being what is called out of breath, which, brought on thus in a healthy individual, is exactly the sensation felt in a variety of diseased states accompanied with *dyspnœa* —the name for the feeling of being out of breath. The congestion of blood impedes the current of the air by narrowing the passages for it: hence the sense of distension produced by the over-injection and load of blood, the arterialisation of the blood being simultaneously retarded.

* Thus, persons running or dancing will at first be flushed; but if the action of the heart become too rapid, as described, they will be seen to turn pale and faint, from a want of blood to the brain. I once saw a healthy active young man *faint* away upon getting into a stage-coach, having run about the eighth of a mile to overtake it.

† This, again, keeps back the blood in the vena cava, producing congestion, disease of the liver and other abdominal viscera, or dropsy, or both, and congestion of the brain, from which, if predisposed to disease, apoplexy or paralysis will result.

This dyspnœa is felt, whether the congestion in the lung be produced *directly* by diseased changes in the lung and air-passages, as in bronchitis, peripneumonia notha, whooping-cough, &c., or *indirectly* and secondarily, by diseases of the heart causing the reflux and congestion as described. We have dyspnœa produced directly by catarrh, bronchitis, &c., when severe; and we have an indirect, or secondary analogous state of the air-passages produced by heart-disease: thus we may see a patient with blue lips, dyspnœa, and cough, but cannot tell, until we examine into the other symptoms, by auscultation, &c., whether the congested state of the air-passages, which produces these symptoms, depends on a primary disease of the lungs themselves, or is a secondary result of disease of the heart. Frequently these causes co-exist; and so much the worse, as the heart-disease will retard the cure of the pulmonary affection; and this will account for the utter failure of "expectorants" addressed to the lung-apparatus, when the heart was the seat of disease. In fact, when we find very aggravated cases of chronic catarrh or bronchitis, with distress of breathing and expectoration of long standing, we may suspect that there is some fault of the circulation in the back-ground.

We have now to consider the *auscultatory* signs of the different diseased alterations of the heart.

1. It has been already mentioned, that at the commencement of Pericarditis, we may be in time to hear the slight rubbing noise produced by the friction of the inflamed pericardium (p. 66). And

also that in Endocarditis there is a murmur. This proceeds from the swollen roughened state of the membrane.

2. If the mitral auriculo-ventricular valve be diseased so as not to hold the blood, the *first* sound* will be spoiled, on account of the imperfect tension of the valves. In the first place, it may be heard, though weakly, as coming from the tricuspidal valves only; or it may be mixed up with a slight noise ("*bruit de soufflet*") produced by the regurgitating ripple of the blood. But if there be a greater amount of disease, including roughness from concretions, the resulting noise ("*bruit de soufflet*") will be strong enough entirely to mask the first sound.

3. If the orifice of the aorta or the sigmoid valves be rough (ossified), though they close so as to prevent regurgitation, still there will be a ripple produced, as the blood passes out of the heart, causing a noise (*bruit*) immediately with, or entirely masking the *first* sound.

4. If the semilunar valves be only insufficient to close the orifice, either from excrescences causing

* The word "sound" applies only to the natural sounds; the word noise ("*bruit*") to the unnatural, morbid sounds, which mask, confuse, or take their place. And I may repeat here that the first sound—that of the auriculo-ventricular valves (the first valves of the forcing-pump), occurs when the muscles of the heart act to send the blood forward; of course it takes place at the same time with the impulse of the muscles against the ribs. The second sound is that of the second set of valves tightened by the backward pressure of the column of blood in the aorta and pulmonary artery, which they support, whilst the muscles are relaxed to repeat the action.

the edge to turn over, or from slight puckering from inflammation, or relatively too small from dilatation of the aorta, the noise ("*bruit*") will be *single*, from regurgitation, and will confuse the *second* sound.

5. If the semilunar valves, besides being insufficient to close the passage, be also rigid from ossiform deposit, there will be a *double* ("*bruit*") noise heard; the first (*direct aortic*) with, or confusing, the first sound on account of a ripple produced by the roughness of the semilunar valves, as the blood is forced through them; and the second noise of regurgitation (*regurgitant aortic*) masking the second sound, as described in the last paragraph.*

We find, then, that noise with the first sound may arise from disease of either the auriculo-ventricular valves or semilunar valves. The diagnosis depends on the circumstance that, if the disease (partial rigidity) of the semilunar valves be so slight† that you have not regurgitation, (in which case the noise would be double), you have not blue lips, dyspnœa, or other signs of reflux congestion which are produced by diseased auriculo-ventricular valves. And this noise of the semilunar valves is heard more towards the upper part of the chest; the regurgitation and that of the mitral at the heart.‡

* The stoppage or stagnation of blood will be the same whether produced by obstruction, or by want of power, in the heart—whether damaged machinery of the valves cause obstruction or regurgitation, or if debility from softening produce the stagnation in the lungs which is equivalent to that induced by regurgitation.

† This harmless noise ("*bruit de soufflet*") exists in many elderly persons.

‡ These noises are frequently audible, without touching the

I must here allude to a noise which is heard with the first sound where the heart is quite perfect, during its rapid action in nervous men and hysterical females. I account for this condition by a spasmodic action of the chordæ tendinæ preventing the valves from closing perfectly; because I have known this exist in individuals the valves of whose hearts were found quite sound on post-mortem examination. I have witnessed the same in men during mental excitement, where it has ceased upon diverting the attention, the pulse falling at the same time; and I know that some of these cases have been mistaken for organic disease.

I have here explained one cause of bruit in a sound heart produced by the nerves. There is another, depending upon the state of the blood, anæmia, in which there is bruit, the cause of which is that the heart's action is feeble and the blood more limpid than natural: the result is a ripple, which produces bruit. For the heart not distending the arteries as forcibly as usual, they contract in size; there is thus a disproportion produced, the cavity of the ventricle being larger in proportion to the calibre of the aorta than usual, which, united to the extra limpidity of the blood, produces a sonorous ripple which does not exist in the normal state. This is also the cause of the jerking pulse of anæmia; the aorta, not being so much stretched at each pulse, approaches more to the state of a rigid tube, and

patient, at a greater or less distance from the chest; in which case there is often accompanying the noise a vibration (*fremissement cataire*), which may be felt by the hand. This accidental loudness does not alter the prognosis.

the pulse, though weak, is less under the influence of elasticity, more jerking: thus a short, sharp pulse is evidence of feeble action of the heart, and the first sound of the heart will be, for that reason, shorter and more like the second sound when there is dilatation or softening.

It is utterly futile to attempt giving more than the above directions for distinguishing the varieties of valvular heart-disease, and by a strict attention to these, little if any difficulty will be found in practical diagnosis. These are the primal and useful points of diagnosis. There are rare cases in which auscultation affords no diagnostic symptoms, such as that of an adult woman who died dropsical in the London Hospital, who had had a bluish tint from birth, always increased by exertion, the sounds of whose heart were scarcely audible, and pulse almost imperceptible. The disease was congenital; the orifice of the mitral valve was not larger than sufficient to admit the tip of the little finger.*

There is a peculiar metallic sound mentioned by authors sometimes mixed up with the first sound of the heart, resembling what is made by pulling the prong of a fork and suddenly letting it go, or by drawing the lips forcibly into a small circle as in the act of whistling, and then slightly percuting close to the angle of the mouth: it is not uncommon, and is caused by the first sound being propagated to the stomach when tense with flatus; it is always under such circumstances that I have perceived it, and

* There was marked hypertrophy of the left auricle, produced by its being constantly over-worked in forcing the blood through such an unnaturally narrow passage.

never as an evidence of disease, which is my reason for mentioning it, to prevent any anxiety on the subject.*

ANEURYSM.

Aneurysm of the ascending aorta is frequently immediately connected with disease of the sigmoid valves, and commences with inflammation, as above described (p. 69). The inflammation causes subsequently deposition of scales of calcareous matter near the roots of the valves. These scales, upon every extra action, irritate and inflame the surrounding membrane, causing fresh scales and plates to be deposited under the membrane lining the root of the aorta; these again, on renewed extra motion, wound and inflame the membranes attached to them; and thus the mischief spreads to the adjoining tissue, the elastic coat of the artery, which becomes thereby inflamed, and of course softened and distended, and an aneurysmal dilatation results; which then goes on increasing, and at last destroys the valvular apparatus. For even if the valves have been previously sufficiently free in their action to per-

* To those who have read voluminous works on the subject the above may appear a scanty account of the bruits of the heart, but will be found all-sufficient. I consider it unnecessary to describe the so-called *musical sounds* of the heart, more especially because those who have wasted their own and readers' time in describing them, wind up with declaring that—"A musical murmur, therefore, indicates no more than an ordinary one;" and just let us enumerate their "*music:*" single bruits; "sighing; bellows blowing; whistling; broken whistle! rasping; sea-shell" (*dum personat æquora conchâ*); double bruit music; "cooing (*molles ubi reddunt ova columbæ*); mewing; sawing; blow and whistle!!"

form their function, when the aneurysmal state distends the root of the aorta, the valves are not large enough to meet so as to close it; and then it is that the aneurysm, which previously, in many instances, produced but slight inconvenience, begins to cause distressing symptoms of cough, dyspnœa, and pain between the shoulder-blades. These aneurysmal dilatations sometimes commence, as described, from cold, with rheumatism and endocarditis, but are also produced by accidents which give a violent strain to the sigmoid valves, such as some violent succussion. I traced one to a fall backwards from a cart; another occurred in a sailor, who, whilst straining on a spar, at a windlass, which broke, fell on his back; another from a fall on the back from a horse rearing; the celebrated surgeon Liston died of the disease of the aorta and semilunar valves here described, produced by a blow on the chest from the gybing of the boom of a yacht.

An aneurysm sufficiently near the surface in a limb or the trunk is seen and felt to pulsate; it evidently shrinks and compresses its contents after each distension by the heart; and it struck me that aneurysm of the aorta would, by its resilience in such case, cause a double or second pulse in the arteries at the wrist: this I put to the test of clinical observation. In a short time, by examining other patients admitted into the hospital besides my own, I discovered three with resilient pulse; one had undoubted aneurysm, making its way visibly through the anterior of the chest, in which the resilient pulse was distinct, as it will be found in all similar cases; the two others had resilient pulse with less distinct-

ness, and when the resilience is slight, it requires a practised hand to detect it,—two fingers must be kept with a light elastic pressure on the artery at the wrist. These two latter patients had no external nor any estimable symptom of aneurysm besides the resilient pulse, and one of them left the hospital. The other, who was dropsical, with visceral disease, died; and upon examination, an aneurysm of the aorta was found close to the heart not larger than a common hen's egg, the smallest aneurysm of the aorta ever detected during life, and by the resilience of the pulse alone. The third patient, who had left the hospital, returned the following year with a confirmation of my diagnosis, as the suspected aneurysm was now so much enlarged as to be seen and felt to give strong pulsation below the right clavicle.

This diagnosis by resilience was published in the *Lancet* in Dec. 1833. I have seen it doubted by some writers, but persons who are acquainted with hydrostatics will easily understand it; and I have had but too many opportunities of confirming it. This resilience is one kind of double pulse. I have elsewhere (p. 70) explained another kind, where one pulse is felt from the auricle, the other from the ventricle. The difference between which double pulse and the resilient double pulse being that, in resilience the first or real ventricular pulse is the strongest; whereas with open valves it is the second which is the ventricular and the strongest. There can be no doubt as to which is first and second, because whichever be the first it comes after the slight pause of muscular relaxation; and in either case there is a pause or longer space of time between the second

and the return of the first than between the first and second; thus, if the ear be applied to the heart, counting one, two, three, there is time to say three after the second, before the first comes again.

There is still another kind of double pulse, from a different cause, not organic, but from fault of innervation,—it is a modification of palpitation, in which the heart is both weak and irritable, sometimes, in addition, enlarged and flabby, the ventricle has not energy to empty itself satisfactorily, but, being irritable, does not wait during a normal diastole, but gives an immediate second systole; in this case two beats of the pulse are felt, and three sounds of the heart are heard,—of the two systolic sounds the first is the strongest. Then follows the false second sound, *i. e.* the extra systolic of the auriculo-ventricular valves; and thirdly, the normal sound of the semilunar valves, *i. e.* the true second sound.

Aneurysms about the arch of the aorta, and indeed wherever they exist, if not from accident, are the result of the inflammatory process described. It is unnecessary here to enter into the pathology of aneurysm generally, which will be found in detail in the excellent work of Hodgson on the arteries, and other recent authors.

There can be but one mode of prolonging life in aneurysm of the chest, in one word *rest*, to keep the heart as quiet as possible, so as to have as little distension of the sac or artery as may be, and thus to afford a chance for its parietes to get firm by the absence of inflammation; and it may be, sometimes, to become even semicartilaginous or bony, or the lining layers of coagulable lymph to consolidate; this last

result can scarcely take place to an extent to be useful in an aneurysm of any size, though I met with one about the size of half a small walnut, which had undergone spontaneous cure by becoming perfectly ossified, so that it was as firm as a nutshell; this little aneurysm was near the semilunar valves, which also had specs of ossification. Sometimes lining layers of plastic lymph become consolidated, and thereby retard the disease. The diet should be cautious and somewhat restricted, but not to extremes; and digitalis in moderation is most useful, by keeping the pulse soft, where it can be borne; but it sometimes produces an intolerable depression of spirits; in this case morphia, if it agrees, will soften the pulse; if both fail, hydrocyanic acid may be tried.

The treatment here described is exactly applicable to diseased valves of the heart. Both with aneurysm and diseased valves, in time, destructive disease of the lungs, kidneys, liver, &c., and dropsy, ensue, and are to be combated in the usual way as each specific symptom shews itself, still adhering to the general rules here laid down.

SOFTENING AND FATTY DEGENERATION.

Fatty degeneration of the heart must not be confounded with obesity of the organ which occurs in obese subjects. The fatty degeneration, on the contrary, is found in persons even emaciated by disease; common natural obesity deposits the fat on the outside of the organ, as seen on the hearts of animals in the shambles.

It is well known that inflammation of the heart softens it as it does other parts, by rendering the

nutrient cell nuclei effete;* and we find that when this occurs, the deteriorated tissue is changed into a fatty matter, the cells of which are of inferior vitality. In this case we find fatty degeneration, and specks and patches of fat substituted for fibres here and there, and mixed through the muscular substance of the heart; and I have seen the same thing in the muscles of other parts, more especially in one instance, of a woman who died in the London Hospital, a martyr to a kind of rheumatism, the muscles of both upper and lower extremities when cut through were actually grey with this fatty deposit.

The muscular tissue thus degenerates from inflammation and sometimes after fever, with or without fat, as described above in various degrees, giving rise to softening and dilatation. This state of heart of course leads to a very weak pulse, and sometimes to rupture of the organ; for some parts, when thus degenerated, are fragile; and when the muscular sound parts recover strength, and begin to act strongly as natural, they tear the unsound part, and death occurs—sometimes very suddenly, if the laceration be large—sometimes gradually, if the perforation and oozing of blood into the pericardium be small. I have seen some cases, however, of rupture, or rather perforation of the heart, without any fatty

* It is quite foreign to the scope of this treatise to enter into minutiæ of hystology; but a most useful work on the subject, and doubly valuable to the profession on account of its clear conciseness, is just published by one whom, despite the precepts of the ΕΓΧΕΙΡΙΔΙΟΝ, I cannot help calling a pupil of mine. The Royal College of Surgeons has shewn its estimation of him and his subject, by instituting a new Professorship, and appointing John Quekett Professor of Hystology.

degeneration, from a very slow ulceration of the inner surface of the left ventricle; and in two instances death was gradual and without pain, except that in the first, where death occurred in thirty-six hours after the symptoms of mischief attracted notice, the sense of want of breath was most distressing, though without actual pain. This occurred in a robust healthy man. In the other case the blood must have been oozing into the pericardium for many days. I was called to the case four days before death, merely because the patient felt uncomfortably weak, but no symptom whatever of disease; the age upwards of 60; a person I had known for twenty years without ever being ill, so that I could not trace back any cause for the ulceration which was found. When first consulted, the pulse was scarcely perceptible; the next day still less so, and for two days before death not at all; without a single symptom of uneasiness, except the unaccountable *malaise* of weakness, and the senses were retained almost to the last, even when there was no power of motion. The pericardium was full of blood; on examining the left ventricle, there was a hollow on the inner surface towards the left side, the effect of slow ulceration, at the bottom of which a perforation not larger than a pin-hole had allowed the escape of the blood.

I should say that there has been lately a most absurd degree of consequence attached to the fatty matter found in diseased hearts; the fat, as I have just shewn, is merely deposited in some cases of degeneration of the fibres, that is, when it is not mere common natural fat of the organ; and it is quite clear that this abnormal discussion of a mere adven-

titious circumstance is hurtful to science, by abstracting the attention from the essential consideration,—the degeneration of the fibre, (p. 90),—which always exists in these cases, previous to morbid fat being deposited. Fat will always be deposited for the reasons I have stated, if the disease do not prove fatal early. The profession always has some hobby or other which it rides to death; and I consider that too much attention has been paid both by continental and British writers to the mere adventitious circumstance of fatty deposition in fibres damaged during endocarditis, pericarditis, fever, &c. Rokitansky seems to have taken a right view of this association, in attributing the diseased state to the nerves, which have been debilitated by the inflammatory degeneration of the tissue, which leads to the subsequent deposition of fat globules uniformly discoverable under the microscope, the fat globules requiring less nervous power for their elimination than the nuclei of muscular fibre.

ASTHMA.

Enough has been stated in the preceding pages to enable us to account for asthma or *asthmatic* breathing; whether permanent, or that which, coming on in sudden paroxysms, is called *spasmodic asthma*. But even the permanent asthma is not uniform, as it varies at different times, from slight, sometimes almost imperceptible dyspnœa, to that degree which renders the patient incapable of walking about. On the other hand, the individual who is subject to spasmodic asthma, though said to be quite free between the times of the attacks, is never, in reality, able

to breathe under exercise or exertion as a sound person does.

The term *asthma* was formerly more commonly used than at present; because now, the causes being better known, the real nature or name of the disease is given instead of asthma, which was only a symptom, in fact *dyspnœa:* for instance, when there was dyspnœa with chronic catarrh and bronchitis combined, severe and permanent, it was called humoral asthma; when the dyspnœa, with or without cough, was habitual and without expectoration, dry asthma.

Dry asthma is produced by different causes. A person who has emphysema of the lungs to any amount, though he may breathe tolerably in ordinary circumstances, can never make any extra exertion without feeling dyspnœa: still emphysema is connected rather with permanent dyspnœa than with that which is commonly called asthma, or with cough.

After bronchitis, whooping-cough, or measles, the bronchial membrane having been extensively and severely affected, will, if not properly treated, remain for years in a state of congestion, causing a greater or less degree of dyspnœa on exertion, with liability to aggravation on catching cold, and also preventing active exercise or exertion, such as running, &c. Formerly this was merely called asthmatic breathing; but the precisely same cause lays the foundation for what is termed an attack of spasmodic asthma: the patient having caught cold, the bronchitis is aggravated; he will not be able to lie down, but be obliged to sit propped up in an arm-chair, labouring for breath, until, relieved by medicine or

from mere exhaustion, the pulse becomes weaker and the membrane less injected, when temporary relief is obtained, usually with some expectoration—either of scanty bronchitic pituita alone, sometimes containing little firm grains of condensed mucus like boiled sago, the pearly sputa of Laennec; or mixed with a more copious mucus, according to the degree of catarrh which may have been induced by the cold.

The way to treat the attack is, to give an emetic, to put the feet in hot water, and to keep them very warm afterwards; to give frequently an expectorant mixture, or pills (before described) of squill, antimony, or ipecacuan, and some opiate combined. When the acute attack is disposed of, the cure is to be completed by some expectorants, as above, until the cough ceases to be troublesome. With these we should combine occasional doses of a mercurial, to be continued, avoiding salivation, until the bronchial membrane is cured, for which a moderate use of mercury is generally indispensable. When the cough is subdued, no longer requiring any anodyne, senega with sulphate of quinine or zinc will be found to promote the cure, and the patient should take exercise in the open air, even in winter. If he be shut up in rooms with double windows, without exercise, neither the constitution nor the bronchial membrane can recover tone sufficient for the cure.

This is the simplest cause of asthma: it will be easily understood, that where there is disease of the heart combined with chronic bronchitis, as it commonly is, the asthma exists in a more palpable form; and, besides the aggravations from cold, the patient is

liable to have paroxysms brought on by indigestion, mental emotions, and other circumstances which disturb the heart's action. In this manner the various causes enumerated by Bree and other writers on asthma, as inducing paroxysms of "spasmodic asthma," attributed to spasm of the bronchial tubes, can evidently be accounted for.

Thus the condition necessary to produce great difficulty of breathing, called asthma, consists of a very congested state of the aerial membrane. This difficulty, when it comes on suddenly, is called spasmodic; not merely from the so-called spasmodic convulsive efforts to draw the breath, in which the respiratory muscles appear to be acting convulsively, but from the prevalent idea that there is some spasmodic contraction in the air-tubes themselves. It is, however, unnecessary to assume this, as the phenomena are quite explicable by the combined derangements of heart and mucous membrane causing laborious action of the voluntary muscles of respiration. But it was found convenient to have one general cause to assign for a proteiform disease, of which the descriptions and modifications given by authors are endless. I will endeavour to shew how those modifications may be accounted for without spasm of the bronchi.

For instance, one of the simplest cases of "spasmodic" asthma which I have seen, consisted in reality of chronic bronchitis, or chronic dry catarrh of Laennec, extending through a large portion of both lungs; but so mild, that the patient seemed quite well under ordinary circumstances, still never able to run up stairs, or to dance, without feeling

very "puffy." Whenever this patient caught cold, he felt towards evening slight restlessness rather than dyspnœa; but as the night advanced, sometimes before going to bed, distressing asthmatic breathing came on, with a short dry cough, obliging him to sit up in an arm-chair, leaning his elbows on the arms of the chair, or resting his arms on a table set before him. I found him in this state when first called to see him with what I was told was one of his fits of spasmodic asthma. This was relieved by putting the feet in hot water, a mustard poultice to the chest, an emetic, and an expectorant mixture consisting of inf. rosæ co. syrup of poppies, oxymel of squill and alum. He had evidently a cold in the head; his pulse was natural, but weak; and I gave him some negus. During the paroxysm there were abundant rhonchi; sonorus gravis and sibilans, in both sides of the chest. Subsequently some rhonchus mucosus; but the attack of catarrh was subdued so soon that the attack of "asthma" was of very short duration.

He then returned to his usual state of comparatively easy breathing, with very slight rhonchi except on exertion; and his family calculated that he might be five or six weeks without another attack, "until he caught cold, or something disagreed with his stomach;" but they could not tell how he always caught cold, for during the last three years he had been kept in the house from November till April, at great inconvenience to his studies, he being between seventeen and eighteen. From this confinement he was, of course, languid and sallow.

This was in the month of January: I directed

him to walk out every day for a short time; gave him a pil. hydrarg. twice a week; senega, sulphate of zinc, and disulphate of quinine in pills; and in a very short time he recovered tone, flesh, and complexion.

In the spring I allowed him to drive and walk out, and go into society in the evenings, and heard nothing more until just before Christmas the next year, up to which time (instead of six weeks) he had continued well. He took the epidemic influenza slightly, and at first paid little attention to it; but the third night I was called to him, with what they termed one of his old attacks of "spasmodic" asthma, which, however, was terrific; for this time he had acute bronchitis; his skin was hot and dry (the fever of influenza), and the pulse quick and wiry. The lungs were not as before, but so congested, that in some places, and in one in particular close to the clavicle, there was not only no rhonchus, but no respiratory murmur, and not sounding well on percussion, whilst every now and then, after a severe fit of coughing, weak bronchial respiration and some crepitation were heard mixed with the gurgling of the pituitous phlegm. It may be said by some persons that these phenomena were caused by spasm of the tubes; but as the same symptoms existed in other cases of influenza at the same time, in patients who had not previously "spasmodic asthma," I do not admit it. Upon this occasion I was obliged to apply leeches to the chest, and adopt the plan mentioned above for peripneumonia notha and influenza. As soon as he was convalescent, I prescribed the tonic and other remedies which had cured him before, and he has now remained quite well eleven years.

The next kind of spasmodic asthma occurs when there is heart-disease, either simple palpitation (p. 71), or valvular disease combined with chronic bronchial affection. In these cases, when any thing makes the heart act inordinately, so as to render the functions of the valves inefficient, a fit of asthmatic breathing will be the result. Fits of spasmodic asthma of this kind, according to the degree of valvular disease, become more frequent than those above described, which occur in young, whilst these latter exist in elderly persons, at which period of life heart-diseases more commonly arise. They are produced sometimes by indigestion, which it is well known induces an inordinate and irregular action of the diseased heart; sometimes by mere nervous irritability, from mental emotions of different kinds, leading to the endless enumeration of the occasional exciting causes of the fits of "spasmodic asthma" formerly found in authors.

There are cases of heart-disease which serve to confirm the opinion of the existence of an asthma depending on spasm of the bronchial tubes; because detection of the disease requires some practice, and a knowledge of the *real cause of the sounds of the heart*. Thus you may find a patient with asthmatic breathing, continuing during the day, the patient having what is called attacks of spasmodic asthma at night. It is probable that you will be told that this is accompanied with chronic bronchitis; and, in fact, the dyspnœa is that state secondarily produced. In this case, if advanced, you will find œdema of the legs, or even of more extent: you may be told that there is no disease of the heart, that

there is no *bruit* or unnatural impulsion; but upon listening carefully, you will find, perhaps, that the first sound is woolly or weak, on account of the mitral valve allowing of regurgitation, though not sufficient to cause a *bruit de soufflet;* and the sound is weak, as being derived almost entirely from the tricuspid valves. I am pointing this out as one of the difficult cases to distinguish; for when the same symptoms are produced by regurgitation of the semilunar valves, a direct *bruit* is always perceptible, and on the second sound. Again, with mitral *patency*, which renders the first sound weak, as just stated, if there be even no *bruit* on the first sound, the second sound will be more faint than natural, on account of the small column of blood which had been propelled into the aorta.

These cases destroy life by the secondary disease of the lung, the capillaries of the bronchi being kept in a state of continual congestion, incompatible with the function of respiration; and the patient becomes dropsical, with livid lips, and sinks; the lung itself frequently becoming œdematous. The disease is incurable, as there are no means of repairing the valves; it may, however, be palliated for years; and even when the patient appears almost suffocated, relief may be obtained. Taking a few ounces of blood will restore the freedom of circulation; but this must not be resorted to without cautious judgment, nor repeatedly, as weakening the powers of life. Dry cupping, as practised by the French, affords more relief than could be imagined from the small and temporary derivation which it produces: but a great deal may and must be done by imparting tone to the

capillaries of the lungs themselves, so as to enable them to resist the regurgitating pressure. The ordinary expectorants are resorted to by most persons, but nothing is so efficacious as the senega, in decoction or infusion, given in frequently repeated doses, in conjunction with whatever diuretic, laxative, or other medicine may be indicated. Senega, as above mentioned, has the same influence as ipecacuanha on the bronchial tubes, at the same time that it can be taken in much larger quantities, in consequence of its not producing sickness. It is most efficacious in solution, on account of its action on the fauces and œsophagus being communicated by contiguous sympathy to the bronchi.

The dyspnœa is increased by every attempt to lie down, because the heart cannot empty itself; and of course more blood is thrown upon it in the horizontal than in the erect position; and for this reason the first asthmatic attack, as it is called, comes on at night. The flurry and mental agitation of the patient quickens the pulse, on which account opiates have a most soothing and beneficial effect; and ethers, helping the action of the heart, without the heating effect of alcoholic liquors, give relief in the paroxysms. It is in these cases of "asthma" that you find other visceral derangements so common, from the same cause—a venous congestion insupportable to the organs. The kidneys, for instance, become imperfect in their function, abundantly excreting albumen with a deficiency of the usually secreted salts. I can recollect, during my pupilage—before Laennec taught auscultatory diagnosis, a patient being actually sounded for stone,

from the irritable state of the urinary organs induced by disease of the heart. The liver is gorged, and consequently inactive; the stomach also, so as to produce loss of appetite, and sometimes nausea, and even vomiting.

Having above (p. 97) given a case of "spasmodic" asthma, which was produced really by chronic bronchitis, I may now relate one in confirmation of my views of the disease being sometimes caused by valvular disease of the heart.

I was called in consultation upon the case of a gentleman aged 55, who was dropsical, with dyspnœa, and subject to fits of "spasmodic" asthma, one of which had nearly proved fatal the night before. He had some cough, with scanty muco-pituitous expectoration, and orthopnœa. There was no morbid sound of respiration, beyond the slight rhonchus sibilans of catarrh or chronic bronchitis; venous congestion, and some lividity of lips. Pulse about 80, weak; impulsion of the heart rather more than natural with so weak a pulse, and percussion limits extended over a larger space than normal. But little morbid alteration of heart-sound; the second sound was natural—no *bruit* of any kind; but the first sound was weaker than natural.

The diagnosis formed was, that there was a defective mitral valve, allowing regurgitation; but that there was no *bruit* therefrom, because the opening was too free to cause ripple, which opening also caused weakness of pulse; and the first sound was weak, as being that of the tricuspidal valve only —the mitral, in fact, giving no sound, as it did

not shut—that there was hypertrophy and enlargement of the left ventricle—that the lung was sound, but that the cough was produced by the congestion of the bronchi incident to venous congestion from faulty circulation.

These points were confirmed by post-mortem examination; one half of the mitral valve was puckered and contracted to the wall of the ventricle, which was enlarged, and more than an inch thick; the carneæ columnæ hypertrophied. This disease might be fairly traced to the endocarditis of rheumatic fever twenty years back; this had at first produced but slight symptoms of difficulty of breathing; but as the heart enlarged from continued over-action, the valve became more disproportionate to its office, and the "asthmatic" attacks more frequent and severe.

If Dr. Hope and others were correct in attributing the first sound to "muscular bruit," we ought to have had here an increased, instead of almost imperceptible first sound of the heart; for there was nearly a double quantity of muscle, and an increased beat of the heart.

There was a peculiarity observable in the carneæ columnæ of the sound half of the mitral valve; they were increased in thickness (hypertrophied as well as the ventricle), from having been overworked in supporting that only efficient part of the valve, which was itself stretched beyond its natural expanse.

I should say that this state of the carneæ columnæ affords an illustration of the cause of increase in frequency, and still more in duration, of the paroxysms of mere nervous palpitation, producing at last alarming symptoms: the slightly hysteric or ner-

vous palpitations causing, by frequent recurrence, hypertrophy of the carneæ columnæ, which, in the subsequent recurrence of palpitations, as they act spasmodically in concurrence with the muscles of the ventricles, keep the valves unnaturally open (causing a *bruit* with the first sound, p. 84), thereby inducing dyspnœa and faintness, from regurgitation on the lungs and deficient supply to the brain; hence the indication for narcotics, to allay the paroxysm, and tonics to prevent their return; morphia, iron, oxyde of silver, of zinc, quinine, &c., and an abundantly nutritive diet, to give tone as well as strength—*credite experto.*

ANGINA PECTORIS

is a term which is wearing out very fast, like "asthma," because we now know better what diseased states of the heart, such as ossification of the valves or coronary artery, produce the sudden and violent pain, or *angina* (anguish), which is only a learned name given to the pain—just as persons who cannot give an explanation of some phenomenon or other shirk it by saying it is *sui generis.*

TUSSIS HEPATICA.

For the sake of diagnosis it is necessary to describe the coughs which are produced by diseased liver. These almost always at first assume the appearance of chronic bronchitis, or chronic dry catarrh: the disease of the liver producing an irritation of the diaphragm and pneumogastric nerves, the uneasy sensation of which causes the patient to cough; at first this is a short, dry, unsatisfactory cough; but

if the patient have previously had chronic mucous catarrh, there is a still more deceptive cough, with expectoration; and even if the bronchi have not been previously affected, the continued effort of coughing in time causes a catarrhal or sub-bronchitic state of the trachea and bronchi, and a slight expectoration. The uneasiness is felt, not in the liver itself, but about the middle of the chest, nearly as high as the nipple, passing through to the shoulder-blade; that is, where the suspensory ligament is attached to the diaphragm, on the right side chiefly, but extending rather across the chest; and many cases of this kind have been treated for chronic bronchitis, though upon examination the liver could be found swollen several inches below its natural limits in the abdomen. In some of these cases suppuration takes place in the liver, and the abscess points externally, or makes its way through the diaphragm and lungs by adhesive inflammation and ulceration, so that the pus escapes; all this becoming accompanied by hectic, and symptoms resembling consumption; and in several instances I have seen the external pointing of the abscess and the burrowing through the lungs at the same time.* In all these cases more or less harassing cough, with distress across the chest, first attracted

* It has been explained above how pus makes its way from the abdomen into the right side of the chest, by an abscess of the liver causing adhesion and ulceration through the diaphragm into the chest. In a similar way adhesion and ulceration occasionally takes place from a diseased stomach, so as to allow its contents to get into the left side of the chest, in which case the flatus which passes in may cause a pneumo-thorax, or may escape through the lung.

the attention of the patient, and yielded only in proportion as remedies made impression on the disease of the liver, and not to expectorants, though expectorants produce a certain alleviation of the bronchial symptoms.

Persons are frequently deceived by liver-cough, and go on treating it as chronic bronchitis, until the occurrence of jaundice, or some other circumstance, leads to the true diagnosis.

I have seen cases of cough and muco-purulent expectoration, with dulness on percussion in the right side, broncophony and crepitation, hectic fever, and its accompaniment of lateritious urine, &c., which had proved nearly fatal, when the patients were relieved by the abscess of the liver pointing and breaking, or being opened externally, and finally recovered perfect health. In two instances there were hydatids in the liver, in one of which some of the small hydatids made their way into the lung, and were coughed up.

Before the publications of Laennec, it was much more common for practitioners to be guided by obvious symptoms, and prescribe for them. Hepatic disease, as is well known, produces cough; this is dry at first, but in time the irritation of the bronchia produces expectoration; and then, if the liver-disease be accompanied by hectic, as is usual, the case may be mistaken for phthisis. In other cases, the indurated enlarged liver produces pain in the back, and sudden starting up, and difficulty of breathing, after the patient has been some time asleep, in the middle of the night, with dry cough, which subsides after the patient has been sitting up for some time. Cases

of this kind, where the patients are dying of diseased liver, with more or less dropsical swelling, are sometimes said to be asthmatic. On the other hand, I have been consulted concerning patients sinking under dropsy from diseased heart, which was attributed to diseased liver; an error more readily committed, in one instance, as the patient had returned with these symptoms from India. In all these cases auscultation was of the most valuable assistance in furnishing both positive and negative information.

We have seen above that those cases called spasmodic asthma, which in reality depend on chronic catarrh, may be cured by tonic medicines combined with palliating expectorants; but this will not succeed unless the patients, instead of being dieted and confined to the house, have every means taken, by animal food, fermented liquors, and exercise in the open air, to put them "in condition."

I may here remark, that I totally disbelieve in the existence of spasmodic asthma as a disease of the muscular structure of the bronchial tubes. I have never seen a case which, sooner or later, could not be traced to organic disease of some viscus, as the heart, liver, spinal cord, or lungs themselves; such as emphysema, Laennec's chronic dry catarrh, &c. &c. Some of these latter cases, occurring in young or old persons, are curable; many of those depending on organic disease of the heart in old persons can of course only be palliated.

PHTHISIS PULMONALIS (Tubercular Consumption).

Tubercles are small semi-transparent granules, like the roe of a fish, deposited in the lungs,—

it is said in the substance of the lungs; but substance is a misnomer, as there is no part thicker than a sheet of the finest paper between the ramifications of the tracheal tubes and air-vesicles. The tubercular matter is deposited in the epithelium of the air-passages; at least, though the tubercles encroach on, or may appear to be in, the areolar vesicular spaces, they are connected with the epithelial cells, which do not extend farther than the bronchial ramifications; and though the minute tubercles, when pressed between the fingers, feel as if they were isolated bodies, like the grains of fish-roe, yet, upon cutting through them, they will be found to be inseparable from, and, as it were, continuous with, the enclosing tissue; and although in general the tubercular matter is deposited at first in these minute spots, it frequently is found coalescing into diffused patches or masses of various sizes ("tubercular infiltration"). This is the first stage.

At first there is no inconvenience felt, no cough at this stage of disease, as I have ascertained over and over again; and there are specimens of incipient tubercles and tubercular infiltration in the Museum of the London Hospital, which I obtained, when a student,* from patients, surgical and medical, who had

* This morbid anatomy of the early stage of tubercles cannot, of course, be found in fatal cases of phthisis; it must be sought for in the lungs of patients who have died from other causes, either of disease or from accidents, in the surgical wards. At the time alluded to, whilst a dresser under the Blizards, I assisted Dr. Yelloly in numerous indiscriminate *post-mortem* examinations upon which he founded his Observations on morbid appearances in the Stomach (*Medico-Chirurgical Transactions*); and had thus, at a time when the anatomy of tubercle was little understood, frequent

no cough. One from a female, who died of peritonitis; others from patients who died in consequence of accidents.

Tubercular cells have considerable resemblance to pus cells; they are effete, and have no power of vitality, or of becoming organised, differing in this respect from the cells of virulent or malignant diseased growths. Tubercles and tubercular infiltration, then, unlike the depositions of inflammation (common or malignant), do not become organised; they increase in size by succession of deposit of the same kind of matter round the first grain, which, being inorganised, albuminous, becomes in time decomposed, and changes colour, losing its transparency, and forming a pale opaque spot in the centre, of the consistence of curd.

Whilst this white substance is firm, the tubercle is called crude, or unripe, presenting a firm white appearance when cut into; such being the second stage. The term maturation is applied to the third stage, from its having been supposed to be suppuration; as the softening of the tubercles has been erroneously considered the same as a maturation or ripening of abscesses. But this melted-down tubercular matter is different from pus, which is formed fluid in the first instance, as may be seen every day

occasions of finding tubercles which had not been anticipated. The opportunities of this kind afforded to students of the London Hospital may be calculated, from the statistical reports of that hospital for the last ten years, which gives an average amount of nine thousand surgical accidents per annum. It was in this extensive field, and at the same period, that Liston acquired much of his surgical knowledge.

on the surface of granulating wounds or ulcers. The melting down of the tubercles is the effort of nature towards a cure. By their thus becoming liquid, the resulting creamy matter makes its way into the bronchial tubes by an ulcerative process, during which, or, more properly, during the existence of that degree of inflammation which takes place previous to the breaking, as well as whilst they are being discharged, there is hectic fever; and according as the tubercles are evacuated, a number of small cavities, causing a honeycombed appearance, are left in the lung. As the tubercles are often in masses or clusters, large pouches will sometimes remain after all the white matter is expectorated. Provided there have been but few tubercles in the first instance, a new membrane or lining invests the resulting cavities, and the patient may live on: this result is a real recovery from actual phthisis, which has by some been thought impossible. But the disease will generally return sooner or later, unless the individual die of other disease.

Considering this simple statement of the disease, one might be surprised that more do not recover; but we must recollect that these tubercular tumours being within the lungs, must, during their progress, induce, and be complicated with, more or less peripneumony, pleurisy, and bronchitis; besides the diminution of the pulmonary tissue so necessary to life, and the hectic wear of the constitution.

The above statement explains what will serve as a valuable means of diagnosis in this disease; its approach is gradual, inasmuch as the tubercles, which are the essence of the disease, grow as gradually and

imperceptibly in the lungs as warts on the cutaneous surface. Afterwards, as they increase in size, they produce inconvenience and some degree of cough; and becoming liquefied, involve the surrounding tissue in their decomposition, occasion the fever which necessarily accompanies inflammation in so vital a part, and by the consequent diminution of the function of respiration and hectic fever, destroy life. This is the essential, unchangeable nature of the disease; all the other accompanying circumstances which we find described vary *ad infinitum* in phases and intensity.

With advancing disease there is a slight tickling cough, often said to be a nervous or unmeaning cough, as there is no expectoration, no sound of phlegm; it is not a loose cough—it is dry, conveying, alas, too much meaning to the suspecting practised ear. Why does consumption vary so much in its course and duration, from a few weeks to twenty years and longer? Because the number of tubercles may at first not exceed two or three dozen, or there may be several hundreds, or a mass of tubercular infiltration, producing rapidly fatal disease.

Why does spitting of blood, however slight, cause alarm and suspicion of consumption? Because experience records that it is one of the commonest early symptoms of the disease, produced sometimes when the tubercles, having "ripened," are bursting into the bronchial tubes, causing that breach of surface, from which more or less blood escapes and is expectorated, and sometimes long previous to that stage or to any cough having been noticed, from the mere congestion of the epithelial membrane caused by

the tubercles. Up to this period there are but slight symptoms; but about this time, either with or without the hæmoptysis, we perceive the slight flush of fever in the cheek, hot hands and quickened pulse; but the pulse is seldom affected to the same degree as in idiopathic hæmoptysis.

The tubercles being generally somewhat in clusters meet one another as they grow larger, so as to coalesce and form a conglomeration; so that when they soften and are expectorated, a space (cavity) is left in the lung, from which, according to the degree and duration of inflammation, a purulent, or mucopurulent, or merely mucous expectoration is thrown off. Now the auscultatory symptoms are at the commencement scarcely perceptible, if the tubercles be few; if at all abundant, there is a diminution of the respiratory murmur, on account of their occupying the space which ought to be filled with air, and there will be diminished resonance on percussion, and for the same reason the expiratory murmur will be prolonged (p. 7). At the same time there will be ronchus sonorus gravis and sibilans produced by the catarrhal state of the bronchial tubes; then, as soon as the tubercles produce inflammation and hectic, the crepitation of spots of pneumonia will be heard in addition; and there will be broncophony in the parts where the lung is consolidated, if near the surface.

When the cavity has formed, if near the surface, or if solidified lung intervene, *tracheophony** and *tracheal* respiration will be heard, and a peculiar sharp click now and then, from the air passing

* 'Tracheophony,' equivalent to 'pectoriloquy;' and 'tracheal,' the same as 'cavernous' respiration.

through the fluid, and a bubble breaking in the cavity, besides the loud mucous or guggling rhonchus; this sound, however, will not be constantly heard in the same place, as the cavity is sometimes quite emptied by the force of the cough.* The cavity in advanced stages of the disease may have become too large to produce those sounds, then tracheophony is lost, and reverberation only is heard, and what is called "amphoric" respiration, as if the air was passing through a thin glass bottle; and sometimes instead of the click of the small cavity, a sound which is called metallic tinkling, louder and sharper, merely from the increase of the cavity modifying the sound.† Percussion undergoes modifications at the same time, and the parts which were dull whilst solid have, when much excavated, again a degree of resonance; but instead of the dull empty-cask sound of healthy lung, there are modifications in the sounds produced by the *form and density of the parietes* of the cavities, to which various names have been given, as "metallic," "tubular," "cracked pot" sounds, &c.

Sometimes, in this stage, the lung breaks, and allows the air and liquid contents of the tubercular part to escape into the cavity of the chest; the

* This takes place where the cavity has been formed from a patch of tubercles conglomerated, but not when the cavity occurs in a mass of tubercular infiltration; for then the cavity is surrounded by too much solid matter to allow of compression during the act of coughing so as to empty it, and in these cases the cough is always more harassing, on account of the difficulty of expectoration.

† I must here again remind the reader that I intentionally omit minute and complicated explanations of phenomena not necessary to diagnosis.

irritated pleura then throws out fluid, sometimes pus, and this state of affairs is called *pneumothorax* with empyema; there is then on percussion enormous (*amphoric* or *tympanitic*) resonance in the upper part of the chest where the air is, and dull sound at the lower part corresponding to the fluid.

Now the tubercles at the commencement do not necessarily produce any symptoms, any more than a chain of strumous knots on the lymphatics, which may frequently be felt in the side of the neck, but which produce no uneasiness, and are often reabsorbed without any remedy being used. We have no proof whatever that tubercles in the lungs are not reabsorbed, and doubtless they sometimes are; we can never be certain of the fact, as the difficulty that we have in ascertaining their existence in the early stage is so great, unless they be so numerous that there remains little hope of recovery. Yet the progress of auscultation has been such, that we may hope for still further additions to our means of diagnosis; and the more thorough knowledge we have of the nature of the disease, the better we shall be able to combat it. Hitherto the application of remedies in phthisis has been in many cases quite empirical, often inert, and sometimes mischievously active. The student must bear in mind that it is a disease of tremendous destructiveness, and that there are but few cases within the reach of art; but he should recollect that some are curable, at least for a time, otherwise he will lose that persevering energy which it is the duty of every medical man to exert as long as life remains: I do not say, as long as there is

hope; for many patients recover from various diseases after all hopes have been relinquished.

Many years ago a young married lady, who had two children, came under my care with all the symptoms of confirmed consumption, cough, and muco-purulent expectoration. She had occasionally expectorated a little blood; there were night-sweats and colliquative diarrhœa. I supported her strength with animal food and some fermented liquor, whenever her pulse could bear it; prescribed gentle exercise in the open air, and free admission of air into her rooms; restrained the diarrhœa by catechu, logwood, and sometimes opiates; sometimes applied half-a-dozen leeches, and blisters, and gave digitalis for a few days when there was appearance of acute inflammation; sometimes gave bark and soda, sometimes quinine with diluted sulphuric acid, which restrained the *sweats*. Beyond my hopes she got well, and continued so for about five years, having one child more in that time. I think that during the attack she had expectorated a crop of tubercles; but I cannot be certain, as I had not then practised auscultation. However, after the five years, she had a renewal of all the symptoms; and I know that she then had cavities in the lungs, as I ascertained by auscultation that there was crepitation, pectoriloquy, and cavernous respiration. From this she recovered again in about a year; and when she regained her strength had another child. Within two years from her second recovery she had another return of the same symptoms, and died,—the lungs, upon examination, being full of large cavities. The process of utero-gestation is said to suspend the progress of

phthisis; but in this case the period occupied by one pregnancy bears a small proportion to the interval between the first and second attack.

Whoever understands the treatment of strumous cases has the groundwork of the treatment of phthisis, modifying that by calculating the nature of the organ in which the tubercular tumours are formed, and throughout making every effort to support the strength, not merely to preserve the vital powers, but for the purpose of promoting the kindly healing of the internal pulmonary sores; for we have abundant opportunities of seeing, in surgical cases, how rapidly strumous and other ulcers get worse as the patient becomes weaker. Hence one of the great difficulties in phthisis is, that the presence of the tubercles constantly brings on inflammation, which takes the form of peripneumony, or pleurisy, and requires antiphlogistic treatment; while the risk is, that in reducing the acute inflammation we reduce the power of the constitution, and so increase the chronic or strumoid disease. Here we have an explanation of the benefit experienced by some from the use of digitalis, or hydrocyanic acid, which keeps down the pulse and the acute inflammation, without wasting the vital fluid, or depressing the system, except in cases where it disagrees with the stomach, and then of course it does mischief by weakening. And because digitalis had proved useful, it was recommended and used empirically, that is, indiscriminately. Having been, however, employed in so fatal a disease, it of course lost its character, except in the hands of those practitioners who could understand in what states it was occasionally bene-

ficial, and would limit its use to them; knowing that, in the cases of phthisis with a feeble pulse and no tendency to acute inflammatory action, it could do nought but harm. Again, the constant repetition of emetics in phthisis, as well as in abscesses, has done good on a similar principle, by checking the deposition of new matter, and facilitating the removal of old; as elaterium is useful in dropsy by its emetic as well as purgative properties. But the operation of emetics is so distressing, and the chances of curing phthisis are so doubtful, that few persons now prescribe this mode of treatment, which was at one time much praised and resorted to in this disease, as well as by surgeons for the removal of abscesses.

One great advantage of auscultation is that of enabling us to decide whether any cases of consumption are cured or not (p. 115). Previous to its discovery, if a case recovered, a doubt always existed whether the patient had been really consumptive; whilst all who died were put to the account of consumption, without any reserve. I may here recapitulate a few of the auscultatory observations made in practice. If few miliary or even crude tubercles be deposited in the lung, no evidence is afforded by auscultation or percussion; if there are many, or tubercular infiltration has taken place (and we may almost always expect to find them near the clavicles), there is diminution of respiratory murmur; and from the solidification more or less bronchial respiration or bronchophony, and some diminution of sound on percussion, occur. Whereas if the patient's cough be produced by catarrh, the sound on percussion

will not be dull, and there will not be bronchophony; and if the murmur be diminished by emphysema, the sound from percussion will, on the contrary, be extra loud. In the progress of the disease there is no alteration in these auscultatory signs, except augmentation, until the tubercular matter, having ripened, begins to make its way into the spongy texture of the lungs and bronchi, when a kind of crepitation is heard, being a mixture of rhonchus mucosus with the rhonchus crepitans, or what Laennec calls subcrepitans, and partaking more of the pure crepitation in proportion as, about this time, the lungs may become in a peripneumonic state just round the tubercles, or the rhonchus mucosus be mixed up with œdematous crepitation when the consumption has brought on dropsical symptoms; besides which we find occasional admixture of rhonchus sonorus gravis, or sibilans, which must not be confounded with the diagnostic signs, but which we need not here analyse. When the sounds cannot be satisfactorily heard during respiration, the patient must be made to cough, so as to remove any mucus which may obstruct the tubes, and prevent the real state from being heard. After the crepitation has lasted some time, we begin to perceive new sounds, according as the tubercles get cleared out; when cavities are quite empty, tracheal ("cavernous") respiration and tracheophony ("pectoriloquy") may be detected; and when they contain some soft tubercular matter, and pus or mucus, we hear cavernous gurgling rhonchus. The sound from percussion at that period frequently alters, becoming sometimes louder again, in pro-

portion to the degree of the hollowness from the excavations.

Tracheophony in any part of the chest is a certain evidence of the existence of an excavation; indeed a cavity not larger than a nutmeg, or even less, produces tracheophony distinctly. In one instance I had a patient with aneurysm of the aorta, in whom during examination of the chest tracheophony was observed in one spot only, which was between the scapula and spine, and which sometimes ceased to be discoverable for a day. After death this was accounted for; it was found that disease of a vertebra, close to the head of a rib, had caused a small abscess, which, instead of pointing externally, had made its way into the lung, through which the pus was evacuated. This cyst, not so large as a nutmeg, gave tracheophony when empty; but when full of pus, as when he had been lying quiet, of course permitted no sound.

I must observe, that ordinary nosological symptoms are not sufficient to establish the existence of tubercular consumption; the whole train of symptoms may occur as the production of an ordinary cause (pp. 53 and 58), such as catching cold from wet feet, &c., producing peripneumony or pleurisy in the first instance; the sequelæ of either are, not unfrequently, hectic, with cough and expectoration, the latter of which might be so similar to phthisis, that if it were alone considered, it would be presumptive evidence of phthisis.

Expectoration of blood would be by no means inconsistent with the supposition of the disease being only pleuritic in the first instance; and I must

here take the opportunity of observing, that though there are not many cases of phthisis in which there is not some expectoration of blood at some period, still that many cases of hæmoptysis occur without being connected with tubercular disease, and more especially in females.

The heightened colour of the cheeks may not be found circumscribed in the forenoon, which is worthy of attention, shewing how perfect an intermission there may be, though the hectic be fully formed, producing hot dry skin and circumscribed hectic flush in the evening; followed by night-sweats, or rather morning-sweats, for the phthisical patient is generally hot, dry, and restless till four or five o'clock, when sleep comes on, which soon terminates in an uncomfortable state of perspiration. The patient in phthisis, during the later stages, has usually an aphthous state of the mouth, the fauces being inclined to be sore, as well as the back of the tongue, with a whitish pellicle, the tongue florid and glazed, as if skinned; but neither this thrush nor night-sweats are diagnostic of tubercles, as they are met with in hectic from any cause—dysentery, for instance, or from abscess in the liver or groin, psoas abscess, &c. But if, added to the preceding symptoms, we have the signs of true phthisis derived from auscultation, all doubt will be removed, and we have only to trust to the means of supporting the strength and allaying morbid sensibility.

In various parts of both lungs, in cases of phthisis, there will generally be found tubercles in different stages, explanatory of the symptoms noticed during lifetime; and also ulcerated appearances in the in-

testines at the termination of the ileum and about the sigmoid flexure of the colon, explanatory of the distressing diarrhœa which commonly occurs in these cases in the latter stages.

The thrush in the mouth in phthisis is generally coeval with, and indicative of, an ulcerated, aphthous, or thrushy state of the bowels; but we must not imagine that aphthæ, especially in young persons, are always accompanied with ulceration of the bowels; for children have thrush very frequently when debilitated by diseases, as from teething or worms, from which they rapidly recover when the cause is removed.

Before we possessed the means of diagnosis established by Laennec, some cases used to be thought phthisis laryngea, on account of the loss of voice and incessant "laryngeal" cough, affording false hopes that counter-irritation on the throat, &c., might effect a cure. Formerly many a case of phthisis used to get the name of a liver-cough—that is, when accompanied by a pain in the right hypochondrium, costiveness, and indigestion; but now the auscultatory symptoms tell too truly the state of the lungs.

In many cases of phthisis, I may repeat, there occurs the superaddition of peripneumony, pleurisy, hæmoptysis, or catarrh, or complications with disease of other viscera; and often dropsy comes on at the last, and hastens the fatal termination, or that pleuritic and purulent effusion into the chest which Laennec calls empyema. When there is hæmoptysis, peripneumony, or pleurisy, or any complication requiring antiphlogistic treatment, we

must recollect the analogy between the phthisical and strumous constitutions, and save the strength of the patient as much as possible. I would advise the young practitioner not to bleed patients beyond what is absolutely necessary to check inflammations in any case, but more especially in those superadded inflammations which occur during the progress of tubercular phthisis. In peripneumonia or pleuritis, with a consumptive habit, we must avoid the risk of knocking down the constitution, if possible; but I confess we are sometimes placed between two evils, and must then choose the lesser, as well as we can judge.

One thing of which I am convinced is, that the true principle of treating consumption is to support the patient's strength to the utmost; and that though *occasional complications* may call for antiphlogistic treatment, *tubercular disease by itself* does not. I must again caution young practitioners against shutting up phthisical patients in warm rooms. I am satisfied that the want of exercise induces a languor which makes them wear out faster than if permitted to ride or walk, according to their strength, in the open air. At every exacerbation of their complaint, phthisical patients say they have "caught fresh cold;" but the same thing occurs when the experiment is tried of keeping them in rooms graduated by a thermometer. A mild climate is palliative, by permitting more free exercise in the open air: but when we look at the specimens in our museums, we may judge whether a warm climate could regenerate such lungs.

The question remains undecided whether a

warm climate can control tubercles of the lungs.* Upon the analogy with struma we might infer that it could; but we must recollect that, notwithstanding their close analogy and relationship, the diseases are not identical. Tubercular disease, though it be not scrofula, bears a strong analogy to it, in its development being spontaneous, independent of common inflammation; and also to various chronic eruptions of the skin. I have had several strumous patients under my care, more or less constantly, for from twenty to thirty years, who have had at various times the general symptoms of tubercular phthisis, cough, profuse expectoration, hectic diarrhœa, &c., some still alive, others who died, but not of tubercles. On the other hand, there are abundant cases of tubercular phthisis which shew no strumous symptom as to constitutional appearance or disease. I have shewn that the medicinal and dietetic treatment which suits strumous is the best for the phthisical cases, and there is no doubt that delicate strumous patients are much benefited by change of climate to Italy, or the south of France; and that scrofula increases as we go into cold, damp regions, and decreases as we go south; hence we might infer that a mild climate may favour the general health of delicate persons, so as to retard or prevent the incipient stage, or formation of tubercles, whilst, on the other hand, we must confess that consumption occurs in some most robust, previously healthy individuals, who evinced

* To assist the judgment of the reader much valuable information is to be obtained from Clarke on the *Sanative Influence of Climate.*

no necessity for any such precaution; the only thing is, that the inhabitants of the milder regions suffer less from consumption; yet few persons can submit to the inconvenience and expense of taking their children to the Continent as a matter of precaution, which may after all, when it has been resorted to, have been unnecessary, as there are plenty of delicate persons who never become consumptive, and plenty of robust ones who do. When unequivocal symptoms of tubercles set in, it is too late, except in such cases as may rally in this climate (p. 115).

In my opinion, the advantage of breathing warm air is very much over-rated. We uniformly see that real consumption (tubercular) runs its course rapidly in Italy, or any warmer climate; such, at least, is the result of my observation.* A deception has arisen in consequence of persons not really consumptive, but affected with severe chronic catarrh, having been sent into warm climates, who from the comparatively trifling nature of this disease, have returned cured, or at least not worse. In some of these cases, erroneously called phthisis, the progress of the disease is said to have been checked by the influence of the milder climate. This popular prejudice has still, however, a strong hold on the minds of men, and even auscultation has not yet corrected it.

It is generally very unnecessary, and worse than useless, to send patients away from their friends, and often at an enormous inconvenience. If they are consumptive, they will thus die in exile; and if not, they may be cured at home. Of the first

* I am confirmed in this opinion by the experience of Andral.

it is unnecessary to give examples—there are abundant marble records in the neighbourhood of Leghorn, in the West Indies and Madeira, &c. A case will explain more fully what I mean by the second. A young gentleman was condemned, by high medical authority, to banishment to Madeira, as "nothing else could save him;" but to this some strong objections existed. First, he was engaged to be married; secondly, his partnership in a valuable business, which depended much on his personal superintendence: a reconsideration of his case was therefore moved for, and my opinion requested. I decided that it was mere chronic catarrh in a relaxed constitution; that some tonic, such as iron or bark, with animal food and fermented liquor, was alone necessary; but, above all, exercise on horseback in the *cool* open air. Under this treatment he recovered within a month, and is now the father of a family.

The case of another patient, who, after having been sent to the West Indies for incipient consumption, as it was called, had returned in good health, was triumphantly adduced to me as opposed to my opinion (as the last-mentioned case would have been, had the patient exiled himself as at first recommended). On the following January, however, I was again consulted, in consequence, as it was said, of the consumptive symptoms having returned. I found the patient shut up in a warm room, dieted, and physicked, and waiting for a vessel, intending to sail again to a warm climate, at a great inconvenience as to family affairs, &c. I prescribed the same remedies as in the former case, and insisted

upon walking exercise in the open air being commenced, even at that time of year. The patient was free from cough in about ten days, and has so continued many years. I must observe, that auscultation alone did not decide me in either of these cases: they had both been previously seen by practised auscultators. Though a warm advocate for auscultation, I am aware that, besides the injurious and absurd affectation of some who are really practically ignorant of it pretending to understand its employment, there are others who place too much reliance on it for diagnosis, omitting the consideration of the collateral constitutional symptoms.

Now, is consumption curable? Decidedly so, for a time (but like gout—*naturam expellas furcâ, tamen usque recurret*): thus it is very seldom that there are but a dozen or two or a hundred or two of tubercles; but if that be all, when they are expectorated, the patient gets well, and remains so until after a year or two, or more, when a fresh crop forms; if these be not too numerous, the patient may recover again, and again, as in the strongly marked case, which is detailed above (p. 115), where the patient survived nine years after the first attack of "confirmed consumption," having been twice during that time, at intervals of two or three years, at the point of death, and having recovered each time to a state of comparative health. Again, another mode in which life is prolonged, is by one side of the lungs remaining sound: thus, when I was a student, a friend of mine was declared to be consumptive, and within six months of his death, by one of the most talented physicians in London; he got better, how-

ever, though always coughing, and went abroad, through various vicissitudes of climate, for three or four years, actively employed in business; returned to London, led an active life, consumptive all the time, and was under my surveillance for twenty years; at last, died of consumption, though a long time about it. The treatment was merely palliative —expectorant pills, and abundant diet, animal food, wine, and other fermented liquor, to keep up his strength, and occasionally tonics. One lung was nearly sound when he died, the whole of the other consumed away, so that that side of the chest was as empty as an egg-shell.

Another patient of mine had consumption sixteen years ago, is still thin and consumptive, though active, but will possibly live as long as myself; and I have several friends whose cases I contemplate with some degree of anxiety, though now apparently in good health, on account of suspicious attacks from which they have recovered.

In former times the opinions repecting consumption were highly erroneous. I can recollect when it was considered a disease of common inflammation, and the tubercles the *result* of inflammation in a peculiar tissue. Referring to the above plain condensed statement, we can recognise the absurdities retailed in works on the practice of medicine, and the erroneous assertions in memoirs, as to the origin of cases of consumption, such as from catching cold; from over-exerting the voice or chest in singing, flute-playing, &c.; the dust from various trades, which, though it may produce chronic catarrh or bronchitis, will never directly cause consumption.

From misconception of the nature of consumption, much stress was formerly laid upon the nature of the expectoration, as to whether it was purulent or not, it being supposed that consumption was an inflammatory ulceration in the lungs; whereas, as above stated (p. 112), the expectoration from the lining of consumptive cavities and bronchi is frequently mucous, without pus; whilst, on the other hand, in cases of chronic bronchitis, not consumption, we may have pus secreted and expectorated. I recollect, as a junior, in consultation with Dr. Baillie and men of his day, the careful search which was made for pus, as a diagnostic appearance; whereas men of equal skill now have learned that it is worthless towards discrimination, *and its absence no security.*

The slow advances of the disease, and the constitutional symptoms, will afford diagnosis even where we have scarcely any auscultatory signs. It is in other diseases of the lungs, above discussed, and in the diseases of the heart, that auscultation is indispensable and invaluable, simple and certain, and especially in the latter, to those who know the real nature of the sounds of the valves.

The progress of the symptoms of consumption vary in individual cases, but are all reconcileable to the above concise statement of its nature, the duration of the disease being generally directly influenced by the quantity of tubercles. Some patients suffer more, some less, just as the inflammation produced is in a more or less sensitive part. For instance, when the ripening and bursting tubercles are on the interior of the lung, the pain is the dull pain of pneumonia; when on the surface, there

are the acute pains and stitches of pleurisy, for the relief of which the older physicians used to bleed, with leeches or otherwise, to a most exhausting degree, without bettering the patient. Under such circumstances, relief must be obtained by opiates, and various external applications, to palliate the symptoms, until the tubercular disease of that spot has run its course,—for run its course it must; and all we can do is to assist nature to bear up against it. The pleurisy thus produced may possibly run so high as to require an active antiphlogistic treatment; but we must recollect how much in consumptive pleurisy the strength of the patient ought to be saved; and the acetate of morphia, or other opiate, will do more towards allaying the inflammation than general or copious local bleeding, especially if combined with antimony or ipecacuanha. Antimony is preferable in the acute or subacute exacerbations, but morphia or opium, in some shape, is indispensable in consumption, to allay the cough; for in the common chronic form it saves the patient from the fatigue and loss of rest; and in the acute state it must be evident of how much consequence it is to save the inflamed parts from the constant concussion of the cough. Morphia is a direct, and in free doses an active, antiphlogistic, besides being anodyne; so that no combination is so efficacious against acute inflammation as the combination of it with antimony; four parts of acetate of morphia with one part of antimonii potassio-tart. in solution, and given freely every two or three hours, or every hour at first.

In the ordinary unpainful state of consumption, the most convenient and useful medicine is equal

parts of pulv. ipecac. co. and pil. scillæ co., made into five-grain pills, one to be taken at the intervals of every eighth hour, or, according to the degree of cough, every sixth or every fourth hour. This is to allay the catarrhal or chronic bronchitic state of the lung induced by the tubercle; just as the same medicine is most efficacious in common catarrh or chronic bronchitis. If the pulv. ipecac. co. confines the bowels, part of the pil. scillæ may be withdrawn, and an equivalent portion of aloes, ext. rhei, jalap, or other laxative, substituted to counteract that inconvenience.

The patient's strength ought to be supported, as in other chronic exhausting diseases; the difficulty in the way of practitioners having always been, that the lung being the part effected, the animal food and fermented liquor, which are so necessary in this as in scrofulous cases, seemed contra-indicated, though absolutely useful to support the strength; and, in general, it will be found that the patient will cough just as much if half-starved, and be weakened, of course, all the quicker. The same observation may be made as to tonics, which are as necessary as in scrofula; but so many think that quinine and other tonics tend to increase inflammation (which I think I have proved elsewhere they do not), that they fear to support the patient's strength by their means.

Inasmuch as we have as yet discovered no remedy for tubercle, we can only support nature through the progress of it, as we do with strumous tumours. It is a disease which has always afforded a harvest to quacks and to quackish regular practitioners, whether they have been knaves or fools.

Some infatuated persons have thought they could cure it, because they did not understand the difference between it and inflammation, and indulged in other misconceptions. Every new agent and new medicine has had its turn in disappointing the world in this *opprobrium medicorum:* Beddoes was sanguine that by inhalation of gas the disease might be modified; Darwin was sanguine as to the effect of digitalis, because it could make the pulse slower; but retarding the pulse did not retard the disease any more than the use of cod-liver oil. It is essential to the disease that the pulse is quick, but making it slower does not touch the tubercles; it is essential to the disease that the patient wastes away, but putting fat on his outside by means of cod-liver oil* does not

* Cod-liver oil has the peculiarity of fattening the human species, as oil-cake does brutes; and, by affording this kind of nourishment, improves the appearance of strumous children, more especially when they have no appetite for food, and is really useful, as the nourishment it affords assists in the formation of healthy pus globules, which are deficient in the thin discharges of strumous disease; but as these discharges do not exist in phthisis, the oil is neither required nor useful. Cases of chronic bronchitis with debility, resembling consumption, have given a false éclat to the remedy on that score.

Two or three years since I was called in consultation by a highly intelligent medical friend on the case of a boy, whose parents were apprehensive of his being in a consumption, on account of constant cough (chronic bronchitis) and emaciation from weak digestion; in fact, all his mucous membranes out of order, with a tendency to struma from weakness. He improved slowly under treatment; but a non-medical friend recommended cod-liver oil, and the proper medicines were discontinued, notwithstanding the exhortations of the medical adviser still attending other members of the family. The youth got a little plumper, or rather less

touch the tubercles or restore the disorganised lung, though it nourishes like other oleaginous articles of diet, and gives false hopes to the friends of the patient, who does not live five minutes longer than if he had not taken it. Digitalis is useful in dropsy and other diseases, and cod-liver oil is useful in struma, &c., but neither of them can cure consumption. Poor St. John Long was an ignorant enthusiast, who thought he could do good in consumption by violent counter-irritation, and died in his faith or superstition; for he applied his own treatment to his own back when he was dying of the disease.

Nothing can be more variable than the progress of this disease; some patients gradually waste away and sink into the tomb with comparatively little

emaciated, the cough continuing from neglect; for the minds of the affectionate though ill-judging parents, being relieved from the fear of consumptive death, could not be persuaded of the fallibility of the oil; but the boy being disgusted with it *usque ad nauseam*, would not take any more, so grew thinner again. After a while, by coaxing, they induced him to take it again; then his cheeks filled up a little; but he was as "weak on his pins" as ever, and coughing away: tired again of the oil—thin again; and with this alternation the infatuated, indulgent parents will perhaps persevere, and the youth grow up into a weak, wheezy adult, despite the remonstrances of their medical friend, from want of medicine which would have assisted the oil.

Now, though I do not attribute anti-tubercular powers to cod-liver oil, I concede what it deserves in struma; and it is useful in other diseases from its non-nitrogenous nature, as in gouty and rheumatic affections: in fact, it was used empirically by our Newfoundland fishermen long ago as an antidote to the rheumatism and scorbutic pains induced by climate and diet.

distress, whilst the sufferings of others are severe, and from different causes; some have repetition of severe pleuritic pains; some suffer much from difficulty of breathing, whilst others have scarcely any feeling of dyspnœa; sometimes the cough is harassing, whilst others seem scarcely conscious of the frequent hacking, which it is painful to hear. The reasons for these differences have been stated above. Great variations take place also in the same individual; the cough, which has been troublesome, with difficult expectoration, up to the time that cavities are formed, will now frequently become looser and the expectoration easier, from the greater compressibility of the parts.

Some patients have the appetite, digestion, and other functions deranged, which often leads to a fallacious opinion or hope that the cough may be a "stomach cough," or a nervous or hysteric cough; but in other instances the appetite and digestion may continue unimpaired up to an advanced stage of the disease, and it is, in fact, one of the diagnostic symptoms, where wasting advances though sufficient food is taken and digested—the red sediment in the urine, however, shewing a deficiency of the assimilating power. One of the most common causes of distress in the disease is the diarrhœa which sets in at the advanced stages, and which is caused by a tubercular eruption taking place in the epithelial membrane of the intestinal canal, similar to that in the epithelial membrane of the bronchi, and which runs a similar course, producing spots of ulceration which harass the patient with diarrhœa and some-

times dysenteric symptoms; and it is well known that fistula is not an uncommon complication, earlier or later. Astringents, such as kino, logwood, lead, silver, &c., with opium, palliate these symptoms. The membrane of the glottis and epiglottis not unfrequently becomes ulcerated,* causing great distress, pain, loss of voice; and in the advanced stage, liquids cannot be swallowed, but are rejected through the nose.

I have seen many cases which assumed the character of phthisis, and which would have afforded opportunities to those who either did not exactly understand, or wished to deceive, to quote them as cases of phthisis cured. For instance, in a case of neglected pleuro-peripneumony, the general symptoms were cough, muco-purulent expectoration, hectic fever, and emaciation; the physical signs, bronchophony, mucous rales, crepitation, and dulness on percussion: *perfect rest*, gentle counter-irritation of the side, the expectorant pills, and abundant nourishment, cured the patient in a few months; and I have met with several cases exactly resembling this.†

* At page 41 I mentioned the mode of sponging the epiglottis and fauces with a probang dipped into a solution of nitrate of silver. The same means also gives considerable relief in this state of phthisis, but has been one of the infinitely varied expedients of charlatanism. This useful practice was introduced from America; and though Brother Jonathan is known to be able sometimes to tell a good story, he did not draw such a long bow as the English practitioners who assert that they pass the sponge and whalebone through the glottis into the windpipe! where even a drop of spring water "going the wrong way" produces violent cough.

† See also p. 58, pleuritic disease simulating phthisis.

Again, the patient alluded to above (p. 98), during one severe attack, had such intense congestion (*engoument*) of the upper part of the right lung, that it produced dulness on percussion, and bronchial respiration to such an extent, that a medical friend, a most expert auscultator, to whom I shewed the case, coupling the symptoms with the primary chronic disease, could not believe that there was not a tubercular mass existing; and yet within six weeks I shewed him to him again with a complete clearing off of these alarming symptoms. Of course, I take no credit to myself for diagnosis in this instance, having previously watched the case; and I mention this to shew how difficult it is sometimes to give a decided prognosis on the single examination of a patient.* I may just mention one kind of cough

* Such cases as above related occur not unfrequently to every person in extensive practice; and, as there seen, these are not to be distinguished from phthisis on a single examination, even by experienced auscultators. Besides what I have stated here, I may add the testimony of my late colleague Dr. Thomas Davies, who saw more of phthisis than any physician of London in his time. He has told me of cases which had surprised him by perfect recovery, he having been consulted only once for his opinion, and he had considered them tuberculous upon the single examination, though he was too cautious to commit himself by giving an unguarded diagnosis. These are very *apropos* cases for those who wish to make out that cod-liver oil or any thing else can cure or "arrest" real tubercular phthisis. I have shewn that cases of *real* phthisis recover temporarily, under *ordinary treatment*, and have seen that those real cases, and the other mentioned unreal cases, have given a temporary *éclat* during my recollection, to inhalation of gases and of tar-vapour, to respirators, probangs, St. John Long and Prince Hohenlohe, to tar-water, digitalis, white mustard-seed, prussic acid,

which it is difficult, if possible, to distinguish from the first cough of consumption: this is the short, dry cough of hysteria, which is a modification of globus hystericus; and I have known many cases of chronic bronchitis so aggravated by hysteric complication, as to give rise to suspicion of phthisis, slight hæmoptysis even having taken place, or sometimes vicarious of catamenia, and not slight,* but curable by diluted sulphuric acid and the treatment recommended in p. 44.

To the *idiopathic hæmoptysis* Laennec gave a name which, however it may be criticised, served at least as a marked distinction from the phthisical hæmoptysis: he called it *apoplexy of the lungs*. This sometimes arises from an accident, such as a severe blow on the chest, &c., or from a spot of inflammatory disease causing the vessels to pour out blood,

cod-liver oil, &c., as remedies for consumption. Faith is a wonderful thing: it can remove mountains, but not tubercles.

* In this work my object is to give generally useful information, rather than rare and curious cases, though I have abundance of them on record, which may not occur to any man twice in his lifetime. These curiosities, which students are always running after, afford but little practical information. I may mention, however, a couple of cases of strumoid tumours in the chest, like enlarged glands, of a substance resembling pancreas, giving symptoms of phthisis, all except perfect pectoriloquy, but strong bronchophony by their solid interposition. In one of these cases death was caused by another disease: one of them proved fatal, rather from enormous bulk of the tumours encroaching on the thoracic viscera, than any inflammatory or malignant disease: one of the masses was five inches in diameter. Another similar case, which has deceived several practitioners, I have still under surveillance.

and this blood diffuses itself into a greater or less portion of the lung, besides what escapes and is spit up. In these cases there is crepitation as in peripneumonia and in peripneumonia notha, and more or less dulness on percussion, in some instances very considerable. Three old medical friends of mine lived for respectively fifteen, twenty-five, and forty years, after an occurrence, or rather repeated attacks of this kind; a relation, who died at the age of seventy, had had slight hæmoptysis at intervals of from three to seven years during his whole life, after the age of seventeen; yet not one of these were phthisical. I know several others living who have had severe spitting of blood, and yet are not consumptive.

Hæmoptysis frequently arises in consequence of disease of the heart when there is congestion of lung produced either by obstructive valvular disease, or when a weak heart has not power to send forward the blood (p. 83), the result being in either case accumulation of the fluid which ought to pass forward.

The treatment is perfectly simple: entire and absolute repose in a reclining, not quite horizontal position, not to speak, to drink freely of "mineral lemonade," which is made with water, sugar, lemon-peel, and diluted sulphuric acid instead of lemon-juice; and if there be much cough, to allay it with morphia. If the patient be plethoric, or if there be pain or hardness of pulse, or at any rate if the hæmorrhage be obstinate, venesection or leeches, followed by a large tepid poultice to the chest: a poultice to the chest is most useful, as in all cases of inflammation therein. As above stated, Laennec called

this disease apoplexy of the lungs, from the clots of blood found in fatal cases, resembling the clots found on the brain in fatal cases of apoplexy; the name may be criticised ("there are spots on the sun"), but is very expressive. Adieu, persevering, candid, immortal Laennec!

"Primo dicte mihi summo dicende" libello.

THE END.

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