The pathology and treatment of pulmonary consumption : and the local medication of pharyngeal, laryngeal, bronchial and nasal diseases mistaken for, or associated with, phthisis.

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John Knott, M.D.
(November 17, 1904.)

THE

PATHOLOGY AND TREATMENT

OF

PULMONARY CONSUMPTION;

AND

THE LOCAL MEDICATION OF PHARYNGEAL, LARYNGEAL, BRONCHIAL, AND NASAL DISEASES MISTAKEN FOR, OR ASSOCIATED WITH, PHTHISIS.

BY

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SECOND EDITION,

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TO

P. C. A. LOUIS, M.D.,

PHYSICIAN TO THE HOTEL DIEU; PERPETUAL PRESIDENT OF THE MEDICAL SOCIETY OF OBSERVATION, PARIS; MEMBER OF THE IMPERIAL ACADEMY OF MEDICINE, ETC., ETC.

My Dear Sir,

In the last edition of your admirable work on Phthisis, you observe: "The study of phthisis under the present point of view—that of its curability—has as yet made but little progress, and consequently does not at the present day possess all the interest which ought to belong to a subject of such great importance. In the cases of cure hitherto known, the morbid state has always been very limited in extent, and this limitation has not been the result of any circumstance which, although fortuitous, was still appreciable, and hence more or less easily producible at will in other cases, but the effect, no doubt, of circumstances peculiar to each individual case. The nature of these circumstances is at the present hour utterly unknown, and to the steady investigation of

them medical observers should henceforth sedulously apply themselves."—(*Sydenham Society's Translation, by Walshe, pp.* 475, 476.)

In following out the recommendation thus given, I have collected facts which prove that a cure may occasionally take place, although phthisis has existed to a very great extent; and from a consideration of these facts, I have endeavoured to approximate towards, if not completely to arrive at, a knowledge of the circumstances which produce a permanent arrestment of the malady. For these reasons you will perhaps excuse my dedicating this work to you—a liberty to which I am impelled as much by the kindness I have personally experienced at your hands, as by the distinguished reputation which you have achieved in medicine.

With the utmost respect and regard,

I remain, my dear Sir,

Yours very sincerely,

J. HUGHES BENNETT.

EDINBURGH, 1, GLENFINLAS STREET,
October 1859.

PREFACE TO THE SECOND EDITION.

THE object of this work is not to give a systematic treatise or a complete Monograph on Pulmonary Consumption, but to point out what, in the Author's opinion, is the true pathology and most successful treatment of that formidable disease. So numerous and so excellent are the books which have been written on this subject, that he has thought it necessary simply to explain the views which have governed his own practice, and the good effects which have resulted from it. He by no means wishes that his little treatise should be compared with such admirable productions as that of M. Louis, on Phthisis, or that of Mr Ancell, on Tuberculosis. He is only anxious to press as strongly as possible on the notice of the Profession and on the attention of the Public, his firm conviction that the facts he has recorded should incite both practitioner and patient to carry out a curative rather than a palliative treatment. Since he first introduced Cod-Liver Oil to the serious attention

of his medical brethren as a remedy for Pulmonary Consumption, in the year 1841,—up to which time it had not been employed in this country for that purpose,[1]—it has been very generally admitted that this substance constitutes a valuable addition to our list of remedies; and the enormous traffic which has since been established in it for medicinal use, is a sufficient proof that his writings, teaching, and practice, have not failed in effect. He begs to return his best thanks to those numerous professional friends who, both publicly and privately, have encouraged his scientific[2] and practical efforts to demonstrate that the resources of Medical Art are fre-

[1] In reference to the statement here made, the Author has great satisfaction in quoting the following passages, from a well-known work of high authority :—" Cod Oil was recommended in England by Dr Percival, as useful in the treatment of Chronic Rheumatism, in 1771. But to Dr J. H. Bennett belongs the high honour of having clearly pointed out its remarkable efficacy in Tubercular diseases, in his *Treatise on the Oleum Jecoris Asselli*, published in 1841."—*An Essay on the Action of Medicines.* By Frederick William Headland. London, Second Edition, 1855, p. 335.

[2] " The theories of Buffalini, Canstatt, Mr Simon, and Dr Hughes Bennett, undoubtedly approximate more closely to the real question of the essential nature of the disease than either of the others, ancient or modern. There is also no doubt that the whole, however theoretical, and however, in some points, they may differ from each other, are founded upon the facts of modern science. After all the attention I have been able to bestow upon the subject, I have no hesitation in declaring my opinion, that Dr Hughes Bennett has advanced the farthest in this investigation; and I believe that the pursuit of the inquiry in the direction indicated by these pathologists, and especially by the latter, will ultimately lead us to a knowledge both of the *modus operandi* of the causes, and of the essential nature of the disease."—*A Treatise on Tuberculosis, the Constitutional Origin of Consumption and Scrofula.* By Henry Ancell. London, 1852. P. 571.

quently capable of checking Phthisis; and he trusts that the whole Profession will soon be prepared to admit that Pulmonary Consumption ought no longer to be considered as one of the *opprobria medicinæ*. At no distant day he hopes to see a repeal of those rules which, on the ground that their cases are incurable, have prevented the access of all consumptives to certain public hospitals and other charitable institutions.

In the present edition, the Author has substituted the word Consumption for that of Tuberculosis, because pathologists have recently limited the latter term to the blood disorder, or constitutional origin of the local disease. He has introduced a Chapter on Diagnosis, with a view of drawing the attention of his medical brethren to three points which may serve, in difficult cases, to render the malady recognisable with greater certainty and precision. He has throughout added many new observations, and inserted additional cases, confirmatory of the success which has attended the analeptic or restorative treatment. Lastly, he has dwelt at greater length on the advantages of topical applications to the pharynx and larynx—has alluded to the novel proposition of bronchial injections,—and pointed out what he believes no writer has hitherto noticed, viz., the importance, in some cases, of examining and treating locally, diseases of the nasal passages.

J. HUGHES BENNETT.

EDINBURGH, 1 GLENFINLAS STREET,
October 1859.

PREFACE TO THE FIRST EDITION.

In the years 1839–40 the Author found a remedy administered in the hospitals of Germany in cases of Pulmonary Consumption, which had never been employed in his own country for that disease, although it had been successfully used there in Rheumatism. This was Cod-liver Oil. He could not fail to be struck with the marked benefits which resulted from its employment in patients who, had they been treated in British hospitals, would certainly have died. In 1841, therefore, he published a Monograph, giving an account of what was then known concerning that substance, and recommended it to his countrymen, from theoretical and practical considerations, as a valuable remedy in Phthisis Pulmonalis.

For five years (1843–1848) the Author held the position of Pathologist to the Royal Infirmary of this city, during which period he performed and recorded the results of upwards of 2000 post-mortem examinations. Gradually one great fact became impressed upon his mind, viz., that all organic diseases occasionally presented a tendency to spon-

taneous cure. He was repeatedly meeting with instances where, although death was occasioned by disease in one organ, there were others which presented traces of previously existing lesions which in some way had healed. In no organs were such appearances more common than in the lungs, and of no disease was evidence of a spontaneous cure more frequent than of Pulmonary Consumption.

Although it was generally considered by the profession that no remedy and no plan of treatment yet proposed could be depended on in cases of consumption, it was obvious to the Author that if the process employed by nature could be discovered, and then imitated by art, we might ultimately arrive at the true principle of cure. Whenever, therefore, decided and unmistakeable evidence of a spontaneous cure came before him, he carefully studied the circumstances which preceded it; and connecting these with the numerous observations which were simultaneously going on, as to the good effects of Cod-liver Oil, he was gradually led to the rules of treatment which are developed in the following pages. These he has tested on a large scale in hospital and private practice. They have also been extensively tried by others who have followed his suggestions, so that he can now confidently recommend them to his professional brethren.

It may happen, however, that the practical rules and the principles on which they are founded are no longer new to some who may read the following pages. This will be accounted for if it be remembered that during the last twelve years the Author has published various papers in connection with Tubercle and Pulmonary Consumption, the substance of

which is embodied in the present work.[1] For the last eleven years also he has been constantly engaged in giving lectures, both on the Theory and Practice of Medicine, systematically and clinically, and has naturally communicated to his pupils the various facts and views now set forth, as they were gradually arrived at or reached maturity in his own mind. Further, it may be observed in some places that the language and ideas are similar to those long since published in certain Reviews, which have appeared in the "Monthly Journal of Medical Science;" and whenever these are identical, it may be assumed with truth that he is the writer of those Reviews.

[1] The Author is not disposed to enter into controversy with regard to a mere question of priority; but with the object of regulating any discussion on this point, should it arise, he appends a list of his contributions to the pathology and treatment of consumption, with the dates of their publication.

1. *Treatise on the Oleum Jecoris Asselli or Cod-liver Oil, as a Therapeutic Agent in certain forms of Gout, Rheumatism, and Scrofula, with Cases.* London and Edinburgh. 1 vol. 8vo. 1841.

2. *Description of a Cryptogamic Plant found Growing in the Sputa and Lungs of a Man who laboured under Pneumothorax.*—"Transactions of the Royal Society of Edinburgh." 1842.

3. *On the frequent Spontaneous Cure of Pulmonary Consumption, and the indications furnished by Pathology for its Rational Treatment.* —"Edinburgh Medical and Surgical Journal." 1845.

4. *On the Minute Structure and Chemical Composition of Tubercular Deposits.* 6 Woodcuts.—"Northern Journal of Medicine." 1846.

5. *On the Elementary Forms of Disease.* Woodcuts.—"Monthly Journal of Medical Science." 1846.

6. *On the Structural Relation of Oil and Albumen in the Animal Eco-*

In 1849, Dr C. T. B. Williams, of London, published a paper on the treatment of Phthisis Pulmonalis by Cod-liver Oil, in which he confirmed all that the Author had stated eight years previously as to the therapeutic effects of that remedy. Dr Williams also adopted the molecular theory of its action which the author published in November 1847. Unfortunately, in adopting his theory as well as practice, Dr Williams seems to have imagined that he had arrived at some-

mony, etc.—"Read to the Royal Society of Edinburgh," 19th April 1847; "Proceedings of the Royal Society of Edinburgh, 1846–7;" and "Monthly Journal of Medical Science," September 1847.

7. *Appendix to the Treatise on the Oleum Jecoris Asselli.* 8vo. November 1847.

8. *On Cancerous and Cancroid Growths.* 1 vol. 8vo. Numerous Woodcuts. Edinburgh. 1849. See pp. 195–7 and pp. 204–6.

9. *On the Course of Tubercle in the Lungs.*—"Monthly Journal of Medical Science. 1849.

10. *On Simple Tubercular and Cancerous Exudations—their Pathology and General Treatment.*—"Monthly Journal of Medical Science," February 1850.

11. *On the Treatment of Phthisis Pulmonalis.* 2 Coloured Plates. —"Monthly Journal of Medical Science." 1850.

12. *Report on the Cases of Pulmonary Diseases treated in the Clinical Wards of the Royal Infirmary during the latter half of the Summer Session* 1851.—"Monthly Journal of Medical Science," December, January, and February. 1851–52.

13. *Illustrations of Laryngeal and Pharyngeal Diseases, which are frequently mistaken for, or associated with, Phthisis Pulmonalis.*— "Monthly Journal of Medical Science," December 1852.

thing new—a conclusion which, as it has been very ably dealt with by a critic in the "Dublin Quarterly Journal of Medical Science" for May 1850,[1] demands no further notice. There can be no doubt, however, that Dr Williams' confirmation of the Author's experience (although tardy), still further supported by an able Report of the Medical Officers of the Brompton Consumptive Hospital in 1851, and the concurrent testimony of several Hospital Physicians, tended to extend the confidence of the profession in its use, which has since become as general in England as it had long previously been in Scotland.

Any well-informed medical practitioner who looks back on the treatment of Phthisis as it existed ten years ago, and compares it with the practice recommended in this work,

[1] "Dr Williams has added his experience to the existing stock of information concerning the value of this oil in phthisis, and has thereby given weighty confirmation, from his well-known skill in thoracic physical diagnosis, to the already received opinion among enlightened members of the profession; and we should not have thus early entered into an examination of certain parts of his paper, bearing upon the early use of the oil, were it not for the purpose of removing an impression likely to be produced by them, injurious to the just claims of Dr Bennett, as the prime promoter of its use in these countries. It was enough punishment for the introduction of one of the very greatest therapeutic agents of the age—one which has, we confidently believe, permanently extended our power over the most fatal and the most frequent of human maladies—to have been scoffed at by the critics for having taken such pains in introducing to the notice of his brethren any *single* therapeutic agent, not being, moreover, a remedy of *delicate use*, in regard to which minute details might be justifiable, the effects of which, too, were either indeterminate or unsatisfactory. It was enough to be satirized for conferring the benefit, without being forgotten when the benefit became patent and recognised by all. This is a double injustice, which it is impossible for any man to deserve, and against which, while we undertake the responsibility of criticism, we shall ever raise our voice," p. 419.

must come to the conclusion that the one is essentially different from the other. The Author has attempted to show, 1st, That Tubercular diseases will heal of themselves, if the faulty nutrition of the system can be removed; 2dly, That, with this object, our efforts should be directed to the digestive rather than to the respiratory system; and 3dly, That the kind of abnormal nutrition which exists is dependent on increased assimilation of the albuminous, and diminished assimilation of the fatty portions of the food. Hence he recommends that the general plan of treatment should be to cause the reception of the deficient elements of nutrition, and therefore that it should not be tonic nor stimulating, but *analeptic* (from *αναλαμβανω*, to restore). With regard to the symptomatology, morbid anatomy, and diagnosis of Pulmonary Consumption, he has nothing to add to the many masterly works which treat of those parts of the subject, and consequently he has not entered into them further than was necessary to evolve the principles on which he considers a correct treatment should be based. But if he has been fortunate enough to show that such treatment is founded on a true pathology, and that a class of diseases which destroys one-sixth of the population in this country may in any way be alleviated, he leaves to the candour of his medical brethren the question of how far he has been instrumental in effecting it.

JOHN HUGHES BENNETT.

EDINBURGH, 1, GLENFINLAS STREET,
Sept. 22, 1853.

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ON PULMONARY CONSUMPTION.

CHAPTER I.

PATHOLOGY OF PULMONARY CONSUMPTION.

It has been noticed by many observing physicians, and especially by Sir James Clarke, that phthisis pulmonalis is ushered in with a bad and capricious appetite, a furred or morbidly clean tongue, unusual acidity of the stomach and alimentary canal, anorexia, constipation alternating with diarrhœa, and a variety of symptoms denominated dyspeptic, or referable to a deranged state of the primæ viæ. Moreover, it can scarcely be denied that, in the great majority of cases, these are the symptoms which accompany phthisis throughout its progress, becoming more and more violent towards its termination. Now, as the nutritive properties of the blood are entirely dependent on a proper assimilation of food, and as this assimilation must be interfered with in the morbid conditions of the alimentary canal, the continuance of such conditions necessarily induces an impoverished state of that fluid, and imperfect growth of the tissues. When, under such circumstances, exudations of the liquor sanguinis occur, they are very liable to assume the form of tubercles, and if they are poured into the lungs, there are then produced those changes and that condition which have been denominated pulmonary consumption.

The term tubercle is of Latin derivation, and literally implies a little swelling. In this sense it is still used by dermatologists, and serves to distinguish a class of skin diseases. The same name was unfortunately applied to the rounded masses so frequently found in the lungs or other organs. It

has also been employed to characterise the same substance when infiltrated in masses, or under circumstances where its original signification cannot apply. At present, tubercle is generally considered to be a peculiar morbid deposit, sometimes grey, but more frequently of a yellowish colour, varying in size, form, and consistence, which sooner or later undergoes a process of softening.

This definition of tubercle is very vague, and may be applied to various kinds of exudation which materially differ from each other. Indeed every morbid anatomist must frequently have experienced much difficulty in endeavouring to determine by the naked sight whether a certain morbid deposit be or be not tubercle. With a view to establishing a correct pathology therefore, our first efforts must be directed to determine what tubercle really is; how it can be accurately separated from the ordinary products of inflammation on the one hand, and from other morbid growths on the other. To arrive at these points we must inquire into the minute structure and chemical constitution of this substance.

SECTION I.

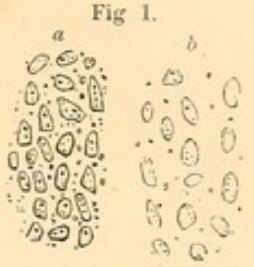
Histology of Tubercle.

Tubercle has been spoken of as presenting a miliary infiltrated, or encysted form; but these distinctions have no reference to structure, but merely to the extent and age of the exudation. It generally presents a yellowish or dirty white colour, and varies in consistence from that of a substance resembling tough cheese to that of cream. Sometimes it is soft at one place and indurated at another. On section, when tough, it presents a smooth or waxy, and when soft, a slightly granular, surface. On pressure it is friable, and may break down into a pulpy matter, but never yields a milky juice.

A small fragment of tolerably firm miliary tubercle, squeezed between glasses with a drop of water, and examined under a magnifying power of 250 diameters linear, presents a number of irregularly shaped bodies, approaching a round, oval, or triangular form, varying in their longest diameters from the

$\frac{1}{4000}$ to the $\frac{1}{2000}$ of an inch. These are the so-called *tubercle corpuscles.* They are composed of a distinct wall, containing generally three or more granules, without any distinct nucleus, and are mixed with numerous granules and molecules, varying in size from a point scarcely measurable, to the $\frac{1}{6000}$ of an inch in diameter (Fig. 1, *a*). If we add to these bodies a drop of weak acetic acid, all the corpuscles become more transparent, but are otherwise unchanged, and many of the granules disappear, as in Fig 1 (*b*). Æther and alcohol produce little change. Ammonia partially dissolves the corpuscles, and renders them capable of being easily broken down. They are immediately and completely dissolved in a solution of potash.

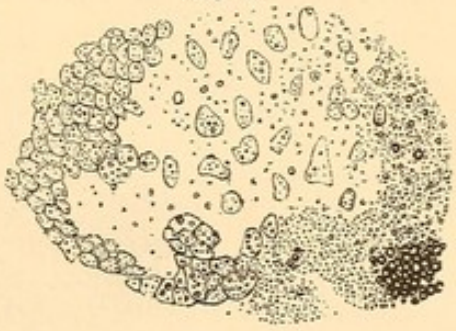
Fig 1.



Tubercle corpuscles from the peritoneum. *a.* The same after the addition of acetic acid.

Again, if we simply squeeze a portion of soft yellow tubercle between glasses, and examine it with a like magnifying power, we shall see similar corpuscles, mixed with numerous molecules and granules, as in Fig. 2. Sometimes softened tubercle seems partially or wholly composed of a granular matter. At others, we only observe it to be molecular, the molecules being exceedingly minute. In some forms of tubercle, the corpuscles are much larger and rounder than they are represented in Fig. 2, still, however, preserving their peculiar character, as in Figs. 3 and 4. In this manner, they approach in form to the corpuscles observed in scrofulous pus.

Fig. 2.



Tubercle corpuscles, granules, and molecules, from a soft tubercular mass in the lung. 250 diameters linear.

Fig. 3.

Fig. 4.

Fig. 3. Tubercle corpuscles from a mesenteric gland. Fig. 4. Scrofulous pus from a lymphatic gland. 250 diameters linear.

The grey semi-transparent granulation is of semi-cartilagi-

nous hardness, and presents to the eye a very different appearance from ordinary tubercle. On making a thin section

Fig. 5.

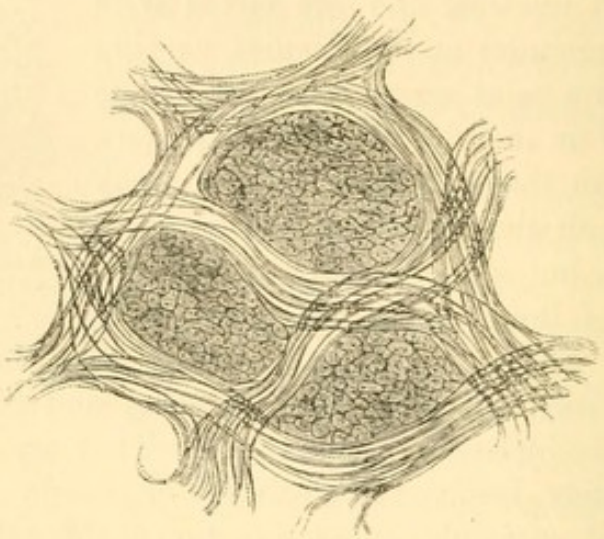


Fig. 5. Section of a grey granulation in the lung after the addition of acetic acid, showing the pulmonary air vesicles filled with tubercle corpuscles. 250 diam. linear.

Fig. 6.

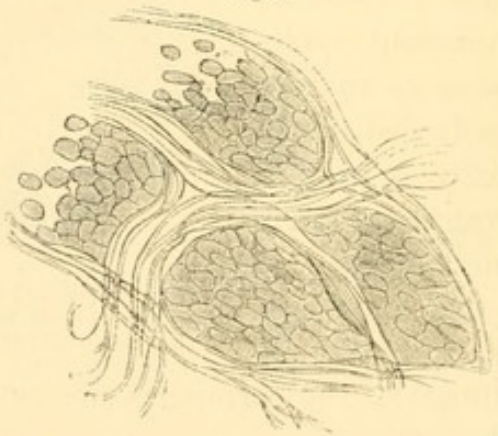


Fig. 6. Section of a firm yellow miliary tubercle of the lung. 250 diam. linear.

of it, however, it will be found to be composed of similiar elements, although more transparent and not so well defined. The addition of acetic acid, by rendering the fibrous tissue more transparent, and dissolving the granules, will permit the same corpuscles to be seen in it as are represented in Fig. 1.

When tubercle presents the cretaceous or calcareous transformation in any degree, the different elements we have described become mixed up with hard gritty particles of earthy

salts. These are of irregular form and size, and are larger and numerous in proportion as the tubercle is more and more calcareous. Crystals of cholestrine may also frequently be seen in cretaceous concretions (Fig. 7). When tubercle is converted into a mass of stony hardness, a thin section presents a granular appearance, made up of a congeries of minute earthy particles, without any distinct form. We frequently find tubercle conjoined with more or less pigmentary matter. This usually appears under the microscope in the form of irregular black masses (Fig. 8, *a*), which are composed of exceedingly minute molecules (*b*). These molecules may be occasionally seen infiltrated into many of the tissues, and among morbid deposits, especially tubercle. They often surround the minute tubercles deposited on the surface of the peritoneum, as in Fig. 8. Their occurrence in considerable masses round chronic tubercle in the lung or bronchial glands, is almost uniform, giving a black or bluish tinge to the tissues. Indeed, it may be said that the older the tubercle, the greater is the amount of pigmentary matter surrounding it. In the lungs and bronchial glands, however, the black pigment, although it resembles that observed in the peritoneum morphologically, differs from it chemically. In the former case, it is pure charcoal, and indestructible by all chemical reagents; whereas, in the latter, the colouring matter disappears under the action of mineral acids, and an immersion for some time in alcohol. A portion of intestine sprinkled over externally with miliary tubercles, surrounded by a black ring, one of which is represented magnified 250 diameters (Fig. 8), was put up by me in alcohol as a prepara-

Fig. 7.

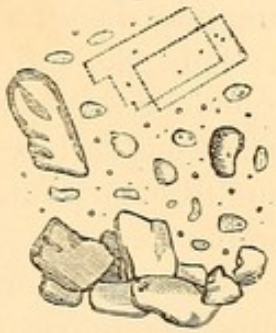


Fig. 7. Fragments of phosphate of lime, crystals of cholestrine, and tubercle corpuscles, from a cretaceous mass in the lungs.

Fig. 8.

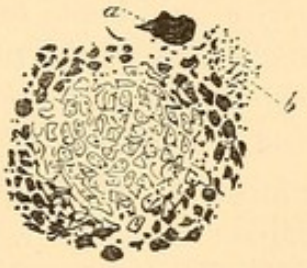


Fig. 8. Corpuscles mixed with pigmentary matter, in a small tubercle taken from the peritoneum. (*a*), Irregular masses of black matter, which may be broken down into (*b*) granular and molecular matter. 250 diameters linear.

tion, and in three weeks the black pigment had entirely disappeared.

Tubercle corpuscles may be associated with pus and granule cells, as well as those peculiar to glandular organs or mucous surfaces in various stages of fatty transformation and disintegration. With all these they have frequently been confounded.

From what has preceded, it must be evident that tubercle presents different appearances, according as it is hard or soft, cretaceous or calcareous. When recent and hard, the corpuscles are crowded together, and the granules accompanying them are comparatively few in number. When soft, the number of granules is much increased, and the corpuscles are easily separated. Lebert[1] is of opinion that at first the corpuscles are kept together by an intermediate substance, which afterwards softens. We can only regard this interglobular substance as the blastema in which the corpuscles are formed. The softening, then, is more probably owing to the development and breaking down of the latter, similar to what we observe in inflammatory exudations generally.

Gulliver[2] and Vogel[3] agree in saying, that at an early period, more especially when in a miliary form, nucleated cells may be observed in tubercular matter. This is denied by Lebert, and I must confess that I have never been able to discover nuclei in the corpuscles of tubercle. They appear to me to be nuclei themselves, which are formed slowly, and have no tendency to produce cells, before they break down into a molecular matter. Hence no danger is to be apprehended from the spread of tubercle itself by an inherent power of growth, and if fresh deposits could be prevented, the tendency of this substance to disintegration, is highly favourable to its absorption. Schroeder Van der Kolk also supposes them to be nuclei; but considers that they result from the disintegration of epithelial cells in the ultimate

[1] Physiologie Pathologique, p. 527, *et seq.*

[2] Gerber's Anatomy, Appendix, p. 85.

[3] Icones Histologicæ, Tab. 4.

bronchi and air-vesicles—a view which seems to me negatived by the fact that they occur in textures destitute of epithelium,

Fig. 9.

Fig. 10.

Fig. 9. Structure of the central portion of a tubercular mass, embedded in the cerebellum. Fig. 10. Structure of the external portion of the same mass, where it was in contact with softened cerebellar substance. 250 diameters linear.

as in the substance of the brain (Figs. 9 and 10), and in the centre of peritoneal exudations.

Virchow[1] considers that the tubercle corpuscles originate in the interior of cells, whether of epithelium or of fibrous tissue. It is well known that the many nucleated cells may occasionally be seen in conjunction with every kind of morbid product. But they are so frequently absent, and when present are so few in number, as to render it highly improbable that tubercle is the result of endogenous cell formation.

Numerous instances occur in which it is utterly impossible to distinguish tubercle from fibrinous exudations on the one hand, or cancerous growths on the other, except by paying attention to the minute structure previously described. I have often been deceived in endeavouring to determine this by naked sight, and found, on a microscopic examination, that so-called tubercular masses were composed of filaments more or less mixed up with plastic or granule corpuscles. Again, not unfrequently tubercle has been mistaken for cancer, or the latter for the former. If, then, we are asked to determine what is positively tubercle, as distinguished from all other morbid products, we must answer—that deposition which is composed of the peculiar corpuscles and granules described and figured in the preceding pages. From pus corpuscles they are readily distinguished by the action of acetic acid, which

[1] Die Cellular Pathologie. 1858.

in them causes no granular nucleus to appear. From plastic corpuscles they may be separated by their irregular form, smaller size, and the absence of primitive filaments. With the granular corpuscle they can scarcely ever be confounded, on account of its large size, brownish or blackish colour, and nucleated or granular structure. The cells of cancer are large, transparent, and distinctly nucleated, and consequently easily distinguished from the small, non-nucleated corpuscles of tubercle. The general characters of these different corpuscles will be gathered from a glance at the accompanying figures

Fig. 11. Fig. 12. Fig. 13 Fig. 14. Fig. 15.

Fig. 11. Tubercle corpuscles from the lung. Fig. 12. Pus corpuscles. One shows the double granular nucleus after the addition of acetic acid. Fig. 13. Plastic or Pyoid corpuscles. Fig. 14. Granule corpuscles from cerebral softening. Fig. 15. Cancer cells from the uterus. 250 diameters linear.

The only other structure likely to be confounded with tubercle is the reticulum of cancer, which not only presents a yellowish appearance closely resembling it, but is composed of nuclei and molecular matter, resulting from the disintegration of cancer cells. But, as this reticulum is always associated with cancerous formation, it may at once be distinguished by the cell elements which accompany it. It should be further noticed, that every form of exudation, at a certain period, presents a molecular and granular structure throughout, and that then it becomes impossible to determine its nature, unless it be associated with the more characteristic elements distinctive of the simple, tubercular, or cancerous exudations.

Fig. 16.

Fig. 16. Corpuscles, etc., in the reticulum of cancer. 250 diam.

As regards chemical composition, Dr Abercrombie[1] showed

[1] Medico-Chirurgical Transactions of Edinburgh, vol. i., p. 887.

that a mass of tubercle, on being plunged into boiling water, contracted, and became more dense and firm, when it presented all the characters of coagulated albumen. This was well observed in the mesenteric glands, which, when only slightly affected, lost a considerable amount of their weight. This loss became less and less as the tubercular deposition increased, until at length the whole gland appeared to be converted into solid coagulated albumen, and scarcely lost any of its weight by boiling.

Dr Abercrombie observes, "the deposition of albumen, therefore, in these glands, appears to be a process of disease. In the early stages of the disease it seems to be deposited in a soft state, and to be involved in the structure of the gland; the gland, in other respects, being vascular and organised, and probably capable of performing its functions. It is in this state that we see the albumen coagulated, when the gland is plunged into boiling water, producing so immediate and remarkable a change in its appearanee and texture. As the disease advances, the proportion of albumen seems to increase, while, at the same time, it assumes a more concrete state, and the mass in general becomes less vascular and less organised, In the last stage, the vascular structure of the gland seems more and more to disappear, until it passes into a mass presenting the properties of coagulated albumen, with little or no organisation."

Tubercle has farther been made the subject of special analysis by Thénard,[1] Hecht,[2] Lassaigne,[3] Preuss,[4] Gueterboeck,[5] Wood,[6] Simon,[7] Scherer,[8] Felix Boudet,[9] Wright,[10]

[1] Andral. Precis d'Anatomique Pathologique, t. i., p. 417. 1829.

[2] Traité d'Anatomie Pathologique, 1829, t. i., p. 378.

[3] Dupuy, Journal Prat. de Med. Veterenaire, 1838, p. 98.

[4] Tuberculorum pulmonis crudorum analysis chemica. Dissert. Berol, 1835.

[5] De pure et granulatione. Berol, 1837.

[6] De puris natura atque formatione. Berol, 1837.

[7] Animal Chemistry, 1842. Trans. by Day, 1846, vol. ii., p. 478.

[8] Jahresbericht von Canstatt, 1844. Leistungen in der Pathologischen Chemie von Scherer.

[9] Bulletin de l'Acad. Roy. de Medecine, t. ix., p. 1163.

[10] Medical Times, vol. ii., pp. 418, 419.

and especially by Dr Glover of Newcastle.[1] From these various analyses, the following conclusions may be drawn :—

1st, That tubercle consists of an animal matter, mixed with certain earthy salts.

2d, That the relative proportion of these varies in different specimens of tubercle. That animal matter is most abundant in recent—and earthy salts in chronic tubercle.

3d, That the animal matter certainly contains a large amount of albumen. Some chemists have also detected caseine, the existence of which is probable ; others gelatine, the presence of which is more doubtful. The statement of Gueterboeck, that it contains a peculiar animal matter (phymatine), has not been confirmed by other analysts. Fibrin and fat exist in small but variable proportion, as a constituent of tubercle, the latter increasing as the disintegration of the tubercle progresses.

4th, The earthy salts are principally composed of the insoluble phosphate and carbonate of lime, with a small proportion of the soluble salts of soda. The statement of Boudet, that cretaceous concretions are principally formed of the latter, is directly opposed by other chemists, and is quite incompatible with their long persistence in the body.

5th, That very little difference in ultimate composition has yet been detected between recent tubercle, and other albuminous compounds.

SECTION II.

The Nature of Tubercle.

If, from the histological facts previously stated, we seek to deduce the nature of tubercle, it can scarcely be doubted that it is an exudation of the liquor sanguinis, but one which presents marked differences from the simple or imflammatory exudation on the one hand, and the cancerous exudation on the other. Thus :—

[1] Pathology and Treatment of Scrofula, 1846, p. 54, *et seq.*

We observe, in a simple or inflammatory exudation, that it may occur at all epochs in life; that it may attack all tissues, and most commonly those which are very vascular; that it may be poured out in large or small quantities; and that it may occur with greater or less rapidity—hence the terms acute and chronic. We further observe, that the acute exudations are generally attended with symptoms of a peculiar character (inflammatory), and have a great tendency to cell or temporary formations, which rapidly break down, are absorbed, and excreted by the emunctories: that the chronic exudations, on the other hand, have a tendency to fibrous or permanent formations, producing adhesions, strictures, hypertrophies, etc.

We observe, in a cancerous exudation, that it occurs for the most part in persons of adult or advanced life; that it may also occur in every tissue, but is by far most common in glandular or fatty organs, such as the liver or female mamma, and is very apt to attack the lymphatic glands *secondarily;* that its progress, although sometimes slow when very fibrous, becomes rapid when corpuscles abound in it; that there is a great tendency to the formation of the most perfect forms of cell life, which have the power of self-development, and thereby of spreading to neighbouring tissues; and lastly, that when, by pressure, ulceration is produced on free surfaces, it bursts through these in exuberant fungoid excrescences.

We observe, in a tubercular exudation, that it occurs for the most part in young subjects, between the periods of dentition and of adult age; that it may also occur in all tissues, but is by far most common *primarily* in the lymphatic glands, and afterwards in fibrous or albuminous textures, as the lungs and serous surfaces; that its progress is generally exceedingly slow; that there is no disposition to the formation of perfect cell-formation, but rather to abortive corpuscles, which form slowly, and slowly break down; that there is little tendency to absorption, but great liability to disintegration and ulceration; and finally, that the local changes are almost always preceded by derangement of the primæ viæ, and a group of symptoms known under the name of dyspepsia.

Taking, then, the products of simple inflammation (say pus) as a standard, we cannot fail to remark, that whilst the vital cell development of tubercle is below, that of cancer is above, this standard. Of the three kinds of exudation, tubercle is the lowest, and cancer the highest, in the scale.

On what this difference in the formative power of the exudation depends, we are ignorant, but every kind of reasoning must lead us to the conclusion, that these different changes and effects depend, not upon the vascular system, which is the mere apparatus for the production of exudation; not upon the nervous system, which conducts impressions to and from this apparatus; and not on the texture, which is the seat of the exudation, as that varies, whilst the cancerous or tubercular formation is the same—but on the inherent composition or constitution of the exudation itself. On this point most pathologists are agreed, and hence the supposed existence of various kinds of dyscrasiæ, originating in the blood, which, it is imagined, explain the different results produced. But here pathologists pause—having once traced these lesions back to the blood, they are content; and they have not sufficiently taken into consideration, that the blood itself is dependent for its constitution on the results of the primary digestion in the alimentary canal on the one hand, and the secondary digestion in the tissues on the other. Yet it must be evident to every physiologist, that if it be the constitution of the blood which determines that of the exudation, the causes which produce this must be sought in those circumstances which operate on the composition of the former fluid.

Now, numerous facts render it probable that while the blood is normal in simple exudation, it contains an excess of nutritive materials in cancerous, and a deficiency of them in tubercular, exudation. These are points, however, which can only be established after examining instances of such exudations in detail. But it must not be forgotten, in the meantime, that as the blood is continually undergoing changes; is receiving and giving off new matters, it can scarcely happen that it remains the same for many hours together. An exudation at one time may be very different from that at another.

At one period it may abound in elements which do not exist in it at the next. Hence it may often happen that a concurrence of circumstances is necessary to occasion a certain result. A cancer once formed may remain local until such a concurrence of events arises, comprising, first, a peculiar constitution of the blood; secondly, the phenomena leading to and producing an exudation; and thirdly, the occurrence of this exudation in some tissue or organ sufficiently predisposed for the purpose. Hence why the histologist is continually finding all kinds of intermediate formations between the three leading kinds of exudation, and why, even when the constitution is thoroughly tubercular or cancerous, simple exudations may be poured into tissues as the result of recent wounds or injuries. But, whilst a recent tubercular or a cancerous exudation may be found to accompany, or alternate with, a simple exudation, they are seldom met with together—a circumstance which still further points out the wide difference between the constitutional causes producing them.

The termination of all kinds of exudation may be the same, only each has its peculiarities. We have noticed the tendencies of simple exudation to be transformed into pus or fibres, according to its seat. In the former case, the pus cells break down, and are re-absorbed in a disintegrated and fluid condition into the blood; in the latter, permanent fibrous tissue is produced, constituting chronic adhesions or cicatrices. The cells of a cancerous growth may also degenerate or decay, but this rarely takes place throughout the whole structure. But it is not uncommon to find in certain encephalomatous tumours, yellow matter either in masses or reticulated through its substance—(*Cancer Reticulare of Müller*). This is generally owing to fatty degeneration of the cancer cells. The fibrous structure of cancer may also increase, and occasionally produce cicatrization. Tubercle possesses no such fibrous stroma; but is infiltrated among the elements of various organs, the vascularity of which it tends to destroy. This, indeed, is the reason why a cancerous tumour increases by growth, which tubercle cannot be said to do; the former is vascular, the latter is not: in the one, cells are formed which

have the power of re-development; in the other, no reproductive cells are produced. In cancer, the morbid matter circulating in the blood (whatever that is), is concentrated or attracted to the cancerous part, and should none afterwards be present, the healthy blood is made subservient to the purpose of nourishing a foreign growth. In tubercle, successive fresh exudations only are made, which, by their accumulation, augment the volume or amount of the morbid product.

All three forms of exudations may be rendered abortive by the animal matter being broken down and absorbed, while the mineral matter remains, constituting a cretaceous or calcareous concretion. This is not unfrequently seen as the result of simple exudation; is rare in cancerous, but very common in tubercular exudation.

During the disintegration of simple, cancerous, and tubercular exudations, the animal matter broken down is again rendered fluid, repasses into the blood, and there constitutes that excess of fibrin detected by chemists. The quantity of this will, of course, vary according to the amount of the exudation, and the activity of the disintegrating process. In the blood this effete matter undergoes a series of chemical changes, preparatory to its excretion by the different emunctories, but more especially by the kidneys, in the form of various sediments. The resolution of simple exudation is generally accompanied by the presence of such urinary sediments, which indicate pretty clearly in what way, after it has passed through various compositions and decompositions, it is at length discharged from the body. In the same manner the amount of these sediments frequently points out the extent of absorption going on in cancerous and tubercular exudations.

Another theory has been advanced regarding the various products of exudation as we have described them, viz., that instead of being new formations in an exuded blood plasma, they are only modifications of pre-existing texture. According to this view, pus cells are only altered epithelial ones, cancer cells are an increased development of gland or other cells, and tubercle corpuscles are a degeneration or "necrosis" of these.

This theory, though based on facts which seem to give it certain support, is opposed by so many others, that its fallacy is easily demonstrated. For instance, pus cells may occur in tissues where no epithelial cells exist, as among muscles, while cancer and tubercle both are found in the white substance of the brain where there are no cells to develop themselves in the one case, nor to degenerate in the other. I am also satisfied, from numerous researches extending now over a period of eighteen years, as well as from others recently undertaken, with the express view of determining the point, that pus, cancer, and tubercle corpuscles have no relation, as to their origin, in the many nucleated cells occasionally associated with them, as Virchow supposes. The truth is, that such cells, when present, are the results and not the causes of tubercular and other irritating diseases. As regards tubercle, I am glad to find that my own results are fully confirmed by those of Dr Radcliffe Hall of Torquay, who has also carefully examined this question.[1]

The views now advanced dispose of the disputes formerly so prevalent among pathologists as to the inflammatory or non-inflammatory nature of tubercle. If by inflammation be understood pain, heat, redness, and swelling, or the presence of lymph and pus, then certainly tubercle is not inflammatory. But if we consider inflammation to be an exudation of the blood plasma, then it, as well as lymph and cancer, are inflammatory products. The modern view of considering all these pathological states to be only different forms of exudation, is the only one which is consistent with our knowledge of existing facts, which reconciles past and present observations, and holds out general principles on which our treatment may be based. Indeed, the modern histologist would be at a loss to understand why so much importance should have been attached to the question of the inflammatory or non-inflammatory origin of tubercle, were he not aware that the former idea has been associated in the minds of practitioners with bleeding, low diet, and tartar emetic, as remedies.

[1] Brit. and For. Med. Chir. Review, vol. xv., p. 485, *et seq.*

In the same manner, the slightest consideration of tubercle as a coagulated exudation, must point out that it must have the same seat as all other exudations. It transudes in a fluid state through the capillaries, and collects in those places outside the vessels that offer least resistance. Thus, in the lungs, although a small portion may insinuate itself between the elementary fibres of the pulmonary structure, it will principally pass into the air vesicles, and by coagulating in them, obstruct the entrance of air. Hence numerous specimens in my histological collection show the tubercular to hold exactly the same position in the lungs as the simple and cancerous exudations.

If now we endeavour to inquire more particularly into the nature of that change in the blood which communicates to the exudations from it those peculiar characters we denominate tubercular, we must arrive at our knowledge from the results of physiological researches. Thus, a healthy nutrition of the body cannot proceed without a proper admixture of mineral, albuminous, and oleaginous elements. This may be inferred from the physiological experiments of Tiedemann and Gmelin, Leuret and Lassaigne, Magendie, and others; from an observation of the constituents of milk, the natural food of young mammiferous animals; from a knowledge of the contents of the egg, which constitute the source from which the tissues of oviparous animals are formed before the shell is broken; and from all that we know of the principles contained in the food of adult animals. The researches of chemists, such as those of Prout, Liebig, and others, point to the same generalisation, when they assert that carbonised and nitrogenised, or, as they are now called, respiratory and sanguigenous food, are necessary to carry on nutrition, inasmuch as oil is a type of the one, and albumen of the other, while the mineral matter is dissolved in both. The chemical theory is imperfect, however, because it does not indicate *how* these elements form the tissues; for it is not every form of carbonised or of albuminous food that is nutritious, but only such kinds of them as are convertible into oil and albumen.

The reason of this was first pointed out by Dr Ascherson,

of Berlin, in 1840, and made known by me to the profession in this country in 1841. I have since endeavoured to show,[1] that the elementary molecules formed of a particle of oil, surrounded by a layer of albumen, which are produced, as he described, by rubbing these two substances together, are not developed directly into blood-globules and other tissues, as he supposed, but must first pass through a series of transformations—a knowledge of which is highly important, not only to a comprehension of nutrition generally, but especially to that abnormal condition of it which occurs in phthisis. Thus the successive changes which are necessary for the purposes of assimilation in the healthy economy may be shortly enumerated as follows :—1st, Introduction into the stomach and alimentary canal of organic matter; 2d, Its transformation by the process of digestion into albuminous and oily compounds: this process is chemical; 3d, The imbibition of these through the mucous membrane in a fluid state, and their union in the termini of the villi and lacteals to form elementary molecules: this process is physical; 4th, The transformation of these, first, into chyle corpuscles, and, secondly, into those of blood, through the agency of the lymphatic glandular system: which is a vital process. It is from this fluid, still further elaborated in numerous ways, that the nutritive materials of the tissues are derived, so that it must be evident, if the first steps of the process are improperly performed, the subsequent ones must also be interfered with. Hence we can readily comprehend how an improper quantity or quality of food, by diminishing the number of the elementary nutritive molecules, must impede nutrition.

When we examine with a magnifying power of 250 diam. a drop of chyle taken from the thoracic duct of an animal, three hours after it has eaten a meal, we observe, that it contains, first, a molecular basis (Gulliver) of incalculably minute particles; and secondly, numerous corpuscles in different stages of development into blood globules. This molecular basis has

[1] On the Structural Relation of Oil and Albumen in the Animal Economy. Read to the Royal Society of Edinburgh, April 19, 1847.

been proved by chemical analyses to consist principally of fat, emulsionised by its admixture with albumen. In short, these two important principles, fat and albumen, constitute essential elements of the nutritive chyme; and the former divided into exceedingly minute particles by the latter, pass through the villi and form the milky fluid called chyle. It is unnecessary for me to trace the subsequent changes this chyle undergoes by its passage through the mesenteric glands, and the successive stages of elaboration produced in it by the operation of the blood glands, and the lungs. No one can doubt that the oil and albumen so derived from the food, and so altered chemically and mechanically in the body, constitute the material from which blood is formed; neither can there be any question that the presence and emulsionising of these elements in proper proportions, are absolutely necessary to supply and keep up the vital properties of the blood.

Fig. 17.

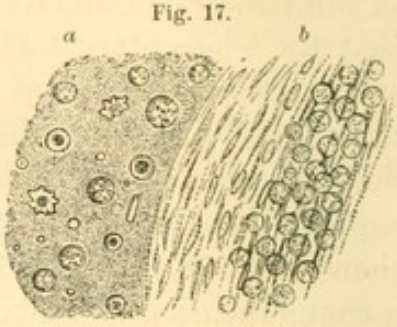


Fig. 17. Chyle from the thoracic of a dog three hours after eating a meal. *a*, Fluid chyle showing its molecular basis and corpuscles in various stages of development into those of blood. *b*, Corpuscles of chyle embedded in fibrillated fibrine. They are round in the centre, but more or less compressed and elongated towards the margin. 250 diam.

The peculiarity of phthisis, however, is, that an excess of acidity exists in the alimentary canal,[1] whereby the albuminous constituents of the food are rendered easily soluble, whilst the alkaline secretions of the saliva and of the pancreatic juice are more than neutralised, and rendered incapable either of transforming the carbonaceous constituents of vegetable food into oil, or of so preparing fatty matters introduced into the system, as will render them easily assimilable. Hence an increased amount of albumen enters the blood, and has been

[1] I have seized on many opportunities of testing the amount of acidity in the alimentary canal of persons dying from phthisis, and comparing it with what was observed in the bodies of those who died of other diseases. In this way I have several times demonstrated, in the Pathological Theatre of the Infirmary, that there existed a marked difference in the amount of intestinal acidity, between the phthisical body and that affected with other lesions.

found to exist there by all chemical analysts, while fat is largely supplied by the absorption of the adipose tissues of the body, causing the emaciation which characterises the disease. In the meanwhile, the lungs become especially liable to local congestions, leading to exudation of an albuminous kind, which is tubercle. This, in its turn, being deficient in the necessary proportion of fatty matter, elementary molecules are not formed so as to constitute nuclei capable of further development into cells, —they therefore remain abortive, and constitute tubercle corpuscles. Thus a local disease is added to the constitutional disorder, and that compound affection is induced which we call phthisis pulmonalis—consisting of symptoms attributable partly to the alimentary canal, and partly to the pulmonary organs.

One of the great difficulties in the pathology of phthisis as now brought forward, consists in the fact that whilst little fatty food enters the economy by the primary digestion, and the adipose tissue of the body disappears, fat is apt to be stored up in certain organs as the result of secondary deposition, especially in the liver. This fact, however, only proves that the formation of fat by the secondary digestion, and as a secretion of certain organs, like the liver and female mamma, are excretory products, and as such are, *per se*, incapable of being reabsorbed or of affording nutrition. In short, such fat must undergo those changes and that elaboration which the digestive functions produce, before it can be made available for the formation of good blood, which, in its turn, is only a preliminary step to healthy nutrition. There is every reason however to believe that the various fatty compounds are convertible into one another,—that fat, for instance, introduced into the alimentary canal, or formed from the starchy and saccharine parts of the food, are, through elaboration, transformed into the fat of the liver, cholesterine, margarine, butter, etc., etc., in which condition they constitute products to be excreted. But that these, introduced into the alimentary canal, acted upon by the juices of its various glands, and further changed by the blood glands, may again be resolved into elements capable of nutrition. The true chemistry and effects of vital changes on the fatty compounds, however, have

yet in a great measure to be worked out by micro-chemical research. In the meantime we may conclude with certainty—

1st. That an oily emulsion must be formed to constitute a proper chyle to be converted into blood.

2d. That in pulmonary and other forms of tuberculosis, this process is interfered with; so that,

3d. A depraved state of the constitution is induced, favourable to the deposition of tubercular exudation into various tissues, but especially into the pulmonary organs.

This theory was objected to by the late Dr Glover, 1st, Because so far as his analyses go, the fats are not deficient in the blood; 2d, Because tubercle itself often contains a considerable quantity of fat; and 3d, Because the theory, "is altogether too mechanical, and vitiates itself by giving a too easy explanation of great difficulties."[1]

With regard to the amount of fats in the blood, it must undergo great variation, which, in respect to the process of digestion, has not yet been determined. The molecular basis of the chyle must pass in large quantity into the blood after each meal, where it may frequently be detected in the serum, constituting chylous or fatty blood. What becomes of this fatty matter diffused throughout the circulating fluid? Is it consumed in the lung, according to the view of Liebig? or does it go directly to constitute the adipose texture? It may be disposed of in both ways. The blood-globules, although for the most part soluble in acetic acid, have been determined by Dr Sanderson[2] to contain a certain amount of cholesterine; and Donné long ago showed that after all the globules had been separated from milk, and could not be detected by the microscope, that chemical analysis still exhibited the presence of fat in the residuum. It cannot be an objection to the views advanced, therefore, that because the small amount of fat found by the chemist in blood, has undergone no diminution, that therefore the fatty molecules introduced

[1] On the Pathology and Treatment of Scrofula, pp. 115, 116.

[2] Physiological Society's Report for May 14, 1853.

by the chyle have no connection with the nutritive and morphological changes in the economy.

As to the argument derived from the fact that tubercle itself is fatty, I have already disposed of it when drawing a distinction between oily molecules formed as a primary and evolving element, and similar ones formed as a secondary and disintegrating element. The source of fat in tubercle is evidently the albuminous compound which, like muscle, fibrinous exudation, and blood, may be transformed into oily granules by a chemical process not yet accurately determined. Flesh, by exposure to a running stream of water, is, as is well known, converted into adipocere. Here, again, the occurrence of such secondary fatty degenerations is in no way opposed to the theory which ascribes nutrition essentially to the emulsion formed in the villi and lacteals.

With regard to the notion that the theory is too mechanical and too easy, this, so far from being an objection in itself, would, were it correct, be a strong argument in its favour. The progress of physiology has in no way been more advanced than by encroaching upon the so-called vital and unknown functions, and showing that several of them may be reduced to the well known laws of physics and chemistry. Unfortunately, however, those who conceive the molecular theory of organisation to be mechanical and easy, do not seem to understand it very thoroughly; for, granting the first form detectable by our microscopes to be molecular; that these molecules, by uniting into masses, constitute nuclei; that around these, cells are formed by the prodution of other molecules, and so on—how are we to explain the successive elaboration of solids and fluids without a knowledge of the influence of numerous organs and textures, and of the delicate chemical and physical alterations which are simultaneously proceeding in all of them at once? I am much afraid that if an "easy explanation of difficulties" be with some an insurmountable obstacle to the reception of a theory, that the one I have advanced ought not to be excluded on that ground. Indeed, its complexity is still so great, as to puzzle the thoughts of all the physiologists in Europe.

I still believe that on the basis of the molecular theory, physiology and pathology are destined to advance and give rise

Fig. 18.

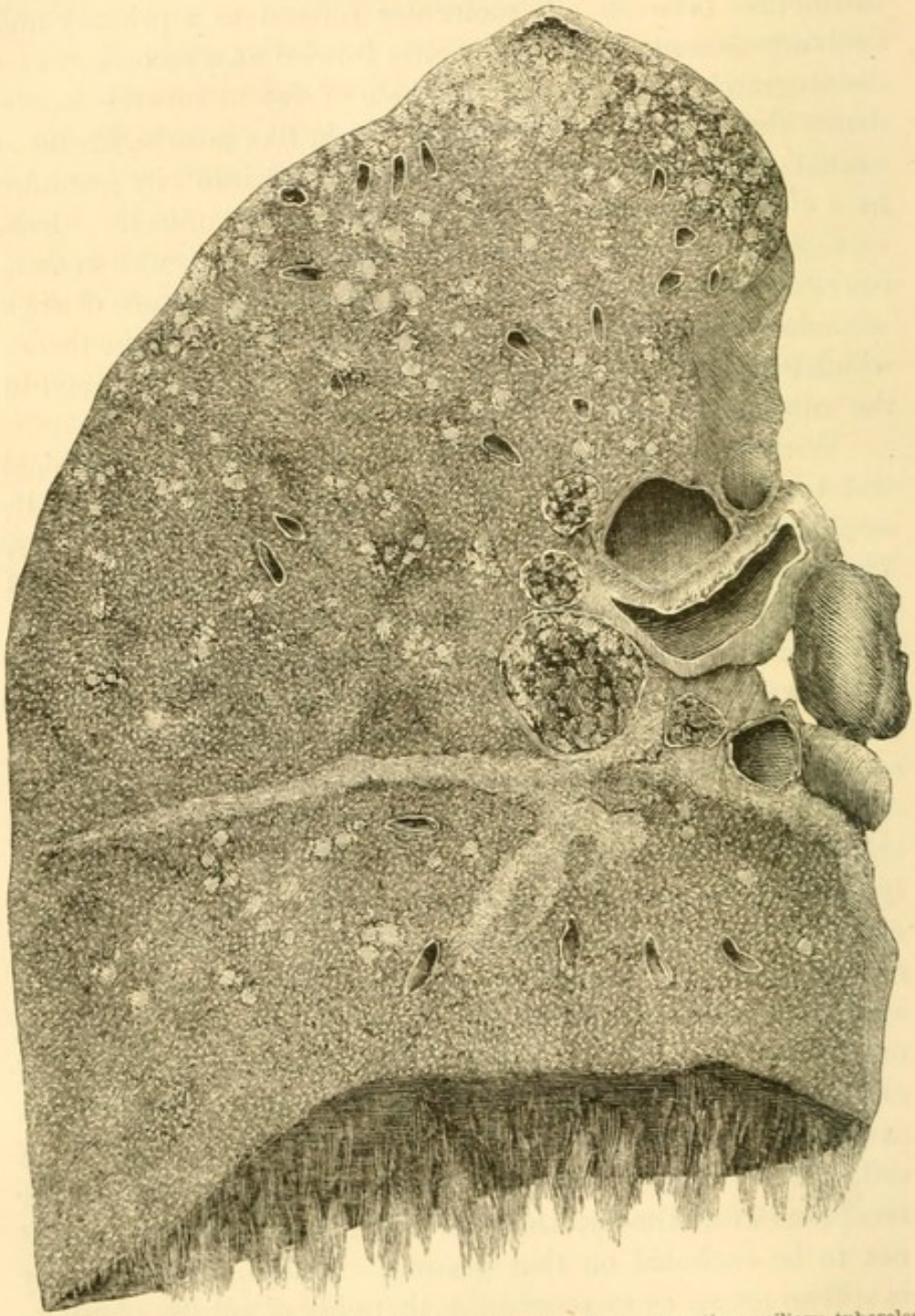


Fig. 18. Section of a lung in the first stage of pulmonary consumption, miliary tubercles are thinly scattered but most numerous at the apex, where ulcerative softening is commencing. *Two-thirds the real size.*

to a more perfect therapeutics. I consider the pathology of consumption to be an instance in point. For although it is very probable some of the details of this theory may require modification, it will, I am firmly persuaded, be found to possess a general harmony with all known facts, while it suggests to the medical practitioner resources, the advantages of which continued experience is daily rendering more evident.

SECTION III.

Natural Progress of Tubercular Exudation—Its Tendency to Ulceration—Its Modes of Arrestment.

At first tubercle is deposited in the state of a fluid exudation from the capillaries in the same manner that lymph is. In this condition it insinuates itself into the interstices of the pulmonary parenchyma, passes through the lining membrane of the air vesicles, and fills their interior. Numerous sucessful injections of pneumonic, tubercular, and cancerous lungs, in my possession, demonstrate that the exudation in all is poured out in the same manner, and occupies the same position in the pulmonary texture. A miliary tubercle may, in this manner, block up from three to twenty of these air vesicles (Fig. 5 and 6). It now coagulates and constitutes a foreign solid body, which can only be removed by being again broken down and rendered capable of being either absorbed or excreted. Thus the miliary or infiltrated forms, whether grey or yellow, after a time soften,—a process which may commence at any part of the mass and gradually affect the whole. This softening is a disintegration or slow death of the tubercular exudation, constituting true ulceration, which is more or less extensive according to the amount and extent of the morbid deposit (Figs. 18, 19, and 20). When recent, the pulmonary parenchyma in the immediate neighbourhood is more or less congested: and when chronic, it is thickened and indurated, often forming a capsule which surrounds the tubercular deposit. The pleura also is very liable to be affected; when recently so, presenting soft fibrinous exudations with more or less adhesion; whereas when chronic, these become fibrous

and reach a thickness and density seldom seen in other diseases. The bronchi are necessarily involved; their terminal extremi-

Fig. 19.

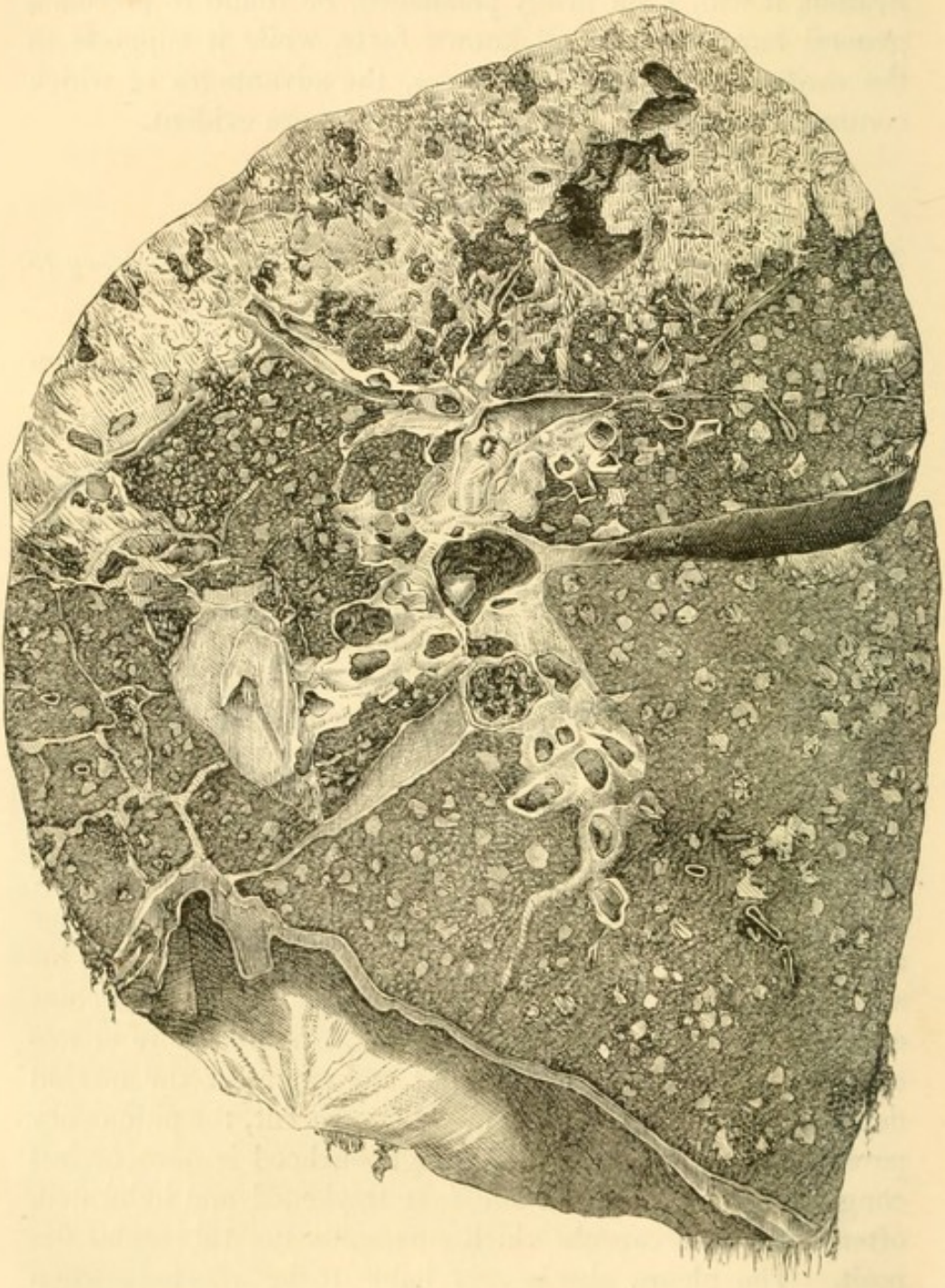


Fig. 19. Section of a lung in the second stage of pulmonary consumption, miliary tubercle is scattered throughout the lung, whilst infiltrated tubercle occupies the entire apex, where ulcerative softening has caused one considerable cavity of irregular form, together with several smaller ones. *Two-thirds the real size.*

ties are among the first structures affected; and as the tuberculisation proceeds, all the appearances characteristic of chronic

Fig. 20.

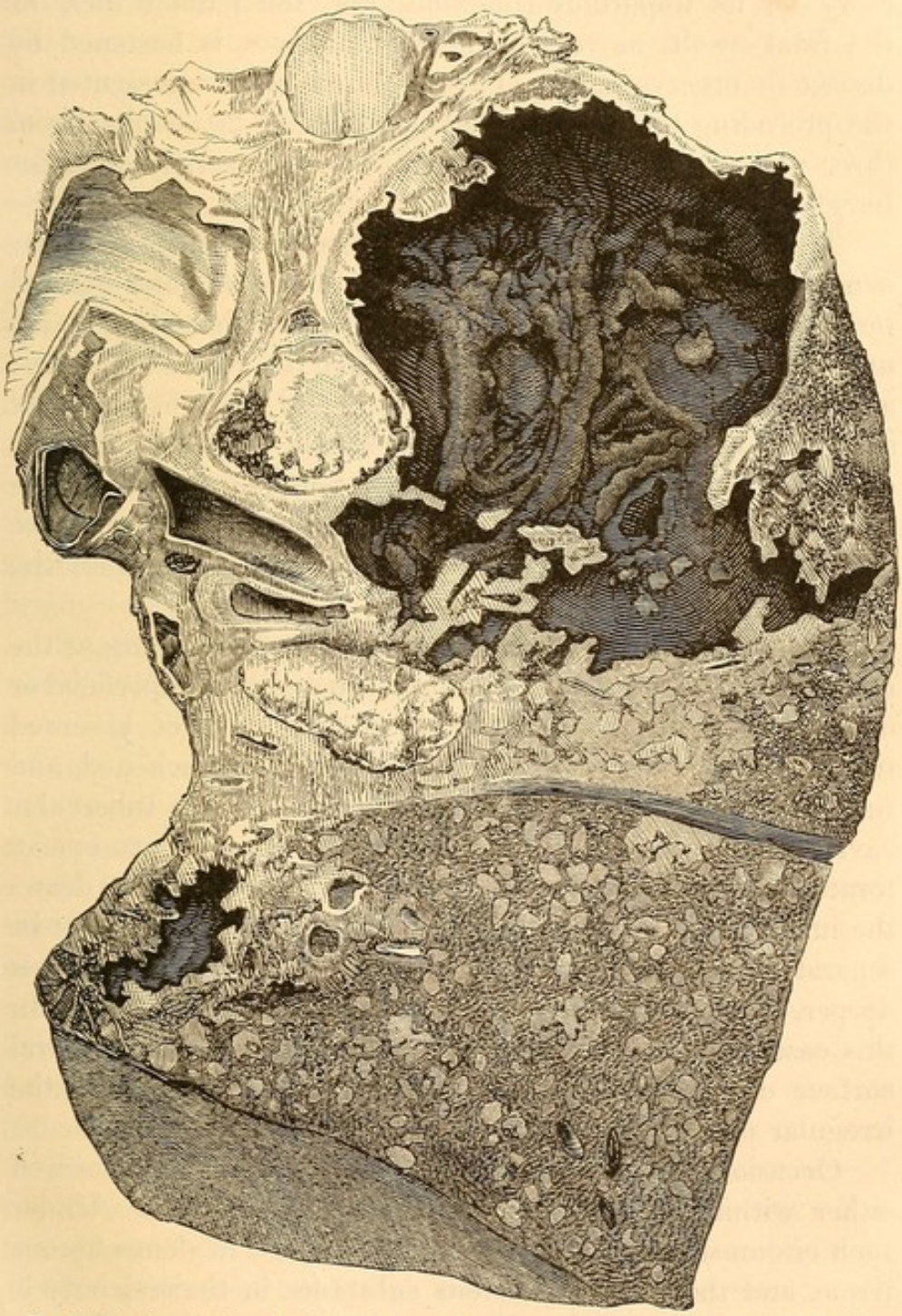


Fig. 20. Section of a lung in the third stage of pulmonary consumption, ulceration has here caused a cavity which occupies the superior half of the organ, and another smaller one has formed in the inferior lobe. Miliary and infiltrated tubercle are scattered throughout the whole of the lung tissue. *Two-thirds the real size.*

bronchitis are produced. As the ulcerative process extends, the lung is more and more destroyed, the excavations become larger and more numerous, until at length it can no longer carry on its important functions, and the patient dies, or the fatal result, as very commonly happens, is hastened by disease in other organs. This process is well represented in the preceding wood cuts, Figs. 18, 19, and 20, copied from three preparations in the museum of the University of Edinburgh.

The ulcerative or destructive tendency of the tubercular exudation has generally been supposed to be its chief characteristic; but there are very few cases in which its progress is uniform. It is continually checked, and for a time slumbers; and all morbid anatomists have recognised, even in the worst specimens of tubercular lungs, numerous cicatrices and evidences of attempts to heal. These attempts are more or less perfect, and when ineffectual, it is owing to the circumstance that as one portion of lung cicatrises, another becomes the seat of recent tubercle.

Cicatrices present different appearances, according as the cavities from which they were formed have been superficial or deep seated. In the first case it will generally be observed that the pleuræ are more or less adherent and thickened, and this frequently forms an external boundary to the tubercular cavity. As the matters which the cavity contains are expectorated or transformed, the lymph gradually contracts, draws the lung closely to the thoracic walls, from which it cannot be separated without great violence. Sometimes, however, it is deeper, and the adhesion is very slight or does not exist. In this case, when the walls of the cavern contract, the pleural surface of the lung is drawn inwards, and in this way the irregular puckerings visible on the surface are produced.

Occasionally no traces of tubercular matter are discovered either within or in the vicinity of these cicatrices. Under such circumstances they appear to be formed of dense fibrous tissue, and the parenchymatous substance in their vicinity is of a bluish-black colour, from increased pigmentary deposit, and of peculiar induration and density, owing to chronic

exudation. More generally, however, the contraction and puckering will be found to have occurred around tubercle which has undergone various transformations. Occasionally there are round masses of crude tubercle surrounded by a cyst. They are of unusual density, still of a yellowish colour; but contain granules of earthy salts more or less numerous. Often they are white and friable, resembling chalky matter. In this state the soft portions have been apparently absorbed, and the whole consists, under the microscope, of irregular masses of earthy matter, mixed with numerous granules and crystals of cholesterine. At other times the whole has been converted into a solid calcareous mass, frequently round, at others having numerous prolongations and irregularities, which accurately fit the surface and bronchi with which they are in contact. These cretaceous and calcareous concretions may remain an indefinite time in the parenchymatous substance of the lungs, or they may be evacuated through the bronchi with the sputa. The cyst which incloses them then forms a dense linear cicatrix.

Such appear to be the usual modes in which tubercular ulcers heal. They occur in exactly the same manner as abscesses in other parenchymatous tissues, the result of simple exudation; and that the process in both is identical, is proved by the frequency with which in the latter calcareous deposits also take place.

If, then, the further deposition of tubercle could be arrested, there seems no reason why cavities in the lung should not heal with the same frequency as ulcerations or abscesses in other internal organs. Indeed, the careful dissections of morbid anatomists have shown that this arrestment, instead of being a rare or occasional occurrence, really happens with extreme frequency.

In 1845, I made a series of observations with reference to the cretaceous masses and puckerings so frequently observed at the apices of the lungs in persons advanced in life. The conclusion arrived at was, that the spontaneous arrestment of tubercle in its early stage occurred in the proportion of from one-fourth to one-third of all the individuals who die after the

age of forty. The observations of Rogée[1] and Boudet,[2] made at the Salpetriére and Bicetre Hospitals, in Paris, amongst individuals generally above the age of seventy, showed the proportion in such persons to be respectively one-half and four-fifths.

The accompanying woodcut represents a characteristic specimen of these cretaceous and calcareous concretions in the apex of a lung, accompanied with puckerings and increased

Fig. 21.

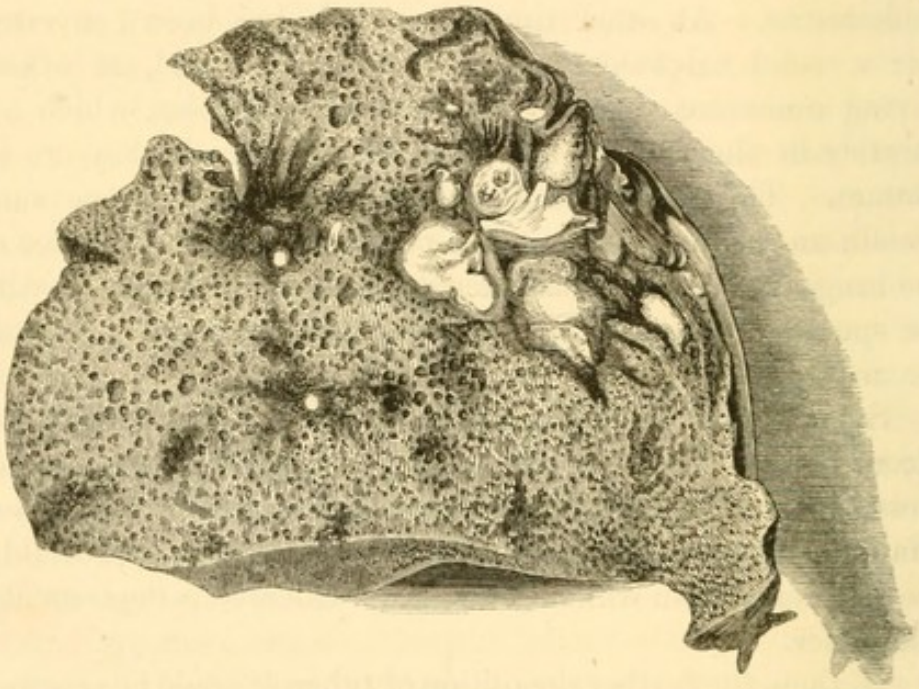


Fig. 21. Section of the summit of the right lung in Elliot's case, p. 50, exhibiting the cretaceous masses, more or less loaded with and surrounded by carbonaceous deposit. Many air vesicles are enlarged, constituting incipient emphysema. The preparation now in my possession exhibits a characteristic specimen of the mode in which a considerable amount of tubercular exudation is arrested by calcareous degeneration. *Natural size.*

deposition of carbonaceous black pigment. It will be observed also that the pulmonary tissue, besides being indurated and contracted, is somewhat emphysematous.

That such appearances are really evidences of arrested tubercles, is established by the following facts:—

1. A form of indurated and circumscribed tubercle is fre-

[1] Archives Générales de Médicine, vol. v. 1839.

[2] Comptes Rendus, tome 6me. 1843.

quently met with, gritty to the feel, which, on being dried, closely resembles cretaceous concretions.

2. These concretions are found exactly in the same situations as tubercle. Thus they are most common in the apex, and in both lungs. They frequently occur in the bronchial, mesenteric, and other lymphatic glands, and in the psoas muscle, or other textures, which have been the seat of tubercular depositions or scrofulous abscesses.

3. When a lung is the seat of tubercular infiltration throughout, whilst recent tubercle occupies the inferior portion, and older tubercle, and perhaps caverns, the superior, the cretaceous and calcareous concretions will be found at the apex.

4. A comparison of the opposite lungs will frequently show, that whilst on one side there is firm encysted tubercle, partly transformed into cretaceous matter, on the other the transformation is perfect, and has occasionally even passed into a calcareous substance of stony hardness.

5. The seat of cicatrices admits of the same exceptions as the seat of tubercles. In a few cases, I have found the puckering and cicatrix in the inferior lobe only; and have met with three where the inferior lobe was throughout densely infiltrated with tubercle, whilst the superior was only slightly affected.

It has indeed been argued, that occasionally these cretaceous masses may be the result of a simple exudation, and of a subsequent small abscess in the lung. When they are found isolated in the middle or base of the organ, such certainly may be the case, and consequently the fifth argument may be affected. But this is rare, and can scarcely make any alteration in the vast proportion of those concretions and puckerings which are undoubtedly the result of abortive tubercles. With these facts before us, and with the knowledge that there is nothing in the nature of tubercle itself which is opposed to the arguments derived from anatomy, the frequent spontaneous arrest of this form of exudation may now be considered established.

Since these observations, however, have become known, it

has been stated that after all, practically speaking, phthisis pulmonalis does not mean the existence of a few isolated tubercles scattered through the lung, and that what is really meant, is that advanced stage in which the lung is affected with ulceration, and in which the bodily powers are so lowered that perfect recovery seldom or never takes place. But here again, a careful examination of the records of medicine will show that many even of these advanced cases have recovered. Laennec, Andral, Cruveilhier, Kingston, Pressat, Rogée, Boudet, and others, have published cases where all the functional symptoms and physical signs of the disease, even in its most advanced stage, were present, and yet where the individual survived many years, ultimately died of some other disorder, and on dissection, cicatrices and concretions have been found in the lungs.

M. Louis, however, observes,[1] "I have not in a single instance, discovered, in the midst of *healthy* pulmonary tissue, cavities communicating with the bronchi, and lined, like *old existing* tuberculous excavations, with a false membrane of slightly greyish colour, and opaque semi-cartilaginous appearance." Now, considering the large number of observations made by so distinguished a pathologist and physician, the inference to be drived from this statement, as well as from the whole tenor of his remarks on the cicatrisation of tubercular cavities, is that, without absolutely denying their rare occurrence, they are of little practical importance. It is a matter of very great moment, therefore, to show not only that tubercles may be arrested at an early period of their development, and when they are limited in extent, but that cavities of large size may be completely healed, and leave, even in the midst of healthy lung, unequivocal traces of their tubercular origin. On this point the following case must, I think, convince the most sceptical :—

[1] Sydenham Society's Translation, p. 24.

CASE I.—*Advanced Phthisis; Restoration to Health; Death many years afterwards from Delirium Tremens; on Dissection, a Cicatrix, three inches long, in the Apex of Right Lung, and Cretaceous Concretions, with Puckering at the Summit of Left Lung.*

John Keith, æt. 50, a teacher of languages, was admitted into the Royal Infirmary, February 8, 1844, in a state of coma, and died an hour afterwards. On examination, the membranes of the brain, at the base, were unusually congested and covered with a considerable exudation of recently coagulated lymph, here and there mingled with bloody extravasation. The apex of the right lung presented a remarkable cicatrix, consisting of dense white fibrous tissue, varying in breadth from one-fourth to three-fourths of an inch, and measuring about three inches in length (Fig. 22). The pleural surface in its neighbourhood was considerably puckered. On making a section through the lung, parallel with the external cicatrix, the substance immediately below presented linear indurations, of a black colour, together with five cretaceous concretions, varying in size from a pin's head to that of a large pea (Fig. 23). The surrounding pulmonary substance was healthy. The apex of the left lung was also strongly puckered, and contained six or seven cretaceous concretions, each surrounded by a black, dense, fibrous cyst.

A very respectable-looking and intelligent man, who attended the post-mortem examination, informed me that Keith, in early life, was in very indifferent circumstances, and had supported himself as a writer. At the age of two-and-twenty, or three-and-twenty, he laboured under all the symptoms of a deep decline, and his life was despaired of. About this time, however, he was lost sight of by his friends; but it was afterwards ascertained that he had become a parish schoolmaster in the west of Scotland, and that his health had been re-established. He returned to Edinburgh six years before his death, and endeavoured to gain a livelihood by teaching Latin and French. He succeeded but very imperfectly, and fell

into dissipated habits. Latterly he had become subject to attacks of mania, apparently the result of drink. It was after an unusually severe attack of this kind that he was brought

Fig. 22.

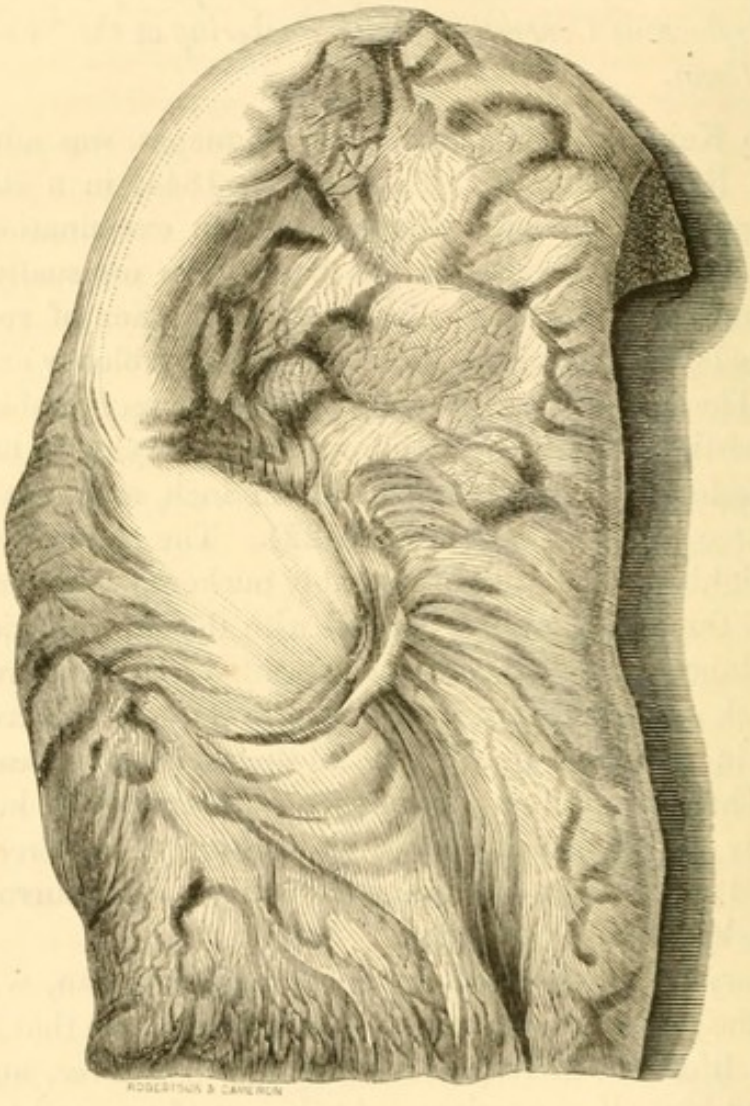


Fig. 22. External view of the summit of the right lung in Keith's case, p. 47, representing the fibrous cicatrix. *Natural size.*

into the Infirmary, where he died in the manner previously described.

This case points out the following important facts:—1st, That at the age of twenty-two or twenty-three the patient had a tubercular ulcer in the right lung, the size of which must have been very considerable when the contracted cicatrix alone was three inches long. 2d, That tubercular exuda-

tions existed in the apex of the left lung. It is, therefore, very probable that the statement made by his friend at the

Fig. 23.

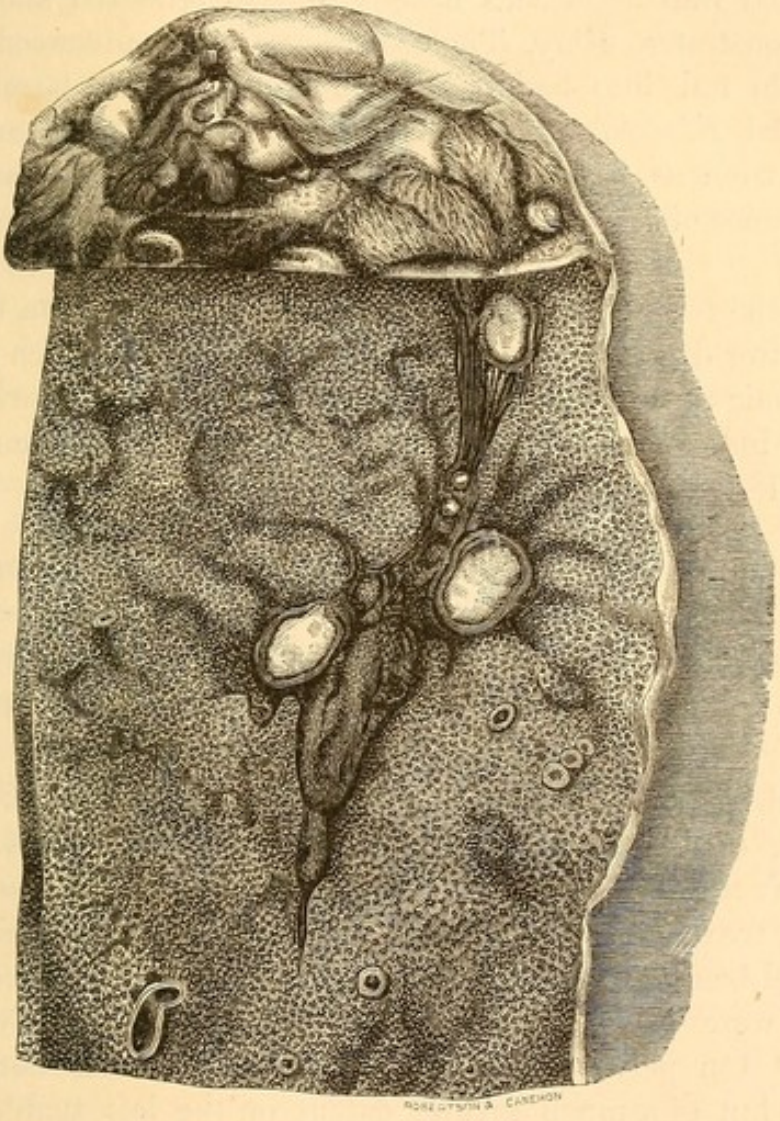


Fig. 23. The section of the same portion of lung seen from within, the apex having been left entire to show the deep puckerings which covered its surface. The line of the healed cavity is densely loaded with black carbonaceous deposit, in which are seen five cretacious concretions, three of then encysted. This preparation, now in my possession is, perhaps, a unique specimen, proving the healing by cicatrisation, of an enormus tubercular excavation in the lung. *Natural size.*

examination was correct—namely that he laboured under all the symptoms of advanced phthisis pulmonalis. It is shown, 3dly, That, after receiving the appointment of a parish schoolmaster, after changing his residence and occupation, while his social condition was greatly improved, these symptoms disap-

peared. We may, consequently, infer that it was about this period that the excavation on the right side healed and cicatrised, while the tubercular exudations on the left side were converted into cretaceous masses, and so rendered abortive. It demonstrates, 4thly, That when, at a more advanced age, he again fell into bad circumstances, and even became a drunkard, tubercular exudations did not return, but that delirium tremens was induced, with simple exudation on the membranes of the brain, of which he died.

In the following case, not only did the examination of the body after death exhibit the anatomical changes which occur in chronic phthisis when undergoing a cure, but the previous history indicates how that cure was brought about by remedial means :—

CASE II.—*Advanced Phthisis; General Health Restored; Death eighteen months afterwards from Typhus Fever; on Dissection two Cavities in the Left Lung, contracted and healing; in the Right Lung Cretaceous Concretions, Puckering and Incipient Emphysema.*

Robert Elliot, æt. 28, was admitted into the clinical ward, No. 2, of the Royal Infirmary, December 30, 1844. He had left the house two months previously, having then been under treatment four months, and taking cod-liver oil with marked benefit. On admission he was much emaciated, and there were all the symptoms of phthisis in its advanced stage. On percussion, there was dulness under both clavicles, but to a much greater extent on the left than on the right side. Under the left clavicle, and posteriorly above the scapula, there was loud gurgling râle, with imperfect pectoriloquy. On the right side, there was occasional sibilant râle; harshness of inspiratory, and prolongation of expiratory murmur; with bronchophony. He took cod-liver oil readily; and was treated, in addition, with numerous remedies to meet occasional symptoms, more especially diarrhœa and hæmoptysis. He left the Infirmary, March 10, 1845, conceiving himself to be nearly well. His strength and general appear-

ance had greatly improved, the physical signs on the right side were unaltered; but on the left gurgling râles had been for some time absent, and been replaced by dry blowing sounds. Some months afterwards, he applied at the Royal Dispensary for some cod-liver oil, and was supplied with it regularly for a considerable time. He entered the Infirmary on two separate occasions subsequently, under different physicians, and was discharged in his own opinion well. In the summer of 1846, I was requested by a Dispensary pupil to visit one of his patients, affected with fever. It was this man Elliot, in a state of complete coma, and with the usual symptoms of typhus. I gave directions for conveying him to the Infirmary, but before this could be carried into effect he died.

Post-Mortem Examination.—Permission for the inspection was obtained with great difficulty, and the chest only was examined. The pleuræ covering the apex of the right lung were very slightly adherent. The summit of the lung itself was deeply corrugated and puckered, and felt hard and nodulated. On being bisected, it was found to contain numerous cretaceous masses, several of them enclosed within an indurated cyst of greyish fibrous matter. The surrounding lung was condensed, puckered, and loaded with black pigment; and the spongy substance in the neighbourhood of the indurated portions presented numerous enlarged air-cells—in short, incipient emphysema. (See Fig. 21, p. 44). The left lung presented two distinct stellate puckerings—one at the summit of the lung, the other about two inches below. Both these puckerings corresponded to a distinct oval cavity. (Figs. 24 and 25, pp. 52, 53). They both possessed a distinct lining wall, and were surrounded by an indurated capsule, connected with radiating cicatrisations in the pulmonary tissue. In the upper one (see Fig. 24), this was very distinct.

Now, I think there can be little doubt that, if this man had lived longer, the cavities in the left lung would have contracted still more, and produced either linear cicatrices, or remained as small permanent dilatations. That some tuber-

cular ulcers of the lung, even when very extensive, may, by the evacuation or absorption of tubercles, be transformed into

Fig. 24.

Fig. 24. Internal section of the summit of left lung in Elliot's case, p. 50, showing the stellate puckering at the apex, and another lower down. Corresponding with the former may be seen a cavity the size of an almond, in process of contraction, and surrounded by dense fibrous radii. *Natural size.*

chronic cavities, with smooth lining membranes, the following case is a remarkable proof :—

CASE III.—*Advanced Phthisis; General Health improved; Death in two years from a Fall, and Abscesses in the Kidneys; on Dissection, Left Lung contracted to the size of the Human Fist, and filled with Cavities having smooth membranes; no Tubercle; in the summit of the Right Lung, Cretaceous Concretions.*

John Finlay was admitted at the age of 19 into the clinical ward of the Royal Infirmary, December 20, 1850. He had been troubled with cough, expectoration, and occasional

diarrhœa for six years, and for three weeks he had been in the Surgical Hospital, under Mr Syme, with scrofulous caries of

Fig. 25.

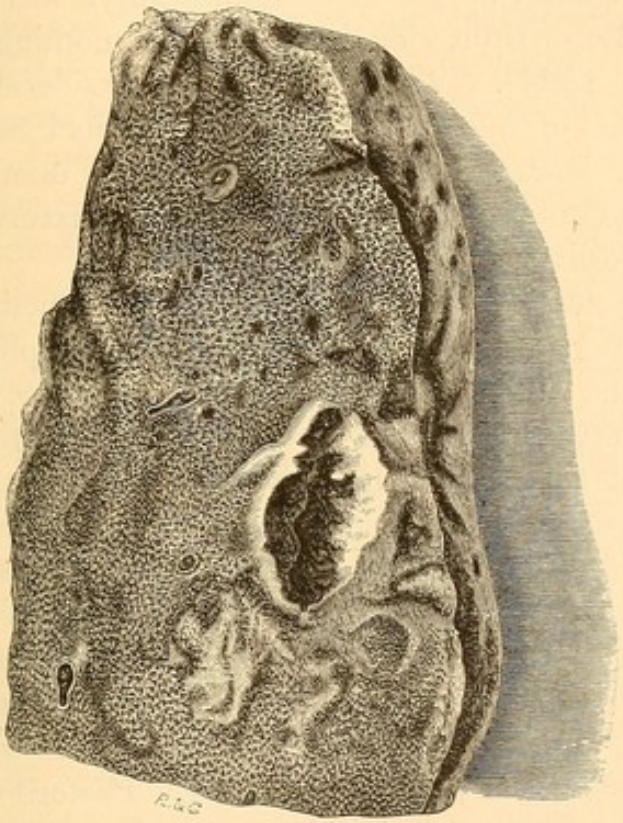


Fig. 25. External section of the same portion of lung, showing another cavity also in the act of healing, in relation with the stellate puckering, lower down. This preparation, now in my possession, exhibits the intermediate stage of cicatrisation in tubercular cavities, all the tubercle having been absorbed or expectorated, and the walls not yet collapsed. *Natural size.*

the left wrist-joint. He had spat blood now and then, but to no great extent. On admission, his external appearance was pale, presenting all the so-called characters of the scrofulous diathesis. There was great emaciation, and development seemed to have been arrested, as he did not look above twelve years of age. The left wrist-joint was immoveable, considerably swollen, with several carious openings discharging pus. There was frequent cough, with copious muco-purulent expectoration. On percussion, the right chest was everywhere resonant; but there was marked dulness over the whole of the left chest, most complete in the subclavicular and supra-scapular regions. On auscultation, loud mucous râles were

heard over the whole of the left chest anteriorly, with gurgling and pectoriloquy under the clavicle. Posteriorly and inferiorly on this side, there was harsh tubular breathing, with prolongation of the expiration. There was puerile respiration on the right side, but otherwise nothing abnormal. Pulse 80; feeble. Tongue clean. Considerable nausea, and total loss of appetite. His diarrhœa had recently been checked by lead and opium pills. Careful management of the diet was ordered, with a tonic alkaline mixture, and small doses of cod-liver oil.

For the next three months, the loss of appetite, sickness, and vomiting, occurred at intervals, and the physical signs remained the same. From this period, however, his general health underwent gradual improvement, the cough was not so severe, and the expectoration became more mucous. The sweating greatly diminished, and he took food more readily. Towards the end of May, he had evidently gained much in flesh, and the discharge from the scrofulous sores in the wrist was trifling. The physical signs were so far altered that the mucous râles over greater part of left side were not so coarse or diffused, and the gurgling under the clavicle was now of a splashing character and more limited. Pectoriloquy in this situation was complete, and there was absence of expansion during respiration. There could now also be heard harsh inspiration with prolonged expiration under the right clavicle; the resonance on percussion also was here slightly impaired. During June, he was much troubled with nausea and vomiting. On the 21st he was attacked with rigors, followed by all the symptoms of continued fever, which terminated by diaphoresis on the seventh day. Shortly after, he was attacked with variola, which ran its usual course. During July and August, there was gradual but marked improvement of his general health. At the end of the last-named month, the left wrist-joint was firmly anchylosed, and all the carious openings had closed up. He has had occasional diarrhœa. There was still dulness on left side, but the mucous râles were not heard so low down anteriorly. Fine crepitation, and increased vocal resonance, were now audible under the right clavicle. Up to

the middle of October, he continued slowly to improve, the sweatings and diarrhœa had ceased, and the cough was much less severe. He now complained of considerable pain during micturition, and, on examining the urine, it was found to contain numerous pus-corpuscles, and to be coagulable by heat and nitric acid. He continued to feel pain on urinating, and to pass puss by the urethra during the month of October. On the 3d of November, the report is:—"Marked dulness on percussion over the left chest anteriorly, and under the clavicle cracked-pot sound. Posteriorly it is resonant. On auscultation, loud friction is heard from below up to the level of the nipple, and above this, loud mucous rattles passing into gurgling under the clavicle. Perfect pectoriloquy in this situation. On right side, puerile respiration; and posteriorly, sibilant râle at the termination of the inspiration. No sweating or diarrhœa. Still occasional nausea and vomiting. General strength much improved, and now walks about the ward, sitting up a great portion of the day." The report on the 21st of December is:—"Still marked dulness over the whole of left side, except under the clavicle, where it is tympanitic, with cracked-pot sounds. Resonance on right side good. Under acromial end of left clavicle feeble and distant gurgling is heard, the respiration having more of a blowing character than formerly, with perfect pectoriloquy. The moist râles over the other parts of this side have disappeared. On right side, puerile respiration is heard over the inferior half of lung; otherwise, the breath-sounds are normal. Posteriorly, dulness of the whole of left side, but there is no cracked-pot sound. On auscultation, the signs are the same as are heard anteriorly. His general strength has much improved. Still complains of occasional nausea and vomiting, but, on the whole, takes his food well. Urine limpid, containing small shreds, which, on examination with the microscope, are seen to be composed of numerous pus-corpuscles embedded in mucus; slightly coagulable on the addition of heat and nitric acid. Pain on micturition diminished." From this time he continued, on the whole, to improve steadily, and was so well during the summer of 1852, as to walk about constantly in

the open air, and went out of the house, by his own desire, on the 1st of the following August. About the middle of October, however, having been well in the interval, he fell down and injured his back. On the following day, he experienced rigors, followed by febrile symptoms, total loss of appetite, and hematuria. He was re-admitted November 1, when it was ascertained that considerable quantities of pus were passed with the urine, which, he says, had also been occasionally tinged with blood. There was pain on micturition, but none in the lumbar region. On examining the left lung, loud gurgling was heard both with inspiration and expiration, extending from the clavicle down to the upper margin of the third rib. There was great dulness on percussion. Below the clavicle, loud pectoriloquy, and lower down, œgophony. Under the right clavicle there was fine moist râle on inspiration, and increased vocal resonance, but the chest expanded well on this side, and was otherwise normal. The fever, prostration, and discharge of pus by urine continued without intermission, and he died December 4, 1852.

Sectio-Cadaveris, Dec. 6th.—Body greatly emaciated; the right carpal bones anchylosed, with marks of numerous old sinuses on the skin in their neighbourhood.

Chest.—Pluræ on the right side adherent at the apex, by loose bands of chronic lymph. The right lung indurated at the apex over an extent the size of a hen's egg, and strongly puckered externally. On section, this indurated portion was seen to contain several encysted cretaceous concretions, with the intervening pulmonary substance condensed, hard, and fibrous. A few chronic miliary tubercles were also scattered through the upper lobe; but the rest of the lung was spongy, crepitant, and healthy. The pleuræ on the left side were everywhere firmly adherent, and over the superior half of the lung which was much atrophied, they were converted into a dense white fibrous mass, three-fourths of an inch thick, which gradually diminished in thickness inferiorly. The left lung was not the volume of the closed fist; it was non-crepitant, felt indurated, but, at the same time, flaccid, evidently from internal cavities. On section the entire mass was riddled with

cavities more or less communicating with each other, containing purulent matter, and having a smooth lining membrane. Many of them presented a pouch-like form, and were identi-

Fig. 26.

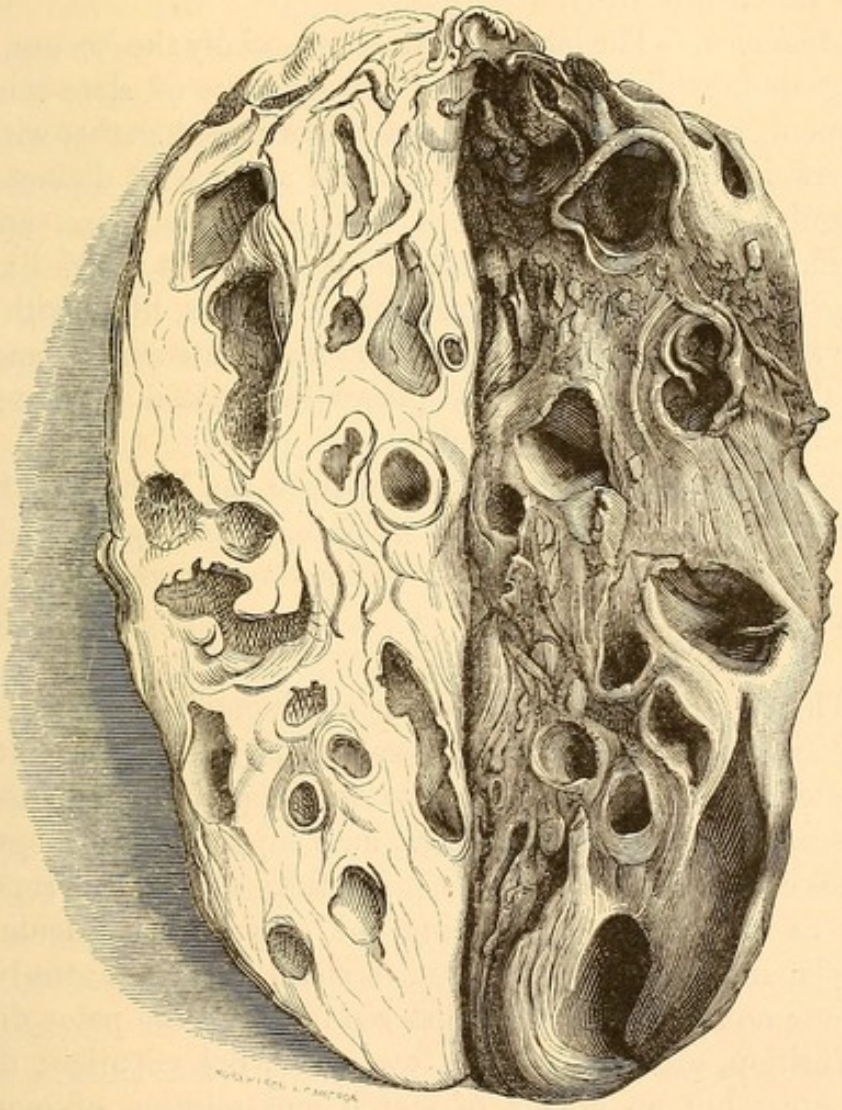


Fig. 26. A drawing of the entire left lung of Finlay, of its natural size, bisected, and the two halves separated, as it may now be seen in the University Museum. The right half is exactly copied, showing the afractuous cavities, lined with a smooth membrane, and the dense fibrous tissue between them. The left side is drawn in outline.

cal with what has been described as dilatations of the bronchi. At the apex were two encysted calcareous concretions, of the

size of millet seeds, but there were no other traces of tubercular deposits. The fibrous structure between the cavities consisted of a close dense fibrous texture, of bluish colour, from pigmentary deposits, in which no remains of pulmonary structure could be found. The bronchi contained a considerable quantity of viscid, muco-purulent matter. Heart, larynx, and trachea, healthy.

Abdomen.—The large intestines, especially the cæcum, were congested, exhibiting here and there patches of slate-coloured pigment, with traces of cicatrised ulcerations, together with one superficial chronic erosion about half an inch in diameter, of irregular form. The kidneys were of natural size, and on section displayed dilatation of the pelves, with pouch-like enlargements, the result of scrofulous abscesses, filled with pus. The secreting substance was everywhere atrophied, and the tubular substance in many places obliterated. Mesenteric glands and other organs healthy.

A careful microscopic examination of the lining membrane of the pulmonary abscesses, exhibited nothing but fibrous tissue, destitute of epithelium. There was nowhere any trace of a mucous surface.

The treatment of this case was conducted on the principles, and according to the rules afterwards to be detailed. It was directed principally to improve the appetite, diminish the nausea, vomiting, and diarrhœa, and support the strength by means of cod-liver oil and generous diet. Externally, repeated blisters were applied. During the attack of febricula and variola, antimonials were given in small doses. Latterly numerous remedies were administered to lessen the pains during micturition, such as anodynes, uva ursæ; bal. copaibæ; diuretics, etc.; but an enema of starch and solution of morphia succeeded better than anything else. It was always observed that in proportion as the dyspeptic symptoms were relieved, and the assimilation of cod-liver oil and food took place, so his health improved; and by great care he was not only kept alive for two years, but I had sanguine expectation of an ultimate recovery, when he met with the accident

which, by exciting acute disease in the kidneys, caused his death.

I have detailed this case, however, principally with the view of pointing out another mode in which tubercular ulcerations of the lung are occasionally arrested, namely, by the formation of pouches or cavities, the lining membranes of which become smooth and cease to exude tubercle. This condition of the lung has been described by morbid anatomists under the name of dilated bronchi, and by Dr Corrigan as cirrhosis of the lung.[1] In the first case it has been imagined to result from chronic bronchitis, whereby the bronchi are dilated from within;[2] and in the second, from the formation of fibrous matters, the contraction of which causes this enlargement from without. A consideration of the details of this case, however, must convince every physician that we had here to do with large tubercular excavations, which, by compressing the lung, had obliterated the whole of its texture and converted it into a contracted fibrous envelope of these excavations. All trace of tubercular matter had disappeared, with the exception of two small cretaceous concretions, and the respiratory function was entirely carried on by means of the opposite lung, in which chronic tubercle to a limited extent, and very latent, was found. Whether, under such circumstances, the pulmonary lesion would ultimately have healed, it is difficult to say; but there can be no doubt he must have lived a long time in this condition before he met with the accident which caused his death. But that many such lesions may be arrested, and life continue, is proved by the observations of Reynaud, who has given figures of what he calls dilatations of the bronchi, many of which were evidently the result of tubercular ulceration.[3] Cruveilhier[4] has also figured a lung presenting similar appearances.

In the case of another man, called Joseph Finnie, which

[1] Dublin Medical Journal, vol. xiii. 1838.

[2] Laennec, vol. i. p. 201.

[3] Mémoires de l'Académie Royale de Médicine, tome 4me., Plate 4, Fig. 1; Plate 5, Fig. 1; Plate 7, Fig. 2.

[4] Anatomie Pathologique Livraison, 32, Plate 5, Fig. 3.

closely resembled that of Finlay, I diagnosed, during life, the same contraction of the lung from tubercular excavations, and the same chronic dilatations in connection with the bronchi. This man died of Bright's disease in the Royal Infirmary, January 1853; and on dissection a similar state of the pulmonary texture was discovered, with the exception that the atrophy of the organ was not so great, whilst traces of tubercular infiltration were more evident.

What has been now stated, must, I think, show that the arrestment of tubercular ulceration may take place in three ways; 1st, By the gradual transformation of the exudation into cretaceous and calcareous concretions; 2d, By expectoration and absorption of the exudation, the collapse of the ulcerated walls, and formation of a cicatrix; 3d, By the ulcerated walls becoming covered with a smooth membrane, remaining open and constituting chronic cavities, which have occasionally been mistaken for dilated bronchi. It should not be overlooked that one or all of these modes of arrestment may be detected in the same lung, and that great diversities of appearance in the pulmonary texture may be thus occasioned. Moreover the occurrence of black carbonaceous deposits is very apt to take place in the neighbourhood of the cretaceous concretions and cicatrices, thus communicating increased density to the texture. This density and contraction in the pulmonary tissue also is, as Dr Gairdner has shown, a cause of pulmonary emphysema in the air vesicles,—a circumstance which has attracted the attention of many pathologists, and has even been considered to be essentially connected with the spontaneous cure of pulmonary caverns (Ramadge). This occasional result, however, is much to be dreaded, as it causes the dyspnœa not unfrequently observed to follow the removal of pulmonary tubercle. But the frequency with which all these various lesions are discovered, and their connection with the spontaneous cure of pulmonary tuberculosis, points out how much more commonly this lesion is arrested, than for a long period has been generally believed by the profession.

From the preceding facts and observations, therefore, we

are warranted in drawing the conclusion, that if, during the advance of phthisis pulmonalis, those means can be discovered which check further tubercular exudation, and keep up the strength and nutritive processes of the economy, that such tubercular exudations as have occurred will be rendered abortive, and that even large ulcerations will heal up and cicatrise. The important point practically is to ascertain what these means are, and how they may be put into operation.

I have conversed with most of the distinguished physicians in this country and on the continent, and find that they are all enabled to refer to cases, which they are now satisfied have undergone a permanent recovery, even when cavities have existed in the lungs, and all the advanced symptoms of the disease have been present. I once made an effort to accumulate the experience of these distinguished men, on this point alone, and had I done so, it would have constituted an unanswerable amount of evidence as to the curability even of the worst cases of phthisis. Want of time, however, prevented them from writing down the facts. But it is unnecessary to refer to recorded experience, when the fact itself is established by the cases already given. Its comparative frequency, indeed, might be illustrated by such an inquiry, and I believe this to be much greater than is generally supposed; but to the great fact itself, nothing more can be added in the way of evidence than that presented by the remarkable cicatrix found in the lung of Keith. So deeply rooted, however, has been the opinion of the necessarily fatal nature of this disease, that the generality of practitioners have concluded, that *because* phthisical cases recovered, that the disease was *not* phthisis; that is, they have rather distrusted their own diagnosis than ventured to oppose a dogma of general belief.

SECTION IV.

Causes of Pulmonary Consumption.

An observation of the circumstances which precede the disease, or its so-called causes, clearly indicate imperfect digestion and assimilation as its true origin. Thus phthisis is

essentially a disorder of childhood and youth—that is, of a period of life when nutrition is directed to building up the tissues of the body. Diminish the proper quantity of food taken by a healthy man, tubercular diseases are not induced; but if this be attempted with children or young persons, they are a most common result. Thus scrofula and tubercle do not originate among the *able-bodied* men in armies and fleets, whatever privations they may be exposed to; but they may be observed to do so in the young of foundling hospitals, factories, and the poor and labouring classes of the community, and especially among tailors, sempstresses, and others who follow sedentary employments. In the higher classes they result from imperfect and insufficient lactation during infancy, or the irregular diet caused by carelessness or over-indulgence. No doubt they may frequently be observed in persons whose parents or relatives have been similarly affected. From facts of this kind it has been supposed that hereditary predisposition, a vitiated atmosphere, changeable temperature, certain occupations, humidity, particular localities, absence of light, and so on, predispose to phthisis. Very frequently several of these are found united, so that it is difficult to ascertain the influence of each. When they so operate, however, they invariably produce, in the first place, more or less disorder of the nutritive functions, and are associated with dyspepsia, or other signs of mal-assimilation of food. Cases analogous to the following are exceedingly common :—

Case IV.—An Irish girl left her own country at the age of 17, to work as a field labourer in Scotland. In Ireland she informed me her diet consisted of potatoes and sweet milk, and once a week fish or a little meat. The quantity was abundant. In Scotland she lived on coarse oatmeal porridge and dry bread, with butter-milk, and did not taste fish or meat once a month. Under this diet her health gradually became affected, and she entered the Royal Infirmary at the age of 21, with all the symptoms and signs of advanced phthisis.

Case V.—A lad, aged 16, of robust health, whose parents

and relations were equally healthy, committed a theft. He was imprisoned in gaol for three months, confined in a damp stone cell, and lived on the ordinary prison fare. His health insensibly declined. On being liberated he could not obtain employment, and found that his strength had greatly diminished. Two months afterwards, he applied at the Royal Dispensary, labouring under phthisis pulmonalis in its advanced stage.

Case VI.—A woman, aged 26, applied at the Royal Infirmary in 1843, who was greatly emaciated, and complained of harassing cough and expectoration. On examining the chest, perfect dulness existed under the right clavicle, with loud mucous râle, and imperfect pectoriloquy. The apex of the left lung was healthy. She had a son, aged six years, a perfect picture of health, and an infant at the breast, seven months old, also quite healthy. The mother died in 1844; both children are living, and are quite healthy, for the father, having good wages, was enabled to give them plenty of food.

Case VII.—A young lady was induced to leave the country, and take charge of her brother's house in town. Deprived of her usual exercise and avocations, obliged to become a sharer in numerous anxieties, and go daily through a routine opposed to her domestic and retiring disposition, her appetite became affected, she grew thin and highly dyspeptic, and, in a few months, hacking cough and harsh inspiration, prolonged expiration and increased vocal resonance, with impaired resonance on percussion, were developed under one clavicle. She struggled on some time longer, but at length I recommended return to her former residence and occupations. From that moment the disease was arrested, and she may now be considered as restored to health.

It is unnecessary to multiply cases of this description. The more they are examined into, the more do I feel persuaded it will appear that the causes of phthisis are not so much hereditary influences, vitiated atmosphere, etc., etc.,

although *these may co-operate*, but almost invariably such circumstances as induce impoverished nutrition, resulting from an improper quantity, quality, or assimilation of food. It must not be overlooked, however, that all the supposed causes of scrofula and tubercle, inasmuch as they are capable of affecting the function of nutrition, may, either directly or indirectly, occasion the disease. A vitiated atmosphere, for instance, by preventing the proper exchanges which ought to take place between the blood and the air, deteriorates the former fluid so as to impede chylification, and this in its turn operates upon digestion both in the stomach and intestines. What is physiologically understood by nutrition is not the mere reception and assimilation of food, but that extensive series of operations in the animal economy, whereby it is assimilated and transformed into blood for the purposes of growth, secretion and excretion. It is only by comprehending it in this extended sense that we can learn how derangement in one part of the process more or less affects the others, and especially how a knowledge of the causes and pathology of pulmonary consumption establish the indications for a successful treatment.

CHAPTER II.

THE DIAGNOSIS OF PULMONARY CONSUMPTION.

I FEEL persuaded that the general notion of the incurability of pulmonary consumption is mainly attributable to the fact, that it is not recognised until it be far advanced. And yet there is, perhaps, no disease which, in the great majority of cases, may be more readily detected by one practised in auscultation. The harsh or tubular inspiration, the prolonged expiration, the increased vocal resonance, followed or accompanied by dulness on percussion, together with the well-known general symptoms, can leave little doubt in the minds of the observant. True, there will always be instances so nicely balanced between health and disease, as well as pathological conditions so fine, that they do not furnish indications that will enable us to speak positively. There are also occasional cases of difficulty, to which allusion will subsequently be made in this chapter, in which the ordinary signs are masked, or in which the use of the microscope may establish the diagnosis. Still, if practitioners only accustomed themselves to detect the signs above mentioned, phthisis would, in a great measure, be disarmed of its terrors. In short, it is not that medical art is destitute of means of detection, but that the necessary skill is not sufficiently diffused among medical men; for, notwithstanding all that has been said and written on auscultation since the days of Laennec, it must be acknowledged among ourselves, that comparatively few have sufficiently educated their ears to detect the finer thoracic murmurs.

The following are a few of the many instances which have come under my notice, illustrative of errors in diagnosis:—

Case VIII.—An unmarried lady, æt. 25, quitted one of the northern Scottish cities, in 1842, to reside in Edinburgh. She had been harassed with distressing cough, dyspnœa, and weakness, for three years, and during that time had undergone all kinds of treatment, general and local, to combat a supposed phthisis pulmonalis. Knowing her family, and noticing her condition, I was confidentially informed by the friends that her case was hopeless, and that her medical advisers considered her lungs to be unalterably diseased. So strong was this opinion, that it was with some difficulty I persuaded the family to allow me to examine the chest. On doing so, I found the pulmonary organs quite healthy. On percussing over the sixth and seventh dorsal vertebræ, she screamed aloud, and jumped from her seat, as if she had received a shock of electricity. The case was one of spinal irritation and amenorrhœa, which yielded to counter-irritation and appropriate treatment. At the present moment she enjoys excellent health.

Case IX.—A young lady, æt. 22, complained, in 1844–5, of great languor, weakness, irregular menstruation, and trifling cough. She applied to two surgeons, of great respectability in general practice, who happened to be attending another member of her family. The friends were informed that nothing was the matter but slight female derangement, and purgatives and emmenagogues were prescribed. In the autumn, she and her family visited a watering-place, and the practitioner there took the same view of the case, and continued the treatment. One morning she was discovered dead in bed; and, to the astonishment of all parties, both lungs were afterwards discovered filled with tubercles and anfractuous cavities.

Case X.—I met a practitioner, some miles from town, in consultation on the case of a gentleman, who, I was informed, was labouring under acute pneumonia. In addition to the intense fever, I was told there was distinct crepitating râle over the whole of the right side, and that he had been actively

treated by a large bleeding, purgatives, and tartar-emetic. The disease had evidently been treated as one of acute pneumonia. On examining the patient, I found him in the last stage of phthisis, with loud mucous and gurgling râles in the upper half of the right side. He sunk rapidly.

Case XI.—The daughter of a medical man became very slowly unwell—indeed, so slowly that the parents never noticed it. Three weeks before her death, Sir James Clarke was consulted, who detected caverns in the lung, not only to the great grief, but to the unbounded astonishment, of the father.

Case XII.—A medical student hurried over from Paris, to attend the medical classes in this University, at the commencement of the session 1843–4. In crossing the Channel, he became very ill, and on arriving in Edinburgh, laboured under great febrile excitement. The case was considered one of fever, then very prevalent in the city, and treated accordingly. He died in a few days, and on dissection, the lungs were found to be filled with miliary and infiltrated tubercle. It was a case of acute tuberculosis.

Case XIII.—A domestic female servant, whose sister was said to have died of phthisis, had been suffering from cough for two years, and had been treated during that time by various practitioners in vain, so that she herself was firmly convinced that she also was dying of consumption. On examining her chest, I could find no evidence of disease in the pulmonary organs, but on searching further for the cause of the cough, I found that the uvula was so long that its apex rested on the dorsum of the tongue. The uvula, at my request, was shortened by Mr Spence, and she has not coughed since, and her general health has become robust.

Case XIV.—A gentleman supposed himself to be labouring under sore throat, and his medical practitioner had, during a period of three years, been from time to time sponging the

fauces and glottis with a solution of nitrate of silver. No suspicion existed in either party that the lungs were affected. Careful examination convinced me that a large dry cavity existed at the apex of both lungs, and that the great vocal resonance and sound on percussion had misled his professional attendant. This case terminated fatally by hæmoptysis a few months after I saw him, when the correctness of my diagnosis was confirmed by dissection. Since the local treatment of the larynx has been generally practised, cases where pulmonary phthisis are mistaken for chronic laryngitis, and *vice versa*, are by no means uncommon.

Cases of this kind could easily be multiplied. They appear to me capable of showing, that the fatality of phthisis pulmonalis is in a great measure owing to its insidious progress, to its reaching an advanced stage before it is detected, or to carelessness in medical examination, rather than to any peculiar virulence of the disease itself. Many diseases, undoubtedly curable in an early stage, if undiscovered and allowed to proceed unchecked, might be considered equally fatal. In this point of view, it has always appeared to me that our large charitable institutions are incapable of checking the evil. At our dispensaries, and among the out-cases of a large hospital, it is scarcely possible for the physician, on the stated days, to do justice to his patients. I have no hesitation in confessing that, on more than one occasion, I myself have been prevented from carefully examining patients, from sheer fatigue. The following is a common history of many applicants to these charities :—

Case XV.—A girl, æt. 19, applied to one of the dispensaries, complaining of irregular menstruation, constipation, want of appetite, and various dyspeptic symptoms. She was ordered twelve purgative pills, and directed to take two every other night. Her chest was not examined. Three months afterwards, she again applied, with hacking dry cough. She was ordered an anodyne and squill mixture, which increased the nausea and dyspeptic symptoms; but she had her bottle

filled regularly for two months. Diarrhœa now came on, which greatly reduced her; and, on applying for the third time at the Dispensary, it was *now* seen that she was consumptive. The disease ran a very rapid progress, and she died in the Royal Infirmary.

Now this, I believe, is the case of thousands of persons who perish from consumption; and I feel satisfied that, had the diagnosis of the disease been properly established at an early period, its onward march might have been arrested. Phthisis, in its incipient stage, may be considered a very curable disease; indeed, so much so, that cure is, as we have seen, spontaneously accomplished by nature, in a vast number of cases. So long as misery and poverty exist on the one hand, and dissipation and enervating luxuries on the other, so long will the causes be in operation which induce this terrible disease. But the means of checking and controlling it on a large scale must be sought, not in drugs, but in hygienic conditions, and the diffusion among medical men of that knowledge and skill requisite for detecting the existence of the disease in its early stages. In short, one of the most efficacious remedies consists in those practical instructions of the medical student at the bed-side, which are now systematically carried on in the clinical wards of this and some other schools of medicine.

There are still some points however with regard to the physical diagnosis of phthisis pulmonalis which require elucidation, and the following remarks are intended to direct the attention of my medical brethren to a few facts which may assist them in their attempts at forming correct conclusions under difficult circumstances.

SECTION I.

Diagnostic Importance of Bronchitic Signs as preceding and masking Tubercular Disease of the Lungs.

The relation of Bronchitis to Phthisis Pulmonalis has necessarily engaged the attention of all those who have had much experience in treating those affections. The term

"Bronchial Phthisis" (however vaguely employed), is in itself sufficient evidence of this, and serves to express a condition in which, with all the usual signs and symptoms of phthisis, those significative of bronchitis are always present to a great degree. But there never can be a case of phthisis without at the same time, more or less lesion of the bronchi, and the supervention of bronchitis and emphysema on the tubercular disease is so very general as to require no comment. The cases which, in practice, are so difficult, especially in a diagnostic point of view, are those where bronchitis ushers in phthisis, and serves to mask the tubercular disease. The difficulty sometimes experienced in these cases may be best illustrated by a few examples.

Case XVI.—I was consulted in the case of a young lady, æt. eleven years, in the year 1845. She had a short time previously recovered from a violent and prolonged attack of hooping-cough, and when I first saw her, complained of dry cough, and occasional difficulty of respiration. On percussion, the chest, on both sides, presented its normal resonance. On auscultation, there was slight harshness of the inspiratory, and trifling prolongation of the expiratory murmer, very general over both sides anteriorly, but especially on the right side, with occasional sibilation. No increase of the vocal resonance anywhere. The patient was a well grown girl, and had no other complaint or functional disorder, and the conclusion, of course, was bronchitis, with slight emphysema, following hooping-cough. This bronchitis, however, continued, the cough and occasional dyspnoea being sometimes very urgent. When eighteen or nineteen years of age, the latter symptom sometimes attacked her when dancing, an exercise of which she was very fond, and obliged her to desist. In the autumn of 1853, expectoration of purulent mucus commenced, and the appetite began to fail, circumstances which excited my apprehensions, although nothing was to be heard but sibilation and prolonged expiration; percussion being everywhere clear. The most anxious care was now taken, by means of good diet and exercise, to support the general strength, and with such

success that there was no emaciation, and little falling off in her bodily powers. In the spring of 1854, however, hemoptysis commenced, at first slight, but subsequently more abundant, especially at the periods of menstruation. Now commenced, also, languor, weakness, dyspeptic symptoms, palor of countenance, night perspirations, and other signs of debility, which gradually increased, notwithstanding the use of cod liver oil and every conceivable means of support. All this time, although it was evident to me that she was consumptive, the most careful examination could elicit nothing but the physical signs formerly noticed, with the addition of occasional sonorous râle posteriorly and inferiorly, mingled with occasional mucous râle. Misty, foggy weather invariably added to her sufferings, while clear, dry weather, notwithstanding the cold, served to revive her. On the approach of winter in 1854, Dr Christison saw her with me, and confirmed the results previously arrived at from physical examination of the chest, and it was then resolved that she should spend some months at Clifton. During the journey she had a severe attack of hemoptysis, and this symptom prevented her going out for some time. Notwithstanding the assiduous professional care of Dr Symonds, the disease progressed, and she died the very day of her return to Edinburgh.

On examining the lungs, there was found great emphysema anteriorly on both sides, and considerable engorgment posteriorly and inferiorly. The middle and inferior lobes on the right side were hepatized from chronic pneumonia, and the upper lobes on both sides, but more especially on the right, contained circular patches of miliary tubercle, about three-fourths of an inch in diameter, irregularly scattered through the pulmonary tissue, communicating to it when pressed on externally, a nodular character. Between these isolated patches the lung was, with the exceptions just noticed, quite healthy.

In this case, which I occasionally saw during a period of ten years, I am satisfied that the ordinary physical signs of phthisis never were present. There was never dulness on percussion, or any indications of softening or of a cavity, and

the post-mortem examination betrayed a condition of the lungs which proved that the signs of bronchitis and emphysema, which had been present throughout her illness, were true indications of what really existed. The pneumonia, the more immediate effects of which caused death, was of comparatively recent occurrence, and the time of tubercular deposition cannot be fixed with certitude, although, judging from the symptoms, I am inclined to consider that it dated from the spring of 1854. Here then we have chronic bronchitis and emphysema, terminating in phthisis, without any physical sign being manifested indicative of the latter lesion throughout the whole course of the disease.

Case XVII.—On the 29th of November 1854, I saw a gentleman, æt. 57, in consultation with Dr Mercer Adam then of Dumfries, who was labouring under chronic laryngitis. He was anxious about his voice, which was of great importance to him, and complained of a troublesome flow of saliva, which had been excited some months previously by a very mild mercurial course. He could only speak in a hoarse whisper. There was frequent, abrupt, barking cough, accompanied by copious, watery frothy mucus, which he declared came from the mouth. Deglutition was difficult, and accompanied by some pain. Appetite capricious; pulse between 60 and 70, of moderate strength; general aspect sallow, and indicative of chronic disease. On percussing the chest, it was everywhere resonant anteriorly, and equal on both sides. On auscultation, the respiratory murmurs anteriorly were feeble, of equal length, the expiration here and there prolonged, with harshness of inspiration, but no other morbid sound. From the absence of voice, no change in the vocal resonance could be judged of, but cough elicited nothing unusual on either side. Posteriorly the dulness appeared somewhat increased, but equal on both sides, and neither respiration nor cough gave any evidence of disease, further than diminution of respiratory capacity, which was attributed to the obstruction existing in the larynx, with probable collapse of the lungs behind. The treatment was directed to supporting nutrition by

means of good diet and cod-liver oil, and a sponge saturated with a solution of nitrate of silver, of the strength of ℈ij. to ℥j. of water was applied to the pharynx, epiglottis, and glottis, every other day. This treatment, persevered in till the end of December, was productive of no benefit, and the troublesome flow of saliva continuing, opium, in grain doses, was given at night to check the secretion. Two or three grains of the drug, in grain doses, at intervals of six hours, succeeded in arresting the salivary secretion, for a period varying in extent from one to three days. At length, the opium seemed to cause unpleasant dryness of the mouth, and it was observable that the appetite had much diminished since its employment, while the general strength was correspondingly lessened. During all this time I frequently examined his chest, which always presented the same signs as when I first saw him ; and Dr Christison, who, on one occasion, examined his chest with me, also failed to detect any positive evidence of pulmonary tubercular disease. Towards the end of January, as it became apparent that no improvement was likely to be effected, he returned home. From this time emaciation progressed, notwithstanding the administration of the most nutritive substances. Deglutition was painful and difficult ; the mouth dry, for which chewing pyrethrum root, and other remedies, were employed without avail. The expectoration increased and became more purulent, the pulse mounted to 120, he could swallow nothing, and died February 26, 1855.

The post-mortem examination was conducted by Drs W. A. T. Browne and Mercer Adam, the latter of whom was so good as to inform me that " the mucous membrane of the larynx was found to be considerably hypertrophied. It presented no ulceration, or traces of ulceration, and its colour and appearance were nearly normal. Both lungs were extensively interspersed with tubercles, which were of all sizes, from that of a millet-seed to that of a boy's marble. These last were isolated tubercles—not aggregated masses—ends of which could be scooped out of its investing membrane. But, besides all this, certain portions of the parenchyma of the lung were completely infiltrated with the tuberculous deposit, so that they

resembled the dense hepatizations of pneumonia. At the apex of the left lung, there was a cavity the size of a pullet's egg, which was empty and dry. One or two smaller cavities were found in the right lung. Both lungs were very emphysematous."

In this case also, frequent examination of the chest convinced me, as it did Drs Browne and Mercer Adam of Dumfries, that none of the ordinary signs of phthisis pulmonalis were present. The post-mortem examination, however, revealed far more extensive tubercular deposition in this than in the former case, which, notwithstanding, was masked by the emphysema, and the diminished breathing from constriction at the larynx. Had the voice been perfect, it is probable that increased vocal resonance might have assisted our diagnosis; but, certain it is, that, notwithstanding every pains were taken, there was no physical signs to warrant our suspicion of the existence of phthisis.

In the following case, the bronchial signs, with consumptive symptoms, were present throughout; and I have no doubt tubercular deposition existed. In this instance, however, an arrestment of the latter was brought about, with recovery :—

Case XVIII.—Margaret M'Kenna, æt. 27, a worker in the fields, was admitted into the clinical ward of the Royal Infirmary, April 25, 1854. She stated, that six months previously, after exposure to cold and wet, she was seized with cough and expectoration, which had continued ever since. She admitted that there had been dry barking cough for a long time, and that, three years ago, she spat blood. For some months past, the appetite had been much impaired, and there had been diaphoresis at night. On admission, she presented a very emaciated appearance. The pulse was 112 weak, with a soft blowing murmur, synchronous with the systolic sound at the base of the heart. Catamenia suppressed, appetite abolished, and a sense of load in the stomach, after taking food; headache, and a sensation of great weakness, which prevented her walking. On percussing the chest, no

appreciable dulness was to be detected anywhere, the sound being clear and equal on both sides. On auscultation, with the exception of slight harshness with the inspiration, no morbid sign whatever could be discovered, either anteriorly or posteriorly; cough, however, was troublesome, attended with a tolerably copious muco-purulent expectoration. No sore throat, or alteration of the character of the voice. Under the use of cod-liver oil, and nutritive diet, with wine, her strength gradually improved. The appetite, however, continued to be impaired; and the diaphoresis at night, cough and expectoration continued. By the end of May, although the symptoms continued, her strength was so far improved that she could get up, and walk about the ward. A careful examination, on the 14th of June, again satisfied me and the clinical class, that none of the physical signs of phthisis were present, although the impairment of appetite, sweating, and extreme emaciation, continued. The cough and expectoration, however, were much less, and her diet was carefully regulated, so as to be as nutritious as possible, without overloading the stomach. She had ℥vj. of wine daily. She continued to improve very gradually; and the report on the 13th of November is, "Percussion good and equal over the whole chest, except over second intercostal space on left side, where there is a marked resonance when compared to the other parts of the chest. Over this place, and between it and left clavicle, the inspiration is very harsh, but the expectoration is not increased; here, also, the vocal resonance is somewhat increased. Over the rest of the chest, inspiration somewhat harsh, but equal. Blowing cardiac murmur still continues; pulse 80, soft and regular. Still weak, with perspiration at night, and disinclination for food. There is harshness of the voice." The laryngeal hoarseness continued throughout December, but disappeared under the use of topical applications of a solution of nitrate of silver with a sponge. She continued to present all the symptoms and general appearance of phthisis, the cough and expectoration being better and worse alternately, and her general strength being now greater, then less. In February and April 1855, the feet became œdematous, and the urine

albuminous, symptoms which disappeared under the action of diuretics. In May and June, there was considerable improvement. Gradually the expectoration and cough entirely ceased; the sweatings disappeared; she walked about perfectly well, though still looking thin, but at length her strength became good, and her general appearance and *embonpoint* greatly improved. On the 1st of July, I examined her chest with great care. There was positively nothing abnormal now to be discovered on percussion or auscultation, either anteriorly or posteriorly, with the exception of the slightest inspiratory harshness, and perhaps trifling increase of the vocal resonance under the left clavicle. She was then dismissed.

On considering all the circumstances of this case, I cannot but form the opinion, that notwithstanding the absence of any marked signs of phthisis pulmonalis, this woman still laboured under that disease. I would explain the slight indications which presented themselves, as being indicative of bronchial lesion, with perhaps trifling adhesion and condensation at the apex of the left lung, whilst a more scattered tubercular deposition, undistinguishable by percussion or auscultation, gave origin to the permanent cough and expectoration. In this as in the two former cases, all the symptoms were those of phthisis; and I ascribe the arrestment and subsequent recovery, in no small measure, to the readiness with which cod-liver oil and nutrients were taken, and the perseverance with which they were continued for nearly fifteen months.

From a consideration of the constant signs of bronchitis, and the frequency of emphysema as an accompaniment of phthisis, it must be evident that some cases are very likely to occur where the physical signs of the two former are likely to mask those of the latter. Especially, it is probable, that conditions of the lungs may exist, in which the augmented sonoriety of emphysema will so counterbalance the increased dulness of tubercular deposition, that the resulting note, on percussion, may assume a medium character, and thereby approach that of health. Whether such be the true explanation of the absence of positive signs, on percussion, in the foregoing cases, I will not pretend to say; but in the absence

of a more positive theory, I offer it as the most satisfactory that occurs to me.

Numerous other comments might be made regarding the relation of pulmonary tubercle to bronchitis, especially in their chronic forms; but I have contented myself, in this place, with pointing out the following important facts:—

1st. That phthisis pulmonalis may exist and prove fatal, and yet, *during the whole of its progress*, only give rise to the physical signs usually considered as indicative of bronchitis with emphysema.

2d. That such signs, when persistent with all the symptoms of phthisis, should render the physician very suspicious of the existence of pulmonary tubercle.

3d. That the analeptic treatment of such cases, and the avoidance of cough mixtures, or other means directed to the alleviation of mere symptoms, offers the surest means for procuring arrestment of the disease, and bringing about an ultimate recovery.

SECTION II.

Diagnostic Value of a Microscopic Examination of the Sputum.

A proper appreciation of the structure of sputum requires a thorough knowledge of histology, as, mixed with the expectoration, may be found—1st. The natural secretion of the salivary and mucous glands, with the epithelial structures of the mouth fauces and pharynx. 2d. All the structures that enter into the composition of the bronchi and lungs, in various stages of disintegration. 3d. The results of various morbid processes, in different stages of development or disintegration, such as the inflammatory, tubercular, or cancerous exudations, extravasations of blood, earthy concretions, etc.; 4th. All kinds of substances which enter into the composition of food, which adhere to the mouth and teeth, such as starch corpuscles, and the different elements which enter into the composition of the various vegetable and animal substances used as aliment; and 5th. Parasitic formations, especially *torulæ*, the *leptothrix*

buccalis, and *confervæ*, which I first pointed out as growing in chronic phthisical cavities of the lung.[1] Great pains and considerable time are also required in the examination, so as to satisfy the inquirer that nothing of importance has been overlooked.

Extensive examination of sputum with the microscope has, up to a recent period, served to persuade most scientific physicians that it was of little practical importance, inasmuch as percussion and auscultation yield us a more efficient and exact means of determining the changes which go on in the lung. The careful examination of sputum, however, by Dr Andrew Clark,[2] as well as some cases which have come under my notice, may induce them to modify that opinion.

Professor Van der Kolk of Utrecht[3] was the first who directed attention to the fragments of the elastic fibres of the lung in sputum, as occasionally being of diagnostic importance, and he has given the accompanying figures of their appearance.

Fig. 27. Fig. 28. Fig. 29.

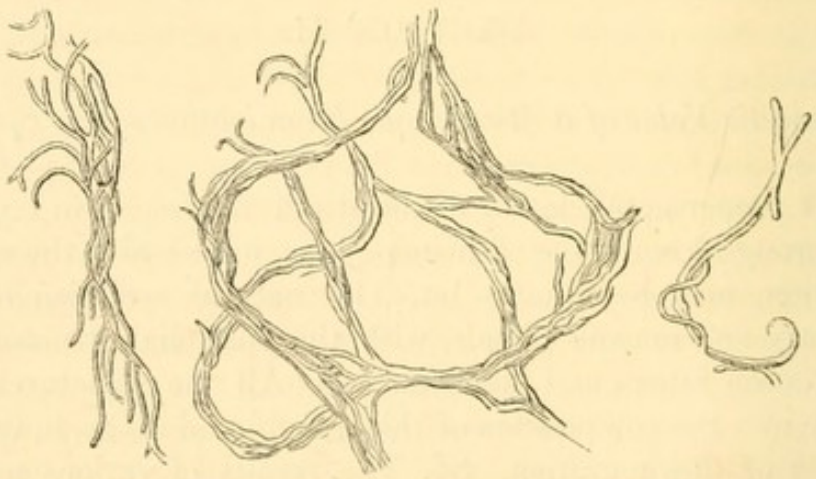


Fig. 27. Fragment of elastic tissue of the lung, in phthisical sputum.
Fig. 28. Fragment of areolar and elastic tissue, still exhibiting the form of air cells, from phthisical sputum.
Fig. 29. Another fragment. *Magnified 250 diameters.*

That such fibres were common in the sputum of consumptives, after ulceration of the lung has commenced, is easily proved,

[1] Transactions of the Royal Society of Edinburgh. 1842.
[2] Trans. of Patholog. Soc. of London, vol. vi. p. 74.
[3] Nederlandsch Lancet, 2 Serie. D. 1.

and has been familiar to myself for the last fifteen years. The important part of Van der Kolk's Memoir, however, is contained in the following passage :—" But we ought to determine if these fibres are only observed when phthisis is already well advanced, and produced great ravages, or if they exist in expectorated matter at the first formation of vomicæ, so that they enable us to determine their existence when commencing. My conviction, with regard to this important problem, is, that it is exactly at the commencement of phthisis, and at the first formation of vomica, that the elastic fibres were present in the greatest abundance, and that they may then be considered as among the most positive signs we possess of the presence of a cavern. Later, when the cavity has acquired a certain extent, these fibres become more rare in the expectoration, and are with difficulty distinguished." This statement is supported by a case, in which very insignificant signs could be determined by auscultation, although the general symptoms indicated phthisis—yet where the fibres existed in considerable numbers in the sputum, and led to a diagnosis, which was confirmed by the subsequent progress of the disease.

Such an instance as that described by Van der Kolk I believe to be very rare, and the question always arises whether the lungs were examined with sufficient care, so as to render it certain that, whilst fibres of elastic tissue, derived from those organs, existed in the sputum, no auscultatory sign could be detected. But that this does occasionally occur, I have now no doubt—1st, from the facts previously given, which show that advanced phthisis may exist without any positive signs; and, 2d, from the following cases which fully confirm the statement made by the distinguished Professor of Utrecht.

Case XIX.—In August 1854, I was consulted when in London by a lady, Mrs B., æt. 23, who had for some time suffered from cough, accompanied by muco-purulent expectoration. There was little emaciation, the general powers of the system did not appear to be much impaired, although she complained somewhat of weakness and diminution of appetite. Frequent cough, with expectoration, were the principal

symptoms. Careful percussion and auscultation of the chest (which was well-formed), elicited positively nothing: the percussion note was normal and equal on both sides; the respiratory murmurs distinctly audible, soft with their usual rhythm, free from all abnormal murmur—no increase of the vocal resonance. Repeated examination, especially in both sub-clavicular and supra-scapular regions, convinced me of this fact. The practitioner (W. T. Iliff, jun., Esq., of Kennington) who had previously attended her, and who was again subsequently called in, informed me, however, that she herself had an impression, that some time previously (in March), she was in the habit of spitting up fragments of her lungs. Mr Iliff had taken portions of the indurated matter expectorated to Mr Quekett, who, in fact, positively affirmed them to be pulmonary substance. At my request, Mr Iliff was so good as to forward to Edinburgh a portion of the expectorated matter, discharged during the March previous to my seeing the patient. It consisted of an oblong substance, about one-third of an inch long and one-sixth of an inch in thickness, and presented all the characters of a piece of lung infiltrated with tubercle. On examining sections of it under a magnifying power of 250 diam. linear, I, with some difficulty (the structure having been preserved in alcohol), determined the existence of circular bundles of areolar and elastic tissue, obscured by a mass of molecular matter in which tubercle corpuscles were imbedded. That this tissue was really expectorated by Mrs B., Mr Iliff entertains no doubt, as he himself removed it from a tenacious mass of expectorated matter. Subsequent to our correspondence on the subject, he also submitted it to Dr Beale, and Messrs Quekett and Rainey, of London, all of whom agreed as to the fact of its being a portion of human lung.

During the winter of 1854–5, Mrs B. continued tolerably well, and without medical attendance. Mr Iliff, however, was again called in on the 7th of April, and found that the disease had been slowly progressing. The expectoration was now increased and more purulent, and she had sensibly lost flesh and strength. On the 25th of May, Dr Latham was

consulted. There was then flattening at the left apex, and in his opinion a cavity there. She had also hectic fever, copious night sweats, diarrhœa, haggard countenance, emaciation, in short, the usual symptoms of the advanced stage. From this time, notwithstanding the most judicious treatment on the part of her medical attendant, the disease progressed rapidly, and she expired, July 26th. An examination after death revealed extensive tubercular disease in both lungs, with cavities in their apices; the left side being the one most affected.

The facts of this case serve, in my opinion, to establish, that there are instances in which the occurrence of disintegrated lung tissue may be detected by the microscope in the sputum, *before* any auscultatory signs are audible. On this latter point, I may observe that Mr Iliff could not detect such signs any more than myself, although he was in possession of the expectorated lung substance. There were also particular circumstances connected with my knowledge of the patient's friends, that made me unusually careful and anxious when making the stethoscopical examination; and certainly, in August 1854, five months after the pulmonary tissue was evacuated, there were no audible signs of phthisis pulmonalis. In reply to a question by me, as to how and when these signs first made their appearance, Mr Iliff stated that he could not tell, as, for many months, he was not in attendance. But I need scarcely remark that, between August 1854 and May 1855, there was ample time for the disease to have progressed to the formation of cavities.

Case XX.—Edward Campbell, æt. 30, a porter, was admitted into the clinical wards of the Royal Infirmary, September 5th, 1856. He stated that for twelve years he had been of very intemperate habits, unsettled in his occupation, and often insufficiently nourished. About one month ago he first noticed a short dry cough, attended with little expectoration until a few days ago, when it became rather copious and yellow. Four days ago, the sputum for the first time was tinged with blood; about the same time the stools became

frequent and loose, and severe night sweats appeared. He has been subject for some time to shiverings, but cannot remember any special rigours ushering in the present attack.

On admission, according to the report, "There is marked dulness on percussion at the apex of left lung, and laterally in the axillary region. There is also crack pot resonance over the left front, from the first to the fourth intercostal space. On auscultation, there are coarse moist râles, during inspiration and expiration, over the whole left lung, anteriorly, laterally, and posteriorly, with increase of vocal resonance, amounting to bronchophony superiorly. Over the lower third of the left lateral region, there is friction with inspiration. The right lung gives the normal results on auscultation and percussion. The sputum is copious, frothy, and streaked with blood; considerable dyspnœa; the cardiac organ is healthy; the pulse is 112, rather incompressible; the appetite bad; the bowels are regular; the skin hot; the face of a purplish hue; the patient is emaciated, weak, and lies on his back; does not sleep well; there is great tremulousness of the limbs; the urine is not coagulable, and it contains abundant chlorides; sp. gr. 1020."

The principal facts during the progress of his case were as follows:—The strength was supported by nutritious diet and wine, or occasionally gin. On the 11th of September the sputum was carefully examined, and yellow elastic tissue was discovered under the microscope. The physical signs on the left side were very slightly altered; the râles less numerous, and there was more bronchial breathing. At the right apex there was now dulness, harsh respiration, and occasional crepitation at the close of the inspiratory murmur. The fever, though still great, had considerably abated. Pulse generally 120, soft. From Sept. 21st to 30th, the pulmonary phenomena were little altered, although they were subject to remissions; but the diarrhœa, which the patient had before only slightly experienced, became very troublesome. On the 1st of October it was ascertained that he laboured under Acute Pericarditis, from the effects of which, conjoined with the pulmonary disease, he died, October 17th.

On dissection, the left lung was infiltrated throughout with grey tubercle; at the apex there was great condensation around three or four cavities containing pus, the largest being the size of a hen's egg. Numerous smaller cavities existed throughout the upper lobe, which, with the cut bronchi, poured out abundant pus on the texture being squeezed. The right lung was also infiltrated with grey tubercle throughout the upper lobe; at the apex there were two cavities the size of hazel nuts. Its inferior lobe was thinly scattered with the same tubercle, and was greatly engorged with blood and serum. Universal adhesions on both sides. Both layers of the pericardium were covered with villous lymph, generally about one-eighth of an inch in thickness. Between them were about two ounces of serum. The valves and substance of the heart were healthy. The abdominal organs were healthy.

On the admission of this man (September 5), he was labouring under intense fever. He had cough and expectoration tinged with blood; dyspnœa; livid face; hot, pungent skin; pulse 112, firm; dulness, with cracked pot sound on percussion over the left chest anteriorly; and coarse moist râles during inspiration and expiration. These were the symptoms of acute pneumonia in its suppurative stage. On the other hand, the disease was described to have come on a month ago with dry cough; there was no distinct rigour ushering in the attack; and the chlorides in the urine were abundant. Hence it might be a case of acute tuberculosis. His general aspect taught us nothing, as, without being robust, he was by no means emaciated. He was treated with gentle salines, in order to moderate the excessive fever; whilst wine, gin, and nutrients were liberally administered to support his strength. This treatment succeeded in somewhat diminishing the fever. On the sixth day after his admission, I carefully examined the sputum with the microscope, and found it to contain abundant fragments of lung tissue, mingled with numerous pus and a few blood corpuscles. This fact first clearly demonstrated the phthisical character of the disease.

All the circumstances of these cases, therefore, have impressed upon me the importance of a microscopic examination of sputum, whenever the symptoms, and a suspicion of phthisis pulmonalis exist, while the physical signs are absent or obscure. In this way many supposed cases of simple bronchitis, or of pneumonia, may be shown to be connected with disintegration of the lung in consequence of tubercle, and the real nature of the case thus manifested.

SECTION III.

A Clinical Investigation into the Diagnostic Value of the Cracked Pot Sound (Bruit de Pot Fêlé of Laennec).

I now propose to speak of that peculiar sound, which Laennec first likened to gently striking a cracked pot, and which, in his opinion, indicated the presence of a cavity, near the surface of the lung, in lean subjects with moveable ribs. It may be very closely imitated by crossing the palms of both hands, so as to leave a hollow between them, and then striking the knuckles of the inferior hand against the knee, so as to produce a clinking sound. It is so peculiar as not easily to be mistaken, and can be produced in the living chest much more readily by the hammer and pleximeter than with the fingers. To this fact I directed attention in the Monthly Journal of Medical Science for December 1854. I also pointed out in the same Journal for February 1855, that a marked cracked pot sound had been produced in a case where there was no cavity, but, on the contrary, only a mass of indurated tissue, surrounded by healthy spongy lung. Since then I have paid great attention to the production of this sound, and found that it could be produced on percussion in chests affected with a variety of diseases, and presenting apparently different physical conditions. I have found it to be common in pneumonia, in pleurisy with effusion, and in several healthy chests. No doubt it is also present when cavities exist; but the general notion with regard to this sound being

diagnostic of vomicæ, which has prevailed since the days of Laennec, requires modification. Further, it is highly important that our views with regard to it should, if possible, be rendered more exact.

To this end, the investigation of which I have now to give an account, was undertaken in the summer of 1855, on one hundred patients, who entered the clinical wards of the Royal Infirmary of this city under my care. This number might now be greatly extended; but I prefer limiting the inquiry to what was then accomplished, as no new fact has been since elicited. The one hundred patients were taken indiscriminately as they presented themselves, the choice being in no way governed by a desire to obtain a preponderance of chest diseases. One ward contained nothing but skin diseases, with very few pulmonary complications. Notwithstanding, on careful percussion of the chests with the hammer and plexi-meter, the patient's mouth being open, it was found that the cracked pot sound was distinctly produced in twenty-nine out of these one hundred cases. The name, age, physical condition of the chest, and, indeed, the history of every one of these cases, is minutely recorded in the ward books. I carefully percussed each chest myself publicly with the clinical class, and the following is a short tabular account of each case, in drawing up which I was greatly assisted by my then resident clinical clerk, Dr Wilson Fox, now of Newcastle-under-Lyne.

I have thought it of some importance to print this account *in extenso*, in order to satisfy auscultators that every care was taken in the examinations, and to show them at a glance, under what great apparent variety of conditions the same sound was produced. I have marked the twenty-nine instances in which the cracked pot sound was audible with a * and a number But it is very instructive to observe how similar was the physical condition of the chest in many cases, which elicited no cracked pot sound, to those which did do so. In short, the investigation, it appeared to me, would have been very incomplete, if the negative, as well as the positive cases, had not been recorded. By examining a number of cases indiscriminately also, I was led to the discovery that the cracked

pot sound was frequently producible in the perfectly healthy adult chest. Skoda and others allude to the fact that it may be occasioned by percussing the thorax of young children, a statement I have confirmed. But it may also, under certain circumstances, be elicited in the healthy adult chest, as the table will show :—

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
1.	Reekie,	M.	22.	*Chronic Pleurisy.*—The left side is dull on percussion anteriorly, posteriorly, and laterally. Respiration is totally abolished, and there is Œgophony. The right lung is resonant, and the respiration harsh and loud.	There has never been any cracked pot sound.
2.	Helan,	M.	22.	*Pleurisy.*—Over the right chest, anteriorly, there is remarkable loudness on percussion, but posteriorly and laterally, commencing at a line drawn vertically half an inch outside the nipple, there is complete and sudden dulness, not altered by change of posture. On auscultation over clear portion, loud cooing murmur accompanies inspiration, and double friction at the margin of dulness. Over dull portion, absence of respiration with bronchophony. On left side respiration everywhere puerile, with increased vocal resonance.	A remarkably loud cracked pot sound over whole anterior surface of right side, which, in six days, subsided. A slight cracked pot sound also under left clavicle, of short duration. * 1.
3.	Dick,	M.	36.	*Phthisis.*—On percussion, dulness under both clavicles —most marked under left. Slight dulness at right base posteriorly. (Patient was admitted a month previously with pleurisy on this side.) Respiration under left clavicle harsh and blowing. Expiration greatly prolonged. Fine moist râle in right	Distinct cracked pot sound under left clavicle. * 2.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				mammary region. Imperfect pectoriloquy exists under left clavicle. No râle.	
4.	Penman,	M.	35.	*Phthisis.*—On percussion, dulness under both clavicles—most marked under left. Dulness at left base posteriorly. Except under clavicle, percussion of right lung gives good resonance. Respiration under left clavicle harsh, with prolonged blowing expiration and attended with large loose râle. Fine moist râle, audible at left base posteriorly, where respiration is weak and distant. Over whole of right lung respiration harsh and expiration prolonged. Pectoriloquy under left clavicle. Vocal resonance increased under right.	Cracked pot sound exists under both clavicles. * 3.
5.	Gaffney,	M.	14.	*Enlarged Spleen and Liver. Leucocythemia.* — Dulness over whole of left side, as high as 2d rib. Right side above 4th rib in front and 7th rib behind, is resonant. Respiration feeble on left side, exaggerated on right. No râle on either side.	None.
6.	Baur,	M.	6.	*Favus of Scalp.*—No dulness on percussion over any part of chest. Respiration healthy throughout. Chest walls very elastic.	Loud cracked pot sound can be elicited on both sides over the whole space between clavicle and nipple. * 4.
7.	Campbell,	M.	43.	*Phthisis, Capillary Bronchitis.* — Percussion shows slight general dulness over both lungs. Marked dulness under left clavicle. Fine moist râles audible over both lungs, in front and behind. Vo-	Cracked pot sound loud on left side, not on right. * 5

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				cal resonance greatly increased under left clavicle, with fine moist râle. June 14. Loud gurgling under left clavicle, with pectoriloquy.	
8.	M'Queir,	M.	19.	*Pneumonia.*—Percussion shows dulness of whole of lower two-thirds of right lung, both in front and behind. Under right clavicle, the percussion note is tympanitic in character. Left lung gives good percussion. Respiration on left side and under right clavicle exaggerated. Over dull part of left lung it is bronchial, and attended with fine crepitation. Vocal resonance over dull part bronchophonic, under right clavicle somewhat intensified.	Cracked pot sound can be elicited under right clavicle, not under left. * 6. This sound continued after patient's recovery, when all physical signs had disappeared.
9.	Davidson,	M.	53.	*Right Pleuro-Pneumonia.*—On percussion base of right lung is dull both anteriorly and posteriorly, at the apex there is resonance. Left lung resonant throughout. On auscultation there is bronchial breathing over base of right lung, both in front and behind. Both friction and fine crepitation audible in left axillary region and at angle of scapula. Vocal resonance increased posteriorly. Left lung healthy.	Cracked pot sound under both clavicles. * 7.
10.	Storer,	M.	50.	*Chronic Pneumonia of Left Apex.*—Percussion gives dulness over upper third of left lung both anteriorly and posteriorly. Right lung resonant throughout. Bronchial breathing, with fine crepitation, heard over apex of left lung. Vocal resonance	Cracked pot sound elicited over left infra clavicular region, not in right. * 8.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				here bronchophonic. Respiration over right lung healthy.	
11.	Russell,	F.	34.	*Morbus Cordis.*—On percussion there is dulness at left base posteriorly. Good resonance under both clavicles. Breathing harsh, with fine crepitation and increased vocal resonance at left base posteriorly. Right side healthy.	Loud cracked pot sound under left clavicle, faintly marked under right. * 9.
12.	Taylor,	F.	30.	*Phthisis.*—On percussion, dulness exists at apices of both lungs, most marked at left. Respiration under both clavicles harsh, with prolonged expiration, attended at left apex with a thin gurgling râle, and at night with sibilant and sonorous râles. Pectoriloquy at both apices.	Marked cracked pot sound under left clavicle. None under right. * 10. Disappeared before death.
13.	M'Kinna,	F.	34.	*Arrested Phthisis.*—On percussion resonance tolerably good at both apices and over both sides of chest. Respiration somewhat harsh at apices. No râles.	None.
14.	Cooke,	F.	20.	*Chronic Pneumonia, Recovering.*—Percussion gives slight dulness at base of right lung posteriorly. Resonance good over left lung. Respiration bronchial at base of right lung, and vocal resonance increased. Respiration healthy on left side. With the mouth shut the percussion note is clear.	Cracked pot sound exists under both clavicles. * 11.
15.	Keith,	F.	34.	*Morbus Cordis, Emphysema.*—On percussion resonance good over both lungs. Sibilant and sonorous râles heard at both bases posteriorly.	Cracked pot sound exists under right clavicle, not under left. * 12.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
16.	Duncan,	F.	26.	*Chronic Pneumonia.*—On percussion there is dulness over whole of left side posteriorly, and under left clavicle as low as 4th rib. Bronchial breathing over whole of left side, with increased vocal resonance. Crepitation audible both anteriorly and posteriorly. Right side healthy.	Cracked pot sound exists under both clavicles. * 13.
17.	Boyle,	F.	30.	*Emphysema, Bronchitis.*—On percussion, resonance good on both sides. Sibilant and sonorous râles on both sides of chest.	None.
18.	Richmond,	F.	?	*Phthisis.* — Percussion gives slight comparative dulness under right clavicle, with slight harshness of inspiration, prolonged expiration, and increased vocal resonance. No râles. Left side healthy.	None.
19.	Roach,	M.	32.	*Phthisis*—Dulness on percussion exists under both clavicles, most marked under left. Respiration harsh under right clavicle, with prolonged expiration. Under left, friction attends respiration; expiration loud, prolonged, and blowing. Loud, dry, cavernous râle exists under right clavicle, not under left. Vocal resonance increased under right clavicle. Under left distinct pectoriloquy is heard.	Cracked pot sound exists under both clavicles, most marked under left. * 14.
20.	Stewart,	M.	56.	*Phthisis.*—On percussion, dulness is found at both apices anteriorly. Harsh respiration at both apices. Increased vocal resonance at both apices, amounting to imperfect pectoriloquy on left side. Fine moist râle at right apex. Dul-	None.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations
				ness with a fine moist râle at both bases.	
21.	Currie,	M.	14.	*Pleurisy* (four weeks).—June 16th. On percussion, there is dulness on left side anteriorly as high as 2d rib ; above this point the percussion tone is loud. Dulness on left side behind as high as spine of scapula. Percussion resonant over whole of right side. Respiration faintly audible over left side anteriorly, attended with fine friction from clavicle to nipple. Posteriorly respiration everywhere feeble, with friction below angle of scapula. On right side respiration puerile. Vocal resonance equal under both clavicles.	June 16th, Cracked pot sound under left clavicle, none under right. *15.
				June 23d.—The loud tone, on percussion under left clavicle, has disappeared. The other physical signs continue the same.	June 23, No cracked pot sound can be elicited anywhere over chest.
22.	Aitken,	M.	46.	*Chronic Double Pleurisy, with Retraction of Right Side.*—On percussion, the whole of right back is dull, as high as spine of scapula. Right base anteriorly somewhat dull. Under clavicle clearer then elsewhere, but duller than on left side. On left side resonance good except at base posteriorly, where sound elicited is deficient in tone. Distant bronchial breathing over whole right side. Vocal resonance under right clavicle greatly increased. No œgophony. Respiration under left clavicle normal ; here there is no increase of vocal resonance. At left scapular and infra mammary regions, friction may be heard.	Cracked pot sound under both clavicles—is more marked under left than under right. *16.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked-Pot Sound, with Observations.
23.	Smith,	M.	18.	*Pleurisy.*—June 2d. On percussion dulness on right side in front as high as 3 inches below clavicle. Above this, up to clavicle, there is a tympanitic note. Posteriorly, dulness as high as infra spinous fossa. On left side percussion normal. On auscultation, respiration over tympanitic spot blowing, with fine friction below; this is inaudible in front. Posteriorly, respiration audible all over back, but very weak. No friction. Vocal resonance greatly increased under clavicle. Respiration natural, though exaggerated on right side.	Cracked pot sound can be elicited over tympanitic spot under right clavicle, not under left. *17.
				July 7th.—Dulness now reaches to apex of right lung both in front and behind.	Cracked pot sound has entirely disappeared, and continued so until his discharge, August 23d.
24.	Lumsden,	M.	25.	*Diabetes Mellitus.*—On percussion, immediately under both clavicles percussion sound healthy. On left side, for 2 inches below 2d rib there is dulness, but not absolute. On right side, percussion good throughout. Auscultation healthy. Respiration healthy in both lungs, except over dull spot on left side, where the breathing is faintly bronchial, and vocal resonance increased. No râle.	None.
25.	Phillips,	M.	41.	*Incipient Phthisis.*—On percussion, resonance somewhat less clear under right clavicle than under left. Right base posteriorly less resonant than left. On auscultation, respiration slightly harsh at right apex anteriorly, with a	None.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				little fine moist râle inaudible at close of inspiration. Jerking respiration at right base. Left lung healthy.	
26.	Crawley,	F.	4½.	*Purpura.* — Percussion gives good resonance over whole of chest. Respiration normal.	Cracked pot sound exists under left clavicle, not under right. *18
27.	M'Bride,	F.	24.	*Phthisis.*—On percussion, dulness exists under left clavicle. Under right there is unusually clear resonance. Sibilant and sonorous râles, and a coarse moist râle under left clavicle. Sibilant and sonorous râles under right clavicle.	None.
28.	Aiken,	F.	9.	*Fever, Pneumonia, Bronchitis.*—Percussion gives dulness over right lung both in front and behind, except immediately under the clavicle where it is clear. Over left lung percussion is good. Sonorous and a little moist râle over left lung. Both fine and large moist râle over right lung both in front and behind. Vocal resonance inaudible.	Cracked pot sound exists distinctly under right clavicle, not under left. *19
29.	Drummond,	M.	67.	*Morbus Cordis.*—June 27th, Percussion over right side of chest is dull both in front and behind. On left side it is resonant. On auscultation, respiration on right side harsh, with fine moist râle both in front and posteriorly, and considerable increase of vocal resonance. Respiration on left side normal. No râle. No increase of vocal resonance.	June 27th, Cracked pot sound exists under both clavicles. *20.
				July 18th, Percussion	July 18th, Can be

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				clear over both lungs. Some sibilant râles in both. No moist râles. No increase in vocal resonance.	elicited under left clavicle, during inspiration, not under right.
30.	M'Kenzie,	M.	36.	*Phthisis.*—On percussion, dulness on right side in front as low as 4th rib. Whole of lung dull posteriorly. Left side clearer than right. Sonorous râle, and coarse moist râle both in front and behind. Vocal resonance increased, especially under right clavicle. Large moist râles on left side both anteriorly and posteriorly.	None.
31.	M'Queenie,	M.	25.	*Dyspepsia, Emphysema, Bronchitis.*—Loud resonance over whole of chest. Sonorous and sibilant râles on right side in front.	None.
32.	Ogilvie,	M.	18.	*Chronic Vomiting.*—Percussion gives slight dulness under right clavicle. None under left. On auscultation, under right clavicle, inspiration slightly harsh and jerking in rhythm. Expiration not prolonged. Vocal resonance greatly increased. No râle. Under left clavicle respiration normal.	Loud cracked pot under right clavicle, none under left. *21.
33.	Anderson,	M.	31.	*Emphysema, Bronchitis.*—Clear resonance over chest. Sibilant and sonorous râles, with respiration on both sides.	None.
34.	Smith,	F.	19.	*Rheumatism.*—Healthy lungs. Percussion gives good resonance over both. Respiration healthy over whole of chest.	Loud cracked pot note under left clavicle, none under right. On entering, a month ago, none was observable. *22.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
35.	Smith,	F.	19.	*Rheumatism.*—Healthy chest.	Faintly producible under right clavicle. * 23.
36.	Mure,	M.	13.	*Fever.* — Percussion slightly dull at both bases posteriorly. Good resonance anteriorly. Sibilant râles at both bases.	None.
37.	Abernethy	M.	41.	*Albuminuria.*—Percussion clear under both clavicles. Slight dulness and increase of vocal resonance at left base posteriorly. No râle.	Cracked pot sound under both clavicles. More marked under left than under right. * 24.
38.	Marshall,	M.	11.	*Favus of Scalp.*—Lungs healthy but chest wall very elastic.	Cracked pot sound can be elicited under both clavicles. * 25.
39.	Clarke,	M.	15.	*Impetigo of Face.* — Lungs healthy. Chest wall very elastic.	Present under both clavicles. * 26.
40.	M'Queen,	M.	57.	*Chronic Eczema.* — Lungs healthy. Percussion everywhere good. Respiration normal, and no increase of vocal resonance.	Marked cracked pot sound under left clavicle, none under right. * 27.
41.	Riddell,	F.	21.	*Diarrhœa.* — Lungs healthy. Percussion normal over whole of chest. Respiration healthy.	Cracked pot sound exists under left clavicle, not under right. * 28.
42.	Hogg,	F.	22.	*Morbus Cordis.* — Slight dulness on percussion over whole of right side. No râle.	None.
43.	Collins,	F.	21.	*Phthisis.* — On percussion, resonance deficient under both clavicles. Harsh inspiration under both, accompanied on right side by loose moist râle. Vocal resonance somewhat	None.

No. of Case.	Name.	Sex.	Age.	Disease and Physical Signs of Chest.	Cracked Pot Sound, with Observations.
				exaggerated, but equally so on both sides.	
44.	Macdonald	F.	24.	*Phthisis.*—Dulness exists on percussion under both clavicles, more marked under right than under left. Loose moist râle under both clavicles, more under left than right. Vocal resonance intensified under both.	None.
45.	King,	F.	26.	*Morbus Cordis.* — Percussion normal under clavicles. Dulness with loose moist râle at both bases posteriorly.	None.
46.	Bonts,	M.	18.	*Phthisis, Hemoptysis.*—On percussion, dulness under left clavicle. Whole left side somewhat duller than right both in front and behind. Harsh inspiration under left clavicle. Expiration almost inaudible. Vocal resonance and fremitus increased. No moist râles. Percussion and respiration on right side are normal.	Slight cracked pot sound under left clavicle, none under right. * 29.
47.	Peacock,	M.	46.	*Chronic Pleurisy* (12 weeks) *with Bulging of Right Side.*—Percussion dull on right side in front as high as 2d rib. Above this normal. Absolute dulness over whole of right back. Left side, percussion normal both in front and behind. Under right clavicle respiration is bronchial. Vocal resonance and fremitus are greatly increased here. Faint bronchial breathing audible over whole of right side. Rough friction heard at different parts. Left side, respiration exaggerated, otherwise normal.	None.
48.	to 100,			*Various Diseases.* — Chest healthy.	None.

In now endeavouring to analyse the above facts, it is important to observe, 1st, That the cracked pot sound was frequently absent in cases where our preconceived notions would have induced us to look for it. This was very observable in cases of phthisis, with all the signs of a cavity, as in Nos. 20, 27, 30, 43, and 44; and in two of these (Nos. 27, 30) the lungs were examined after death, and cavities were found, although of comparatively small extent. 2d, A second point of importance is, that it was found to be frequently present in pulmonary diseases where there was no cavity, as in four cases of pleurisy and several instances of pneumonia. 3d, It was shown to exist in several cases where neither symptoms nor signs gave any evidence of disease of the lungs. 4th, It was frequently observed in the same individual to come and go, evidently in consequence of changed physical condition in the lungs during the progress of the case.

With regard to the twenty-nine cases in which cracked pot sound was present, they may be arranged as follows:— Pleurisy, 4; pneumonia, 5; pleuro-pneumonia, 1; phthisis, 6; other diseases with pulmonary complication, 5; pulmonary organs healthy, 8.

Pleurisy.—Of the four cases of pleurisy (Nos. 2, 21, 22, 23), three were acute, affecting one side only, and one chronic, affecting both sides. Of the acute, two were on the right side, and one on the left. In the three acute cases, there was in all of them, immediately under the clavicle of the affected side, unusual clearness on percussion, and the production of the cracked pot sound was limited to the resonant space. Where double pleurisy existed (No. 22), there was resonance under both clavicles, and the cracked pot sound was elicited on both sides. In another case of pleurisy (No. 1), in which the whole of the left side was dull, without resonance on percussion anywhere, there was no cracked pot sound.

The analysis of these five cases of pleurisy therefore, in four of which the cracked pot sound was produced, whilst in one it was not, indicated, that it is only when this disease is partial—that is to say, where a small portion of resonant lung

still remains—that the sound can be produced. So far as these cases, therefore, are concerned, it would seem that there must exist a portion of spongy lung—that is, a portion of air—in the chest, in order that the peculiar sound may be elicited. That this, however, is not the only condition, seems indicated by a sixth case (No. 47), where there was dulness on the affected side everywhere posteriorly and anteriorly, except in the space above the second rib, where percussion was normal, and where no cracked pot sound could be produced. It is probable, therefore, that the spongy lung in pleurisy, forced upwards and compressed, must be in some peculiar state of tension in order that percussion over it produce the peculiar noise we are treating of. This seems proved by the fact that it is only in the four cases where the percussion note was unusually clear and tympanitic that cracked pot sound was caused, whilst in the case where the resonance was normal, and in the one where no resonance existed, it could not be produced. This conclusion is further strengthened by the fact that in No. 21, as soon as the loud tone on percussion under the left clavicle had disappeared, and in No. 23, as soon as dulness invaded the apex of the affected side, then the cracked pot sound could no longer be elicited.

Pneumonia.—Of the five cases of pneumonia, in which cracked pot sound was elicited (Nos. 8, 10, 14, 16, 28), two were acute, and three already chronic when the observations were made. Of the acute cases, in one (No. 8) the disease affected the lower two-thirds of the right lung, and percussion in the upper third was clear, where the cracked pot sound could be produced. In the other (No. 28), the disease affected the whole right lung, except the apex anteriorly; and the cracked pot sound was audible under the right clavicle. Of the chronic cases, in one (No. 10) the disease was confined to the upper third of left lung, where cracked pot sound was produced. In the other two (Nos. 14, 16), the sign was audible under both clavicles, although in the first the disease was confined to the base of the right lung, and in the other it affected the greater portion of the left lung only.

From these facts it seems evident, that although the same physical conditions may possibly exist in pneumonia as in pleurisy—namely, portions of spongy lung, rendered more or less tense by neighbouring condensation—there must be some other cause capable of producing the cracked pot sound. Hence, why should it exist over the healthy as well as over the diseased pulmonary organs? Its occurrence over healthy lungs will be subsequently alluded to. Among the 100 cases examined, there were no others than those above mentioned; so that, in every unequivocal case of pneumonia which occurred, the cracked pot sound was elicited.

Pleuro-Pneumonia.—In the single case of this disease (No. 9) in which the symptoms and signs of pleurisy and pneumonia occurred together, the cracked pot sound could be elicited under both clavicles, although dulness on percussion was only present at the base of the right lung, whilst at the apex it was resonant. This case, therefore, physically resembles the two instances of chronic pneumonia just alluded to.

Phthisis Pulmonalis.—Among the 100 cases examined were 14 cases of phthisis, in 6 of which the cracked pot sound could be produced, whilst in 8 it could not. Of the 6 cases (Nos. 3, 4, 7, 12, 19, and 46), the cracked pot sound was heard only under the left clavicle in 4 (Nos. 3, 7, 12, 46); and under both clavicles in 2 (Nos. 4, 19). In all the cases, it is stated that wherever the cracked pot sound could be produced, there was dulness on percussion, which was associated with more or less moist râle, or hoarse inspiration, with increased vocal resonance. The uniform dulness of percussion in phthisical cases contrasts remarkably with the equally uniform clearness in cases of pleurisy. It follows, that neither dulness nor clearness on percussion is necessary for the production of this peculiar sound.

Of the six cases of phthisis in which cracked pot sound could be produced, we had an opportunity of examining the body after death in four. Before proceeding to open the thorax, I endeavoured to produce the sound by percussing the

dead chest, and after making an opening in the trachea, and keeping the edges of the incision apart with a pair of forceps, I succeeded in doing so in three out of the four cases (Nos. 4, 7, 19), but not always on both sides after death, when it had been heard on both sides during life. The following are the facts elicited by dissection of the lungs in the four cases referred to:—

No. 4. *Penman.*—After opening the trachea, the cracked pot sound could be elicited over the cartilage of left fourth rib, but nowhere else. *Left Lung.*—The pleuræ everywhere firmly united by dense adhesions, but at the apex they were somewhat softer than elsewhere. In the substance of the lung, half an inch from the apex, was a cavity about five-eighths of an inch in its longest diameter, lined by a distinct membrane, and quite empty. The surrounding tissue considerably infiltrated with tubercle, having, however, a considerable amount of crepitant lung, so that it floated in water. Posteriorly and inferiorly the lung was highly congested and œdematous. Several small bronchi were obstructed by clots of blood. *Right Lung.*—Pleuræ on this side adherent over upper third of lung. The whole of upper lobe infiltrated with tubercle, and congested; not so spongy as on the other side, and readily sank in water. In the upper third of the lobe were several small cavities. Lower lobes considerably congested, but free from tubercle. In this case the cracked pot sound could be produced, during life, on both sides.

No. 7. *Campbell.*—On opening the trachea, a loud cracked pot sound could be elicited under the left clavicle. *Left Lung.*—Pleuræ everywhere firmly adherent, especially at the apex, where the united pleuræ were thickened nearly half an inch. Immediately under the clavicle there was a cavity the size of a small orange, lined by a membrane, and traversed by bands of pulmonary substance. The rest of the upper lobe was densely infiltrated with tubercle, and here and there were cavities varying in size from a pea to a hazel nut. Throughout the lower lobe, tubercle, also infiltrated, but to a less amount. *Right Lung.*—Pleuræ not adherent. A few tubercles were scattered through the upper lobe, but to no great

extent. A considerable mass of crude tubercle also was infiltrated into the tissue of the inferior lobe. In this case the cracked pot sound could be produced during life only on the left side.

No. 12. *Taylor.*—No cracked pot sound could be produced on the dead chest. *Left Lung.*—Pleuræ everywhere firmly adherent, especially at the apex, where they were much thickened. In the upper lobe were several cavities, the largest occupying the apex, and capable of containing a large orange. It was lined by a distinct membrane, and bounded anteriorly and posteriorly by very thin walls, in a few places composed only of the thickened pleuræ. Superiorly it communicated with several smaller cavities, which varied in size from that of a pea to that of a large bean. The intervening pulmonary tissue was densely infiltrated with tubercle. Numerous grey granulations were scattered irregularly through the inferior lobe, and the whole presented here and there a bluish and black tint from pigmentary deposit. *Right Lung.*—The pleuræ were only adherent at the apex, where they were much thickened. The summit of the lung was dense, and indurated from numerous puckerings and cicatrices in its substance, associated with cretaceous concretions. At the extreme apex in front was a cavity capable of holding a large walnut, surrounded by indurated and almost cartilaginous-like walls, and lined by a distinct membrane. The two inferior lobes contained several masses of grey tubercle, and the anterior free margin was very emphysematous. In this case the cracked pot sound could only be produced during life on the left side.

No. 19. *Roach.*—The trachea being opened, a cracked pot sound was elicited under the clavicle on the left side, but not on the right. *Left Lung.*—Pleuræ everywhere firmly adherent. The upper third of the lung was converted into a large cavity, covered only superiorly by the thickened pleuræ. It was traversed in various directions by bands of indurated tissue, and communicated inferiorly with smaller cavities all filled with pus. The inferior portion of the lung was throughout infiltrated with tubercle in various stages of softening. With the exception of a small portion at the extreme base

posteriorly, no part was spongy. *Right Lung.*—Pleuræ universally adherent. At the apex was a cavity of irregular form, measuring one inch and a half in its longest diameter. It communicated inferiorly with several smaller ones,—the intervening pulmonary substance, and the inferior lobes, everywhere infiltrated with tubercle, but not so dense or so much softened as on the other side. In this case the cracked pot sound could only be produced during life on the left side.

In all these cases, where a cracked pot sound was producible, it is to be remarked that a cavity was found after death; but in the case of Taylor (No. 12), it happened that although a large cavity existed on the right side, no cracked pot sound was audible. Hence, although in phthisis, where a cracked pot sound is produced, it is often found associated with a cavity, it follows that cavities may exist, without giving rise to this particular sign. The inquiry with regard to phthisis, however, cannot be considered to be complete, unless we attend to the eight cases of that disease in which the sound could not be elicited.

Of the eight cases (Nos. 13, 18, 20, 25, 27, 30, 43, 44) of tubercular lungs in which no cracked pot sound could be produced, there were three which presented the signs of softening at the apex (Nos. 20, 30, 44). In the two first the lungs were examined after death, with the following results:—

No. 20. *Stewart.*—No cracked pot sound could be elicited by percussion on the dead chest, after making an opening into the trachea. *Right lung.*—Tubercle very generally infiltrated throughout the whole of lung, having little spongy tissue. About an inch below the extreme apex was a cavity the size of a hazel nut. *Left lung.*—Tubercles were scattered through the lung, dense at apex, but no cavity.

No. 30. *Mackenzie.*—The chest was not examined by percussion after death. *Right lung.*—At the extreme apex posteriorly, was a cavity the size of a small walnut, traversed by bands of indurated lung tissue, and lined by a distinct membrane. Tubercle was very extensively infiltrated through the inferior lobes, having however considerable portions of spongy tissue. *Left lung.*—This lung was more extensively affected

with tubercle than the opposite one, and at the apex were three anfractuous cavities, the largest the size of a hen's egg.

It results from these facts, that cavities may exist in the lungs similar in position, size, and character with those over which a cracked pot sound may be elicited on percussion, without in themselves furnishing all the conditions necessary for its production. In the last two cases in which the lungs were examined after death, it will be seen that their respective ages were 36 and 44, and the elasticity of the chest might have been diminished. Again, it must occasionally happen, that in such instances direct communication with the bronchial tubes may be temporarily cut off or prevented, and hence the absence of the sound in question. On such a point, it is impossible to speak with certainty. But still the comparative frequency with which the sign may be elicited over tubercular cavities, renders it when present, in conjunction with other signs and symptoms of the disease, highly diagnostic of a cavern. It cannot be considered an infallible sign, however, even in phthisis, as it may be occasioned by mere indurated tubercular lung, as in the case I recorded in the Journal for February 1855, when the same physical conditions exist as in pneumonia at the apex.

Diseases with congested, collapsed, or emphysematous pulmonary complications.—These were five in number (Nos. 11, 15, 29, 32, 37). Of these there were three with *morbus cordis*, a disease in which pulmonary lesions are frequently induced (Nos, 11, 15, 29). One case is called "Chronic Vomiting," from the leading distressing symptoms which accompanied it (No. 32), whilst the other was a case of Bright's disease. In these five cases, the cracked pot sound was produced under both clavicles in three (Nos. 11, 29, 37), and under the right clavicle only in two (Nos. 15, 32). In determining the physical signs present in these cases, it will be found that physically they were essentially the same, and presented similiar exceptional facts, as occurred in other instances previously noticed. Thus in the three cases of morbus cordis, there was either dulness posteriorly and inferiorly, with resonance superiorly,

or there were evidences of chronic bronchitis and emphysema. In the case of chronic vomiting, there was dulness under the right clavicle, where the cracked pot sound was elicited, and in the case of Bright's disease, percussion under both clavicles was unusually clear, and the cracked pot sound was heard on both sides. These cases, therefore, only confirm the observations made in previous ones, namely, that the cracked pot sound may be produced over parts which are either dull or clear on percussion, and that it is not pathognomonic of any special pulmonary lesion.

Diseases without pulmonary complication.—The importance of percussing every case indiscriminately, whether there was disease of the pulmonary organs or not, is evident from our having been led to the discovery, that in eight cases out of the hundred, in all which the lungs were perfectly healthy, cracked pot sound could be elicited. (Nos. 6, 26, 34, 35, 38, 39, 40, 41). Skoda and Walshe allude to the fact, that in young children it can easily be produced. Indeed, I have found that if a child between the ages of three and six years takes a deep inspiration, and holds its breath for a moment, we can then always elicit the sound. But the ages of the eight cases of which we are now speaking were as follows, viz., 4½, 6, 11, 15, 19, 19, 21, and 57 years. Thus, seven out of the eight were not above 21 years, and four not above 15 years. In one man, however, nearly sixty, with a perfectly well-formed chest, the sound could also be produced. It follows that if this sign be so frequent in healthy chests, and especially in young persons, who are so commonly the subjects of phthisis, we have at once an explanation of how it happens, that the cracked pot sound may be elicited, even on the side of the chest where no disease exists, and why it is often double when only one lung is affected. There can be little doubt that the frequency of this sign in healthy chests is connected with the elasticity of the thoracic walls. It would also appear, from its constancy during a deep inspiration in children, that the tensity of air within the chest, alluded to under the head of pleurisy, is also an important condition.

Such, then, are the apparently opposing and puzzling facts, to which a careful analysis of the 100 cases have led us. Let us now endeavour to ascertain, 1st, what theory of the production of the cracked pot sound is consistent with these facts; and 2d, what utility the production of this sound is likely to serve as a diagnostic sign of disease.

Theory of the Production of the Cracked Pot Sound.

Any true theory of the production of the cracked pot sound must embrace all the known facts. It follows that, inasmuch as it may be produced in cases of pleurisy, pneumonia, and even in the healthy chest, the existence of a cavity as supposed by Laennec, or of a mixture of air and fluid, as stated by Piorry, is not essential. According to Skoda, when percussion is made over a cavity, it is compressed at each stroke, and a portion of air suddenly driven out of it into the bronchial tubes; the hissing murmur caused by the escaping air is mixed up with the ordinary percussion-sound of cavities, and this compound noise represents the cracked pot sound. That part of the theory, however, which considers a cavity necessary, is shown by the preceding facts to be incorrect.

It has been noticed by various observers, especially by Graves, Stokes, Williams, Hudson, Walshe, and Markham in this country, and by Martinet, Andral, Piorry, Roger, Skoda, Winterich, and others abroad, that a peculiar tympanitic tone, on percussion, is frequently produced in cases of pleurisy and pneumonia. An inquiry into the causes of these tympanitic and non-tympanitic sounds, or a review of the theories of Graves, Skoda, and others, is not my present object, and would lead me too far from the immediate subject of this investigation. Two excellent papers have been published regarding them by Markham[1] and Winterich.[2] The preceding facts, however, will show that the cracked pot sound is producible sometimes with the tympanitic and sometimes with the non-tympanitic percussion note; and it appears to me, that had attention been more carefully directed to the first sound

[1] *Monthly Journal*, June 1853. [2] *Medizinischen Neuigkeiten*, 5 Jahrgang.

instead of so exclusively to the latter phenomena, it would have probably been ascertained long since to have been as distinct and frequent as I have demonstrated it to be. Dr Markham observes of a case, in which there was an amphoric percussion sound, that on one occasion both he and Dr Sibson noticed distinctly the cracked pot sound near the same spot. The post-mortem examination showed that the right lung was gorged with blood and serum, but everywhere still retaining some portion of air.

On carefully considering what are the necessary conditions for the production of this peculiar sound, comparing these with the facts detailed, and referring to the well-known modes of producing the sound artificially, 1st, with the two hands crossed, and, 2d, by percussing with the pleximeter on a bladder containing a small quantity of air, it appears to me they are, as regards the chest, 1st, A certain amount of confined or tense air in the tissue of the lung; 2d, The sudden compression of this air by a solid body in its neighbourhood; 3d, Communication of this air with the external atmosphere.

1st. That a certain amount of air must be present is proved by its existence in all the twenty-nine instances in which the sound could be elicited. Thus, in pleurisy encroaching on the lung from below upwards, percussion is clear under the clavicles. Where the entire thorax was dull, there was no cracked pot sound (No. 1). We have also previously alluded to the fact, that in one case (No. 21), as soon as the clearness of tone under the clavicle had disappeared, and in another (No. 23), as soon as dulness invaded the apex of the affected side, the cracked pot sound could no longer be produced. The same observation applies to the cases of pneumonia, pleuro-pneumonia, congestion or collapse, proceeding from below upwards. On the other hand, where percussion is dull, as in pneumonia affecting the upper third of the lung, the confined air must exist below the diseased part, and be affected by the blow on percussion. In phthisis, with cavities, isolated or anfractuous, this condition is easily found. In healthy chests, especially in children, it may be easily demonstrated to occur, just when the chest is distended with air, as at the end of inspiration, thus affording the first essential condition.

2d. The sudden compression of the confined or tense air seems also to be a necessary condition in the production of the sound. This, however, may be effected in various ways. The blow of the hammer was in all the twenty-nine cases the immediate cause, but this could not operate in compressing the air unless the walls of the thorax were elastic, as we have shown it to be in most of those in whom the chest was healthy; or, unless in cases of diseased chest, the blow communicated vibrations to indurations over the lung, which thereby compressed the air. In the former case the blow would act directly, in the latter indirectly. Hence why in some lungs with elastic thoracic walls, during inspiration, it may be produced without disease, and why when elastic indurations occur, as in pleurisy, pneumonia, or phthisis, it may be elicited in disease. I have frequently observed, when percussing diseased chests, that the cracked pot sound diminishes in intensity after repeated percussions,—I presume from the tensity of the air being diminished by portions of it which have in this way been squeezed out of the space percussed.

3d. That there should be a communication between the air in the chest, and the external atmosphere, is proved by the invariable necessity of having the mouth and nostrils open before the cracked pot sound can be produced, and its immediate disappearance on shutting the mouth. After death, also, it can never be produced without previously making an opening in the trachea, or securing patency of the larynx. The necessity of this condition indeed serves, in my opinion, to explain how it happens that in several cases where cavities exist in the lung—that is to say, where confined portions of air are present, with elastic chests or indurated surrounding tissue—still the sound is not elicited. For it is easy to conceive that in such cases, the bronchi leading to the external atmosphere, or the cavities themselves, may at various times be filled with purulent secretion, mucus, blood, or other fluid, and that swelling of the bronchial lining membrane, or compression of the tube, may cut off the communication so necessary for the production of a peculiar note on percussion. Hence it appears to me why in phthisical cavities the sound comes and

goes—why it may be present or absent before death—but, above all, why this is no more an invariable sign of a morbid state than any other with which we are acquainted.

Although these appear to me to be the conditions necessary for generating the sound, it is very difficult to determine the exact physical state at any one time necessary for its production. I believe, however, it will be found to reside in a mixture of solid and aeriform parts, the latter of which are capable of being compressed by the blow of percussion. Sometimes the former surround the latter, as in the case of a cavity. At others, the latter lie over or upon the former, as in cases of pleurisy and dulness at the base; and occasionally the former lie upon or over the latter, as in pneumonia or infiltrated tubercle at the apex. In healthy chests a similar condition is produced by a full inspiration with elastic thoracic walls—as it is in a dead stomach rendered somewhat tense by air; in which last case, by percussing with a pleximeter and bringing the two walls of the organ near each other, the cracked pot sound may be produced—a statement originally made by Skoda, and the correctness of which has frequently been confirmed by myself.

Diagnostic Value of the Cracked Pot Sound.

A phenomenon which occurs in the general run of hospital cases, so frequently as twenty-nine in a hundred, and which was audible in twenty-one out of thirty-six pulmonary diseases in that hundred, must probably be considered a more common sign than any other with which we are acquainted. The character of the sound, also, is so peculiar and distinctive, is so easily produced when percussion is properly performed, and so little likely to be confounded with anything else, as to demand our careful attention. Yet it must be clear that it is in no degree pathognomonic, as it may be present in a variety of morbid states, and exists far more commonly in health, as we have shown, than is generally supposed. All these circumstances, however, are by no means opposed to its value in a diagnostic point of view. Indeed nothing, perhaps, has so

much tended to throw discredit on the physical diagnosis of diseases of the chest, or been more mischievous in practice, than the attempts to connect particular diseases with particular signs, of which the notion that crepitation is diagnostic of pneumonia, and that dulness on percussion under the clavicle is diagnostic of phthisis, are striking examples. Hence, although, *per se*, the cracked pot sound is of little value—of no more, indeed, than any other individual sign—it is, when conjoined with other signs *and symptoms*, capable in no small degree of assisting the physician in his diagnosis of thoracic diseases.

Dr Stokes noticed the existence of this sound in some cases of bronchitis in children, Dr Walshe has repeatedly observed it in infancy, and Dr Markham has elicited it in the case of an engorged lung, containing a certain amount of air, but without a cavity. But we are not aware that any attempt has yet been made to indicate, from the results of careful inquiry, the probable uses of this sign in practical medicine. It is very probable that it may subsequently be discovered in diseased conditions not yet observed by myself or others; but, among several which occur to me as very probable ones unnoticed for the present, I venture to give the following, as the results to which the present inquiry has led me, viz.:—

1st. That the cracked pot sound is far more frequent than is generally believed.

2d. That for its production, careful percussion, with the mouth open, should be practised with the hammer and plexi-meter.

3d. That it is not necessarily indicative of a cavity in the lungs, but may be present in various diseases of the chest, and even when the chest is perfectly sound.

4th. That, notwithstanding, in percussing the chest, we should never omit to do so when the mouth of the patient is open as well as shut, with a view of determining whether the cracked pot sound exists or not.

5th. If present, it indicates either healthy lungs, with very elastic thoracic walls, or else increased density mingled with confined or compressed air in the thorax.

6th. The youth of the patient, resonance on percussion, puerile or healthy respiration, and the absence of pulmonary symptoms, will serve to diagnose the healthy character of the lungs.

7th. If the usual signs and symptoms of pleurisy, with dulness, be present with the cracked pot sound, it indicates that a portion of spongy lung is still performing its functions, and is not far from the thoracic walls.

8th. If there be dulness under the clavicle with the mouth shut, and cracked pot sound when the mouth is open, it indicates a mixture of indurated tissue and of air—a circumstance which may occur in partial pneumonia or in phthisis pulmonalis —probably under other circumstances, such as aneurismal or other tumours compressing the lung.

9th. Partial pneumonia can only be distinguished from limited tubercular deposition under such circumstances, by the general symptoms on the one hand, and by the absence of signs of a cavity on the other. If these fail, the diagnosis is most difficult.

10th. But if there be symptoms and signs of a tubercular cavity, then the cracked pot sound indicates that such cavity has a direct communication with the larger bronchi, and through it with the external atmosphere.

11th. As this is the most common condition of tubercular cavities, the occurrence of the sound in such cases, though far from infallible, is still highly diagnostic.

The practical value of these conclusions, and the modifications in and extension of them, which may result from further clinical investigation, I shall not now dwell upon. It may be well to observe, however, that I have recently had a case in the clinical wards of the Royal Infirmary, where, with all the symptoms and signs of advanced phthisis, indicating small cavities at both apices, there was a remarkably loud percussion note over the left mammary region, with distinct metallic tinkling immediately under the nipple, at the close both of inspiration and expiration. The sound resembled a double *tink, tink*. It was supposed that pneumo-thorax existed,

yet a careful post-mortem examination showed no formation of air, as supposed by Graves, no lesion of the pleura whatever, and no cavity where the noise was audible, but small nodules of tubercles scattered through emphysematous pulmonary tissue, with a small cavity at each apex. Was the metallic tinkling propagated downwards from the cavity at the apex? This interesting question must for the present remain unanswered.

I think there can be little doubt that the remarkably characteristic cracked pot sound must be of greater importance than it has hitherto been considered, and that, if rightly interpreted, it is calculated to assist us, in an eminent degree, in rendering our diagnosis more complete and exact.

From what has been stated, few, I presume, will venture to dispute the immense value of physical signs in the diagnosis of phthisis pulmonalis. And I say this, because I feel satisfied that, notwithstanding everybody now-a-days employs stethoscopes and microscopes, there are few who derive from these instruments all the advantages they are capable of bestowing. I would take the liberty of recommending to certain writers, in their popular expositions of medicine, in future to avoid sarcasms which are only calculated to excuse indolence in students, and to depreciate the value of the scientific investigation of disease among practitioners. What advantage, for instance, can medicine derive from publishing the following passage:—"We wonder how many of the century of graduates sent forth from our University every year, armed with microscope, stethoscope, uroscope, pleximeter, etc., and omniscient of *râles* and *rhonchi*, sibilous and sonorous; crepitations, moist and dry; *bruits de râpe, de scie, et de soufflet;* blood plasmata, cytoblasts, and nucleated cells, and great in the infinitely little—we wonder how many of these eager and accomplished youths could 'unsphere the spirit of Plato,' or read with moderate relish and understanding one of the Tusculan dissertations, or who had ever heard of 'Butler's Three Sermons on Human Nature,' 'Berkeley's Minute Philosopher,' or of an 'Essay on the Conduct of the Understanding.'"[1] On this subject, I am of opinion

[1] Horæ Subsecivæ, by John Brown, M.D., p. 7.

that, if our university graduates can discriminate disease better by the skilful use of the microscope, and detect the *râles* above alluded to with the stethoscope so as to know their diagnostic value, it must be a matter of comparative indifference to mankind whether they are able to "unsphere the spirit of Plato" or not. It is, certainly, a good thing to possess the sagacity and practical tact of a Sydenham or an Abercrombie; but it is better still to have, *in addition* to this, the practised ears and pathological knowledge of a Laennec or a Louis.

CHAPTER III.

GENERAL TREATMENT OF PULMONARY CONSUMPTION.

From the previous study of the pathology of pulmonary consumption, we have been led to the conclusion, that it is a disease of the primary digestion, causing—1st, Impoverishment of the blood; 2d, Exudations into the lung, which present the characters of tubercular exudation; and 3d, Owing to the successive formation and softening of these, and the ulcerations which follow in the pulmonary or other tissues, the destructive results which distinguish them. It has also been shown, that circumstances which remove the mal-assimilation of food frequently check the tendency to repeated tubercular exudations, while those which previously existed become abortive, and that occasionally extensive excavations in the pulmonary tissue may, owing to like circumstances, heal up and cicatrise.

But although the fact of the recovery from phthisis pulmonalis, even in its most advanced stage, can no longer be denied, it has been argued that this is entirely owing to the operations of nature, and that the physician can lay little claim to the result. Andral, who early admitted the occasional cicatrisation of caverns, states this in the following words:—"No fact, he says, demonstrates that phthisis has been ever cured, for it is not art which operates in the cicatrisation of caverns; it can only favour this, at most, by not opposing the operations of nature. For ages remedies have been sought either to combat the disposition to tubercles or to destroy

them when formed, and thus innumerable specifics have been employed and abandoned in turn, and chosen from every class of medicaments." But if it be true, according to Hoffman, that "*Medicus naturæ minister non magister est*," it follows that by carefully observing the operations of nature, learning her method of cure, imitating it as closely as possible, avoiding what she points out to be injurious, and furnishing what she evidently requires, that we may at length arrive at rational indications of treatment. In short, a correct interpretation of the processes gone through during a spontaneous arrestment of the disease, must be the foundation for those principles which should regulate the interference of art.

Now, a careful examination of phthisical cases will, I think, show that the great obstacle the practitioner has to contend with are the dyspeptic symptoms, which render all his efforts at nourishing the patient in the ordinary way useless. Such individuals have a most capricious appetite, frequently loathe all kinds of animal food; and it will be found that even when they *say* that the appetite is good, and that they live well, the diet actually consumed is either deficient in quantity or in quality. Nothing, again, is more common in the progress of such cases than the temporary improvements which follow a change of diet, of locality, or of temperature. How frequently do poor patients, on coming into an hospital, get better merely from enjoying rest and the regular diet of the institution. How often, after a short journey, or on reaching what has been considered a favourable locality, are the friends of consumptive patients in the higher classes rendered happy by the temporary marked improvement which takes place. I consider that such amendments will always be found commensurate to the stimulus given to the nutritive processes of the economy.

From the foregoing considerations it follows that the cure of pulmonary consumption by art, will be proportionate to our power, 1st, Of improving the faulty nutrition which is the cause of the exudation assuming a tubercular character; 2d, Of favouring absorption of the exudation already poured out; and 3d, Of preventing the recurrence of fresh exudations by

careful attention to hygienic regulations. I propose making some observations on each of these heads, as preliminary to the special treatment of individual cases.

SECTION I.

First Indication—To improve the Faulty Nutrition, which is the Cause of the Exudation assuming a Tubercular Character.

To improve the faulty nutrition which originates and keeps up the disease, it is of all things important to cause a larger quantity of fatty matter to be assimilated. A mere increase in the amount, or even quality, of the food, will often accomplish this, as in the case of Keith (Case I. p. 47). The treatment practised some years ago by Dr Stewart of Erskine, which consisted in freely administering beef-steaks and porter, and causing exercise to be taken in the open air, excited considerable attention from its success. But in order that animal diet should be digested and assimilated, the powers of the stomach and alimentary canal must not have undergone any great diminution. In most cases it will be found that the patient is unable to tolerate such kind of food, and that it either lies undigested in the stomach, or is sooner or later vomited. Under these circumstances, fluid fatty matters themselves are directly indicated, by giving which we save the digestive apparatus, as it were, the trouble of manufacturing or separating them from the food. By taking a considerable quantity of oil, a large proportion of it is at once assimilated, and is rendered capable of entering into combination with the albumen, and thereby forming those elementary molecules so necessary for the formation of a healthy chyle. Such, it appears to me, is the rationalé of the good effects of cod-liver oil.

Since I introduced cod-liver oil to the notice of the profession in this country, as a remedy for pthisis, in 1841, I have continually prescribed it in hospital, dispensary, and private practice. I need not perhaps say, that I have given it in a very large number of cases, and have observed its effects in all the stages of the disease, and under almost every cir-

cumstance of age, sex, and condition. I have had the most extensive opportunities of examining the bodies of those who have died after taking it in considerable quantities, and am still observing the cases of many persons who may be said to have owed their lives to its employment. Further, I have carefully watched the progress it has made in the good opinion of the professional public, and perused all that has been published regarding it in the literature of this and other countries. It were certainly easy for me, therefore, to write at great length on this subject; but it appears to me unnecessary to dwell on the utility of a remedy which experience has now rendered so obvious. It need only be said with regard to cod-liver oil, that although at first many eminent practitioners felt more or less sceptical as to its value, and therefore delayed giving it, I have not heard of one who, after employing it in a few cases, has retained any doubt as to its importance in scrofulous and consumptive cases.

The general opinion of the profession with regard to cod-liver oil, may be said to have fully confirmed what I formerly stated concerning it in the following words, viz., "That no remedy has so rapidly restored the exhausted powers of the patient, improved the nutritive functions generally, stopped or diminished the emaciation, checked the perspiration, quieted the cough and expectoration, and produced a most favourable influence on the local disease. Many individuals presenting the emaciation, profuse sweats, constant cough and expectoration, as most prominent symptoms, with a degree of weakness that prevents their standing alone, after a few weeks' use of it, are enabled to get up with ease and walk about, with a visible improvement in their general health, and an increased amount of flesh. The physical signs of the disease may continue unaffected for some time; but if the treatment be continued, the moist gurgling rattles are exchanged for dry blowing sounds, which become more and more persistent, pectoriloquy is merged into bronchophony, the respiration is easier, and a check is evidently given to the ulcerative process, and the formation of purulent matter in the air passages."[1]

[1] Appendix to Treatise on the Oleum Jecoris Aselli, p. 189.

The following is a summary of my views regarding cod-liver oil, as a remedy for pulmonary tuberculosis :—

1. Cod-liver oil is, as M. Taufflieb pointed out, an *analeptic* (*αναλαμβανω*, to repair), and is indicated in all cases of deranged nutrition dependent on want of assimilation of fatty matter.

2. It is readily digestible under circumstances where no other kind of animal food can be taken in sufficient quantity to furnish the tissues with a proper amount of fatty material.

3. It operates by combining with the excess of albuminous constituents of the chyme, and forming in the villi and terminal lacteals those elementary molecules of which the chyle is originally composed.

4. Its effects in phthisis are, to nourish the body, which increases in bulk and in vigour; to check fresh exudations of tubercular matter; and to diminish the cough, expectoration, and perspiration.

5. The common dose for an adult is a table-spoonful three times a-day, which may often be increased to four, or even six, with advantage. When the stomach is irritable, however, the dose to commence with should be a tea or dessert-spoonful.

6. The kind of oil is of little importance therapeutically. The pure kinds are most agreeable to the palate; but the brown coarser kinds have long been used with advantage, and may still be employed with confidence whenever cheapness is an object.

7. I have never observed its employment to induce pneumonia, or fatty disease of the liver or kidney, however long continued, although such complications of phthisis are exceedingly frequent.

It has been argued, that if it be merely the assimilation of fatty matter which is required to improve the faulty nutrition in consumption, any kind of oil would answer the purpose. Now, as I have previously stated, whenever fat in any form, or food rich in fat, can be digested, benefit is sure to follow; and hence, in certain cases, the well-known good effects which have been obtained from the use of milk, especially asses' milk. Cream

and butter have also been given largely. Ascherson has recommended caviar, and Popken fat bacon, with partial success. I have seen mutton and pork chops do wonders, but then the appetite and stomachic functions have been far better than is usually to be found among phthisical cases. I have also been informed that, in some parts of America, cures have been brought about by living on the bone marrow of the buffalo, and that the consumptive patient gets so strong in this way, that he is at length able to hunt down the animal on the prairies. I have also given skate, shark, and dog-fish oil with good effect. Again, vegetable oils have been tried, but the purest of them, such as the almond and olive, produce, in the majority of cases, a purgative action, and thereby diminish instead of improving the strength. Linseed oil has been largely tried by Rust and others, who have given it in mistake for cod-liver oil, and found it to be of little service. Cocoa nut oil has been recommended by Dr Theophilus Thompson. But although the occasional success of various kinds of fatty matters and of fatty food, when assimilated, confirms the general principle which, under the head of pathology, I have endeavoured to establish, the universal result of experience is, that no substance hitherto known is so easily tolerated by the stomach, and is of such general application as an analeptic in tubercular diseases, as cod-liver oil.

But even this substance, in a few rare cases, cannot be retained on the stomach, and efforts have been made to introduce fat into the economy by some other channel, such as by the skin or rectum. Frictions with oil and unguents were largely employed by the ancients, and constituted part of the system of training their athletæ. More recent observations have shown that butchers, cooks, oilmen, tallow-chandlers, tanners, and other individuals who are continually coming in contact with fatty matter, are for the most part particularly robust and well nourished, and are less liable than others to tubercular disease. It has been said that the children and young persons employed in wool factories, where large quantities of oil are daily used, are generally exempt from scrofula and from pulmonary consumption. Such facts have led to

the supposition, that a certain amount of fat may, by entering the lymphatics of the skin, so affect the chyle as to render it more nutritive; and that, in cases where oil cannot, without great difficulty, be tolerated by the stomach, advantage may be derived from introducing it through the integument. Such a practice, indeed, has been recommended by Dr Baur of Tubingen,[1] who has given several instances where the scrofulous disposition has been removed by rubbing in different kinds of oil, or by taking oil baths. Some time ago, I caused a cod-liver oil ointment, manufactured by the Messrs Parker of Leith Walk, to be used externally; but, unfortunately, the constant smell proved to be more annoying than the unpleasant taste and eructations. Even the purest vegetable oils, used externally, cause great trouble in applying them, stain the linen and dress, occasion most disagreeable sensations of uncleanliness, and, to the poor, are very costly. Persons occasionally get better under this as they do under every other kind of treatment, but extensive experience has now proved that the external application of oils has little or no effect in supporting nutrition.

In a letter which I received from Dr Buist of Aberdeen, on the 23d of June 1853, he informs me that he was induced by the consideration that the rectum was a more reasonable channel than the skin for introducing nourishment, to try oleaginous enemata. These were composed of a couple of wine-glassfuls of cod-liver oil, a table-spoonful of wine, the same quantity of arrowroot, beat up with eight or ten ounces of warm water, to which was added sixty drops of laudanum. I have since tried this mode of administering oil, and in a few cases with temporary advantage. I fear, however, that the objection to the constant use of enemata will, by the majority of persons in this country, be stronger than that against continued inunction. In cases, where the stomach is obstinately intolerant of food, this plan should be tried, with a view of reanimating the vital powers and of gaining time. But after all, it must be evident that as nature never intended mankind to be permanently nourished

[1] Archiv. für die gesammte Medicin. von. Häser. Bd. 1. s. 256; and the Author's Treatise on Cod-Liver Oil, p. 56.

either by the skin or by the rectum, so in imitation of her processes, the object of an analeptic treatment in pulmonary consumption must be to cause the elements of food to be taken by the mouth, to diminish the dyspeptic symptoms, and induce assimilation by the lacteal rather than by the lymphatic vessels.

SECTION II.

Second Indication—To favour Absorption of the Exudation already poured out, and subdue the Symptomatic Fever produced.

We have seen that the changes which occur in the blood-vessels and their contained blood, preliminary to a local tubercular exudation, are of exactly the same character as when a simple or inflammatory exudation occurs, and that the difference between the two consists in the diminished power of growth possessed by the former. The symptoms which accompany the actual period of exudation vary in intensity according to its amount, extent, and the rapidity with which the local changes occur. In their nature, however, they are exactly the same as characterise the various so-called inflammatory diseases of the lungs, such as pneumonia, bronchitis, and pleuritis. Indeed, these lesions are the constant accompaniments of pulmonary consumption and occur more or less rapidly—that is, they are acute or chronic. Hence all kinds of intermediate changes between the simple and tubercular exudations are constantly going on in the progress of a case; and the phenomena of phthisis, pneumonia, pleurisy, and bronchitis, in their acute or chronic forms, may appear together, and be inextricably mingled, or they may succeed each other at intervals. This circumstance, which is so puzzling to the inexperienced practitioner, and often leads to such errors in diagnosis and treatment, affords to the pathologist who can detect them by auscultation, the most accurate information as to the progress of the disease, and the character of the remedies he should employ.

Pulmonary consumption is undoubtedly, for the most part

a slow and insidious complaint; but the careful observer will not fail to remark, that it is scarcely ever free from exacerbations, characterised either by their febrile character or by increased cough and local pain. These are only too frequently attributed to "attacks of cold" by the patient, and their nature is not even guessed at, unless a careful diagnosis has been made by a physician. But when phthisis has been recognised, these febrile attacks and so-called "colds" resolve themselves either into the occurrence of a repetition of the tubercular exudations, or into intercurrent pneumonia, pleurisy, or bronchitis. In some cases, indeed, these attacks are scarcely perceptible, and the disease runs a slow and insidious course throughout; in others they are frequent, and occasionally so violent and severe that the individual dies rapidly, constituting a so-called "galloping consumption." Between these two extremes there is every kind of gradation, which defy description, but which will be readily understood by the pathologist. Consequently, the great problem to be worked out in the treatment of pulmonary consumption is that, while on the one hand it is originally a disease of diminished nutrition and weakness, and consequently requires a general invigorating and supporting system of treatment, that on the other it is accompanied by local excitement, which demands an antiphlogistic and lowering practice. These two opposite indications have created the greatest confusion in the minds of practitioners, and hence the long disputes about the phlogistic and antiphlogistic nature of phthisis, whether it be inflammatory or non-inflammatory, whether it should be treated by bleeding and tartar emetic or by tonics and good diet.

Although the general notion of those who have maintained the inflammatory origin of tubercle is pathologically correct, in so far as it depends upon an exudation of the liquor sanguinis, the practice founded upon this doctrine has led to the most unfortunate results. Experience in recent times has demonstrated that even uncomplicated cases of pneumonia, where hepatization is well marked, so far from being benefited by bleeding and antiphlogistics, recover more frequently, sooner and better under an opposite line of treatment. This fact,

indeed, is now universally acknowledged; and although some endeavour to explain the present revolution in practice, by supposing that the disease has undergone a change in its type, it seems to me certain that it is not because an inflammation is different now to what it was thirty years ago, or because the human constitution has changed, so much as to an improved diagnosis and pathology, that we must ascribe the alteration.

Inflammation consists in a series of changes in the nervous, sanguineous, vascular, and parenchymatous functions of a part terminating in exudation of the liquor sanguinis, or what some call effusion of lymph. Now, what proof is there that any of these necessary changes have of late years undergone modifications? If a healthy man receive a blow, or any other injury on his person, are the resulting phenomena in these days in any way different from those which took place in the days of Cullen and Gregory? Were the effects which followed wounds received at the battle of the Alma different from those which resulted from similar injuries at the battle of Waterloo? This has not yet been shown. Do we observe any essential difference in our civil hospitals in the effects of injuries, or in the process of healing, after wounds and operations? This also has not been shown. Again, if a healthy individual now-a-days be exposed to cold or wet, and be seized with an inflammation of the lungs or pleura, is not the lung hepatized in the one case, and do not layers of organizable lymph form in the other, in exactly the same way as formerly? If so, is not hepatization removed, and does not the lymph contract adhesions in the same manner now as in the days of Cullen and Gregory? More of these changes have been shown to be materially modified in recent times; and if they have not, in what can it be said that inflammation and its results have changed within the last twenty years?

As to the vigour of the human constitution, the theory of change of type, if it mean anything, proceeds upon the supposition, that when a man of average strength now-a-days is seized with inflammation, he presents all the symptoms that used to be observed in a weak one. This is asserting that the human race has so degenerated within the last twenty years,

that the lowering treatment which formerly was beneficial is now injurious. But so far is this notion from being supported by facts, that it might easily be shown that in Great Britain mankind is more vigorous, better fed, clothed, and housed, and that human life is more valuable than it was formerly. Mere opinion, however, could never establish one doctrine or the other. But in countries where medical science has not advanced in the same ratio as it has done with us, as in Spain and in Italy, the old practice is still fostered, and with the same fatal results. Are we then to believe that whilst the people of England, France, and Germany have degenerated, in Spain and Italy only they have retained their pristine vigour? I need scarcely say that every known fact is opposed to such an idea. Some have even gone so far as to attempt an explanation of the supposititious fact, thinking that the use of potatoes, of tea, or the introduction of railways, has something to do with it. Dr Watson is of opinion that it is attributable to the epidemics of cholera, which "leave traces of their operation on the health and vitality of a community, long after they have ceased to prevail as epidemics." (*Practice of Physic*, 4th edition, p. 97). Mr Robertson of Manchester is satisfied, from experience, that it is since the boil epidemic appeared that the change has taken place (*Edin. Med. Journal*, Oct. 1857, p. 299). Surely it would be well, before speculating as to causes, to determine, in the first place, whether the alleged change in pulse and type has taken place at all. How often do our senses deceive us, when objects are at hand! How little can they be depended on when it is simply asserted by this or that practitioner, that a pulse was stronger twenty years ago than it is now! Yet we have no further evidence than this advanced by the supporters of a theory, which claims for its fundamental fact a diminished vital force in the heart and pulse of man and animals, to explain a change of medical practice. It so, happens, however, that there is no subject in all physiology with regard to which we possess more elaborate and more exact information than we do concerning the pulse. Hales published a remarkable series of experiments, in reference to the static force of the pulse in 1731, and similar

observations made by Poiseulle in 1828, by Valentin in 1844, by Ludwig in 1847, and by Vierrordt so late as 1855, show that no great variation has taken place during 127 years. What proof has been advanced by the supporters of change of type to show that there has? Certainly none whatever.

I am persuaded, therefore, that an explanation of our improved practice in modern times is not to be sought for in the idea that organic diseases have recently changed their nature, or that the symptoms accompanying them are different from what they used to be. But if you attend to the altered views of their pathology which now prevail, the reason will be seen at once. Thus, when an exudation is poured into the pulmonary air vesicles and bronchi, the rapidity of its resolution will depend upon its extent, constitution, and the general vital power of the individual. Should it remain fluid for any time, it may repass into the vessels without further change, or be expectorated. But in the great majority of cases it coagulates; and histological observation has shown that its subsequent absorption is dependent on its being transformed into cells, which are more perfect and more rapidly developed and disintegrated, and consequently sooner got rid of, according as the vital powers and state of nutrition of the individual are more perfect. On the other hand, whatever lessens the general strength of the system, checks this cell development in the coagulated exudation, and delays the transformation through which it must pass before it can be absorbed. Hence the great effort of the practitioner, so far from diminishing the strength, ought to be to support it, and favour cell growth and disintegration: then, when the blood is loaded with the effete matter thus introduced into it, to assist its excretion by means of diaphoretics, diuretics, and purgatives, according to circumstances.

Hitherto bleeding in pneumonia has been made dependent, not so much on the pathological state of the lung, as upon the general condition of the patient, and upon the force of the pulse. It has been supposed that, by abstracting a considerable quantity of blood from the system, we act upon the vessels of the inflamed part, and prevent the extension of the disease. But venesection can only lessen the amount of blood

in any internal organ, by operating on the system generally, and diminishing the force of the heart. In doing so, however, we weaken the powers of the economy, and this at a time when the febrile symptoms prevent nourishment from being introduced by the alimentary canal. But it has always appeared to me, that when hepatization has occurred to any extent, our chief object should be, not to attempt lessening the blood in the inflamed part, the possibility of which, by means of a general bleeding, is very doubtful; not to diminish the congestion of the neighbouring parts, under the idea of preventing an extension of the disease,—but to relieve the affected organ of the coagulated exudation which is pressing upon the vessels, impeding the circulation and obstructing the entrance of air. Indeed, it must be clear that this latter is the essential process to be favoured, and all known facts prove that a check to the vital powers of the economy is directly opposed to its accomplishment.

From a careful investigation into the effects of different kinds of treatment in pneumonia, it would appear that the result of a vigorous antiphlogistic practice as carried on upwards of twenty years ago, is a mortality of 1 in 3 cases; that the result of a treatment by tartar emetic in large doses, according to Rasori, and more recently to Dietl, is a mortality of 1 in 5 cases—but according to Laennec, 1 in 10 cases; that the result of moderate bleedings, as in the treatment of Grisolle, is a mortality of 1 in $6\frac{1}{2}$ cases; and that the result of a dietetic treatment with occasional bleedings and emetics in severe cases, as with Skoda, is a mortality of 1 in 7, and if pure, as under Dietl, a mortality of 1 in 13 cases, all carried on in large public hospitals. Further, that the mortality from pneumonia in the army and navy, occurring generally among healthy able-bodied men, has been also a mortality of 1 in 13 cases. Lastly, that the result of a treatment directed to further the natural progress of the disease as practised by me, is, among patients in the clinical wards of the Royal Infirmary of Edinburgh, under my care, up to this time (September 1859) a mortality of 1 in 27 cases.

From these facts it follows that uncomplicated pneumonia,

especially in young and vigorous constitutions, almost always gets well, if, instead of being lowered, the vital powers are supported, and the excretion of effete products assisted. It is exactly in these cases, however, that we were formerly enjoined to bleed most copiously, and that our systematic works even now direct us to draw blood largely and repeatedly in consequence of the supposed imminent danger of suppuration destroying the texture of the lung. Such danger is altogether illusory, and the destruction to lung tissue, so far from being prevented, is more likely to be produced by the practice. In fact, the only cases in which it occurs are in aged or enfeebled constitutions, in which nutrients and not antiphlogistics are the remedies indicated. We can, however, readily understand how blood-letting, practised early and in young and vigorous constitutions, does less harm, or, to use a common expression, "is borne better," than when the disease is advanced or the patient weak, and this, because then the vital powers are less affected by it. Hence the diminished mortality in the second series of Louis' cases, and probably in the army and navy cases. But that it cures the greater number of persons attacked, or shortens the duration of the disease, is disproved by every fact with which we are acquainted.[1]

Such are the views which, for some time, have regulated my treatment of pulmonary lesions, and they appear to me capable of accounting pathologically for the good results of that remarkable change in practice which has lately taken place with regard to bleeding in these diseases. If they be sound with regard to a simple pneumonia, I need not say that they apply with increased force to cases labouring under an essentially debilitating disorder like pulmonary consumption. Accordingly, universal experience has lately demonstrated that, in the last-named disease, not only are a good diet, cod-liver oil, and abstinence from lowering remedies, the best means for correcting the general nutrition, but that they also

[1] For a more lengthened exposition of his views on this subject, and for an account of the opinions elicited during the Blood-letting Controversy of 1857–8, the author must refer to his *Clinical Lectures on the Principles and Practice of Medicine*. 3d edit. Edinburgh, 1859.

secure the most rapid disappearance of the exudation; convert the moist rattles of the lung into dry sounds; favour the contraction of cavities, and convert such tubercles as have not softened into cretaceous matters, by inducing absorption of their animal matter.

What has tended, perhaps, more than anything else to favour moderate general bleedings in acute phthisis, as well as local bleedings during the exacerbations in the course of chronic phthisis, is the temporary relief they occasion. I consider that there is no fact better established in practical medicine than that a considerable amount of relief, consisting of less local pain, a more free respiration, and diminished febrile action, may frequently be seen to follow the use of moderate, general, or local bleeding. Indeed, the benefit is sometimes so marked as to induce their frequent repetition. But every one of the cases of consumption I have seen so treated has terminated fatally. On the other hand, by carefully avoiding depletion; husbanding the patient's resources during the exacerbations and fever; simply favouring excretion by means of salines and diuretics; then, on their subsidence, once again cautiously administering nutritives, and following the first indication, I have succeeded, as the cases subsequently detailed will prove, in causing a permanent arrestment of the disease, and ultimately a complete cure.

The plan, therefore, which is best adapted for checking the local changes, producing acute exudation, and for subduing the symptomatic fever, ought to be much the same as guides us in the treatment of a typhus fever. In this disease the administration of active lowering remedies at first, is well known to increase the subsequent collapse, and retard convalescence,—so in pulmonary consumption, however we may flatter ourselves that by bleeding or mercury we have checked inflammation, the real disease, so far from being arrested by these remedies, is, for the most part, accelerated. For some years, therefore, I have depended solely on small doses of antimony, occasional diuretics and quinine to relieve the acute symptoms, exacerbations, and febrile excitement, and have never had occasion to repent the practice.

In the chronic forms of the disease, the second indication is only to be followed out by topical counter-irritation. Hence a seton, or issue, a succession of blisters, tartar emetic, ointment, and croton oil, are occasionally beneficial, and may be used according to circumstances. Cold sponging, employed with great precaution, so as not to produce a chill, but rather a glow of heat afterwards, is also beneficial. The application of leeches should be avoided, as it is not easy to see how abstracting a few ounces of blood from the thoracic integuments, which are furnished with blood from the mammary and intercostal arteries, can operate upon such vascular organs as the lungs receiving their blood entirely from the pulmonary and bronchial arteries.[1] It is true that a few leeches applied under the clavicle often relieve certain symptoms; but I have never been able to satisfy myself that they have ever been of permanent benefit; and although I am far from saying that they are always injurious, I have occasionally thought that the exposure of the person, the warm fomentations, and unpleasant trickling of blood, have increased rather than diminished the uneasiness of the patient.

SECTION III.

Third Indication—To prevent the recurrence of fresh Exudations by careful attention to Hygienic regulations.

If we can succeed in renovating the nutritive processes, arresting the disease, and favouring absorption of the exudation already poured out, it becomes very important to prevent the recurrence of fresh exudations. This is only to be accomplished by avoiding all those circumstances likely to deteriorate the constitution on the one hand, or induce pulmonary congestion on the other, and offers a wide field for the judicious practitioner, especially in his character of a watchful guardian of the patient's health. One of the great difficulties we have to overcome in this climate, is the frequent variations of tem-

[1] On this point I would refer to some very able remarks by Mr John Struthers, on "Local Blood-letting in Affections of the Internal Viscera." *Monthly Journal* for April 1853.

perature, and the sudden changes from fervent heat to chilling cold. Supposing that we have the means of supporting nutrition and arresting local irritation, it is by no means certain that good will be accomplished, from the impossibility of securing those hygienic regulations and that equable climate, which are necessary to carry out the third indication.

In the first place, nutrition itself is more connected with proper exercise and breathing fresh air than many people imagine. This process does not merely consist in stimulating the appetite and giving good things to eat. It requires,—1st, Food in proper quantity and quality—2d, Proper digestion—3d, Healthy formation of blood—4th, A certain exchange between the blood and the external air on the one hand, and between the blood and the tissues on the other—and 5th, It requires, that there should be proper excretion, that is separation of what has performed its allotted function and become useless. *All* these processes are necessary for nutrition, and not one or more of them, for they are all essentially connected with, and dependent on one another. The means of preventing not only pulmonary consumption, but tubercular disease in general, therefore, consist in carrying out those hygienic regulations which secure these different nutritive acts.[1] The most important of these undoubtedly are attention to the air breathed —that is climate, to exercise, and diet.

Much has been written on climate, and more especially on the sanative influence of certain foreign climates in cases of consumption, and nothing is more difficult than for a medical man, practising at home, to arrive at correct notions on this subject. He may read books on climate generally; he may study monographs on the special advantages of particular places, and he may further converse with sensible men who have practised there, without being in any degree more enlightened.

The real questions to be answered, in reference to the sanative influence of climate, are,—1st, What is the proportion of cases in which arrest of the disease takes place, as determined by a strict diagnosis, the stage of the disorder, and the age

[1] See the Author's Outlines of Physiology. Small 8vo. Edinburgh.

and general strength of the patient? 2d, Are such arrests more frequent in foreign countries than they are at home? So far as I am aware, no series of facts exist capable of satisfying us on these points. On the other hand, is it not certain that if a phthisical person recovered his bodily strength in Madeira, Spain, or Italy, the benefit is at once ascribed to the influence of climate; whereas, if the same thing happens at home, the case is considered one of bronchitis, or at all events its phthisical character is denied? Yet it has of late become sufficiently evident, that, with proper care and treatment, phthisis may be arrested in this country much more frequently than was formerly supposed; and we have no reason to believe that such arrestment is more common in Madeira, Egypt, or Italy, than it is in Edinburgh or London.

It may, then, fairly be asked,—Whether the practice which has so long prevailed, of sending consumptive patients abroad, is beneficial or not? My own experience is on the whole hostile to the propriety of sending confirmed phthisical patients abroad in search of health. I have now met with many consumptive individuals who, so long as they remained at home, continued in a satisfactory condition, enjoyed life, and carried on their usual occupations in comfort; but who, seized with an unconquerable desire of completely getting well, through the agency of a warm climate, have gone to Italy, Malta, or other favoured locality, and died most miserably. Such cases have been so frequent as to have given rise in my mind to a feeling of great scepticism as to the utility of expatriating such persons,—a feeling which would have become absolute, were it not counterbalanced by a conviction engendered by foreign travel, and dependent on what may be called personal sensation, rather than actual experience of any beneficial result obtained by others. I allude to that exhilarating feeling which the traveller experiences, during early spring, in the south of France, or the borders of the Mediterranean, caused by the clear atmosphere, balmy air, and luxuriant landscape. He who has felt that delightful sensation, and paid attention to its influence on his own bodily powers, will not easily abandon the idea that such influence, if rightly directed to the relief of certain

morbid conditions, must have some effect. I believe that such a feeling insensibly constitutes the real basis of all our belief concerning the good effects of climate; and as, notwithstanding repeated disappointments, I cannot help thinking that, in certain cases, it is really beneficial, it may be worth while to enquire why it often fails, and why it sometimes succeeds.

Supposing, then, that residence or travel in certain foreign countries, may be beneficial in particular cases, and the chief argument in its favour are the sensations to which I have alluded, it cannot be denied that many fallacies are liable to enter into our reasonings. For instance, it does not follow that the same elastic feeling experienced by a healthy, vigorous individual on the mountain side, on the sea-shore, or in the beautiful valley, should be felt by a debilitated, worn-out person in a similar situation. Nor is it reasonable to suppose that the qualities of mind, power of exertion, and consciousness of bodily strength—all of which are elements in the production of the feeling alluded to—should be alike in the two cases. Hence, while some persons may be benefited, and the nutritive powers stimulated under such circumstances, others will feel languor, depression of spirits, or increased fatigue, and find themselves much worse. The difficulty, therefore, is to discriminate between these two classes of persons,—a difficulty which defies all general rules, dependent as it is not only on the stage of the disease and bodily strength of the individual at the time, but also on his peculiar constitution, habits, general excitability, powers of imagination, and cultivation of mind. Hence, before sending patients abroad, all these points must be anxiously considered; and even then, the whole will resolve itself into the fact, which can only be determined by experiment, whether, upon actual trial, they feel better or worse.

I believe, however, that in most cases the change is at first beneficial, and that it would be to a considerable extent permanent, were it not for another fallacy which extensively prevails. I allude to the idea that the climate itself has a sanative tendency, and that the breathing this or that air is like taking so much medicine, and ought to do good *per se*.

But it should be considered that the best climate is only useful as a means of taking exercise, and promoting the nutritive functions, without exposure to those drawbacks which are more or less common at home. It is by regarding exercise as necessary to securing active digestion that its importance as a therapeutic agent becomes obvious in phthisis; and any locality which will enable the sensitive invalid to go out daily on foot, horseback, or in a carriage, without the chance of meeting cold winds or showers of rain, must possess an advantage over one where these occurrences are common. All accounts agree in representing Madeira, and some other places, as more favoured in this respect than even the best localities in England—and if so, they may, in the sense referred to, be more beneficial as places of residence.

In searching for such benefits in a foreign climate, the patient has often to sacrifice the occupations he may be accustomed to at home, and the society of his friends. But if this can be done without inconvenience, and without causing mental depression or a sense of *ennui*, it may even be advantageous. Mental impressions must not be overlooked. Then he will experience a great difference between the comforts of an English residence and those in a foreign house, which, even to the healthy traveller, often prove annoying, and to the invalid are injurious. In Rome, Dr Burgess[1] says the streets are built to exclude, as much as possible, the rays of the sun, and in winter are as damp and cold as rain and frost can make them. And then he adds, "What a difference between the warm carpet, the snug elbow-chair, and the blazing coal fire of an English winter evening, and the stone stair-cases, marble floors, and starving casements of an Italian house!"[2]

It is well pointed out by Dr Burgess, that those who go to the large Italian cities are exposed to other dangers connected with the desire of seeing celebrated places, works of art,

[1] The Climate of Italy in Relation to Pulmonary Consumption. London, 1852.

[2] In a case in which I was consulted, the gentleman was advised by Professor Skoda of Vienna to visit England rather than Italy, on account of the superior comforts of the houses in the former country.

churches, vaults, etc., which induce great bodily fatigue, and often chill the body by long exposure to damp air, or from standing on cold marble floors. Sight-seeing is even to healthy persons perhaps the most wearying and exhausting of all occupations; what must its effects be on an invalid?

Another evil of continental cities consists in the attractions of fashion, so that the young can seldom resist the late evening parties, the dance or public amusements, when, flushed with excitement or exertion, they return to their homes late at night, exposed to the chill air, the injurious effect of which is augmented by the previous heat and foul air of crowded assemblies. All such irregularities, and every kind of overfatigue, are more than enough to counterbalance the supposed good effects of climate. Hence places of quietude, offering no temptations to gaiety, and possessing only natural advantages of scenery, and the gentle stimulus of a clear atmosphere, mild temperature, and cheerful society, are the best. At no time indeed are late parties and crowded assemblies tolerable for those disposed to consumption. Dr Richardson[1] well observes, "The refreshments of the ball-room are utterly out of place. In proportion as they are delicate and elegant, so are they mischievous. Wines, ices, sweets, jellies at twelve o'clock at night, for a delicate girl just 'out'! How will she sleep after this? How will she wake next morning? How will she languish through the next day—nauseated, pale, and lifeless?"

Another fallacy is the idea that warmth is the agent which, in such cases, does good; and people talk of a warm climate as synonymous with a healthy climate. But unaccustomed warmth is most relaxing, and tends, instead of checking, to occasion increased development of the tubercular exudation. Nothing is more common to observe in this country how phthisical patients gets worse on the approach of sultry weather in summer, and how comparatively better they are in winter, so long as they avoid exposure to cold winds. In fact, it is not a warm climate which is sought for by the invalid, but a temperate climate during the winter, and a steady climate

[1] Hygienic Treatment of Pulmonary Consumption.

during the spring. As summer approaches, many parts of the British Isles are infinitely preferable, and especially many portions of Scotland. During the sultry weather of June, July, and August in the south of England, I have seen numerous patients at once revive on breathing for a few days the comparatively cool air of Edinburgh. The languor and exhaustion they previously experienced at once disappear; the appetite, which was deteriorated or lost, improves; they become better nourished in consequence, again enjoy exercise and recover. All sultry, damp, and close places should in the summer and autumn be avoided as injurious.

It follows, from all the information I have been able to collect, that that climate is best which will enable the phthisical patient to pass a few hours every day in the open air, without exposure to cold or vicissitudes of temperature on the one hand, or excessive heat on the other. Wherever such a favoured locality may be found during the winter and spring months, its advantages should be considered as dependent on exercise, and on the stimulus given to the nutritive functions, rather than to its influence on the lungs directly. It is a matter also of great importance to remember, that the comforts of home, a well-arranged diet, general hygienic rules, and a proper treatment, are as necessary in Madeira, Italy, Spain, or Egypt, as they are in Great Britain.

But, after all, the great mass of those affected with phthisis have not the means of searching out a favourable climate on the Continent, or even of maintaining themselves in a sheltered nook on the western or south-western coasts of this country. It may, therefore, be thought easy for us, by confining patients in a suite of rooms in which the heat is regulated, to secure immunity from cold and change of air; but such a contrivance is most intolerable to them; the mind becomes peevish, which in itself is a powerful obstacle to the proper performance of the digestive functions. But, above all, the body is deprived of exercise—that necessary stimulus to the appetite, respiration, and other functions. Some years ago, I succeeded in confining a consumptive patient, whose case will be afterwards given, to his room for an entire winter. His spirits suffered

greatly; but on the whole he supported the imprisonment with resolution. Next winter, however, nothing could induce him to remain at home, and one day he rushed out of the house, ascended Arthur's Seat, and was much better in consequence. Since then I have been convinced that, although by confinement you may occasionally gain some advantages, on the whole it is a prejudicial practice if carried out even for several days continuously.

What is required in these cases is the means of exercise in the open air, whether on foot, on horseback, or in a carriage, where the patient is protected from cold winds, and where the mind can be amused by pleasant sights and cheerful conversation. Such is the case in all those favoured localities considered best for consumptive people, and some such advantages might be derived from the Crystal Palace at Sydenham near London. Delicate individuals can be transported there by means of a close carriage, in the worst seasons, without difficulty, and on entering it, could breathe for hours a pure, balmy air, meet their friends, take exercise in various ways, read, work, or otherwise amuse themselves. Such an out-door means of recreation, combined with careful hygienic regulations at home, will go far to remove many of the difficulties which we have to encounter in the ordinary treatment of consumption.

The extent to which exercise should be carried ought always to be short of anything like considerable fatigue,—I say considerable, because many patients plead weakness and fatigue as incapacitating them from any exercise whatever. Going out in the open air at least should be insisted on, as sitting in a garden or open place is much better than remaining in a room; the person, of course, being well clothed according to the season of the year. Walking or riding on horseback are the best kinds of exercise; slowly climbing a hill brings all the muscles into action, and best stimulates the respiratory and nutritive functions. All violent, sudden, and unequal exertion, however, should be avoided. Hence it is better to take a little exercise at a time, but frequently in the course of the day, and con-

tinue it regularly and methodically, gradually increasing its amount and varying its character as the strength improves.

If it be important to obtain a good climate and take exercise in order to stimulate the respiratory and nutritive systems, the necessity of proper ventilation in the sitting and sleeping rooms of consumptives need not be dwelt upon. It will be manifest that this is of essential importance. I agree with Dr M'Cormac of Belfast in thinking that the best ventilator is the sash-window let down for an inch or so from the top, and that this with an open fire sufficiently ventilates the apartment. When it is considered that at least one-third of human life is spent in sleep, and that, as formerly explained, nutrition is dependent on inspiring sufficient oxygen to unite with the molecular elements of food in the blood, too much attention cannot be given to the air and temperature of the bedroom. As the disease advances, and breathlessness is easily excited, it becomes more incumbent that the air which enters the lungs should be as pure as possible, and constantly renewed.

With regard to diet, it may be said, in general terms, that one of a nutritious kind, consisting of a good proportion of animal food abounding in fat, is best adapted for phthisical cases, whilst everything that induces acidity should be avoided. But, as previously stated, the difficulty consists in causing such diet to be taken, on account of the bad appetite and dyspeptic or febrile symptoms which prevail. No effort, therefore, should be spared to overcome the obstacles which prevent food of sufficient quality and quantity from being digested, the appropriate means for doing which must vary according to the circumstances of the case, and will be treated of in the next chapter. The strongest stimulus to the appetite, however, is exercise; and hence the importance of the considerations already entered into, with reference to securing what is essential in the treatment of the disease, namely, good digestion and proper assimilation.

If the pathology of pulmonary consumption formerly de-

scribed be correct, it indicates what are the means best adapted for preventing, as well as arresting, the disease when it has already commenced. These are, for the infant, a healthy nurse, cleanliness, and careful attention to all those circumstances which tend to increase the bodily vigour and secure good digestion. At the time of weaning and of teething, the most watchful care becomes necessary, so that local irritation and its effects may be prevented as much as possible, and a proper diet, containing a sufficient amount of the fatty principles, be taken. During adolescence, indulgence in indigestible articles of food should be avoided, especially pastry, unripe fruit, salted provisions, and acid drinks; while the habit of eating a certain quantity of fat should be encouraged, and, if necessary, rendered imperative. The same precautions, conjoined with proper bodily exercise in the open air, avoiding exhausting and too fatiguing occupations, should subsequently be maintained until the predisposition to tubercular disease has been completely overcome. Too much mental activity should be discouraged, and the precocious faculties and intelligence, which leads to study, reading, and sedentary pursuits, especially guarded against. In short, everything that can support and invigorate should be adopted, and everything that can exhaust and depress should be shunned. As vitiation of the chyle and blood precedes the local deposition of a tubercular exudation, it necessarily follows that that numerous class of delicate invalids, whose chief complaint is derangement of the digestive process, with languor and debility, may by the hygienic means now indicated, and proper treatment of the dyspepsia, be restored to health.

Were it possible in all cases for these three indications to be carried out, I feel satisfied the prevention and cure of phthisis would be more frequent; but in the treatment of this disease, the physician has to struggle not only with the deadly nature of the disorder, but with numerous difficulties over which he has no control, such as, among the poorer classes, the impossibility of procuring good diet, and the thousand imprudences which not only they, but the majority of invalids,

are ever committing. Then another great difficulty is, to convince the patient that, notwithstanding the removal of his urgent symptoms, the disease is not cured, and that these will return, if the causes which originally produced them are again allowed to operate. Indeed, it is when the marked improvement has taken place which follows successful treatment, that the embarrassment of the physician commences. In our public institutions, the patients often feel so well that they insist on leaving the hospital, or on giving up their attendance on a dispensary. I have frequently found it impossible to prevail on such persons to continue the treatment; and the consequence is, that again returning to their often unhealthy employment and bad diet, and exposed to the other causes favourable to the production of the disease, the distressing symptoms again recur. Many cases, with one or more caverns in the lungs, in this manner have returned to the Infirmary, under my care or that of the other physicians, from four to eight times, and on each occasion have gone out in their own opinion perfectly cured, though assured to the contrary, and urged to remain. In private practice, and especially among the higher classes, the patients are equally indisposed to persevere, though satisfied of the great benefit they have experienced. They are seduced by the pursuit of pleasure, or governed by fashion and on the return of their symptoms, fly from one vaunted system of practice to another, visit watering-places or foreign climes, and in vain seek for that benefit which a steady continuance of a proper treatment can alone secure.

Notwithstanding the difficulties which thus present themselves in bringing about a complete cure of the disease, I have now frequently succeeded in ascertaining that pulmonary caverns have completely healed up, while all the symptoms and physical signs indicating their presence have disappeared, and only slight dulness on percussion, and increased vocal resonance, have remained as a proof of the puckering and induration of the pulmonary parenchyma attendant on the cretaceous concretions and cicatrices. In many of these cases, I am satisfied that had not cod-liver oil been given at the com-

mencement of the treatment, the constitution would never have rallied from the state of exhaustion and depression under which it laboured. (See Case XXII.) Some of these cases will be subsequently detailed, and they will serve to show not only the importance of the nutritive or analeptic treatment, but of the necessity of perseveringly continuing it after the more urgent symptoms have been subdued.

The general treatment for pulmonary consumption now recommended, is based upon the following pathological propositions :—1st, That tubercular diseases will heal of themselves, if we can support the nutrition of the system ; 2d, That, with this view, our efforts should not only be directed to the pulmonary, but especially to the digestive system ; and 3d, That the kind of morbid nutrition which exists is excess of albuminous and deficiency of the fatty element in the chyle. The kind of treatment applicable to correct both the lesion of the blood, as well as of the subsequent tubercular deposits, is not tonic, stimulating, or antiphlogistic, but truly analeptic or reparative, and directed to the supply of those elements of nutrition which pathology indicates are deficient in this class of diseases.

It has been endeavoured to be shown that these principles of treatment have been long understood and put in practice.[1] Passages have been cited from the lectures of Dr Gregory, and from the writings of Fuller, Morton, Christopher Bennett, and even the ancient Greek physicians, to prove that nutrients and oil were administered by them. Any one, however, who will consult the writings of these physicians, will find that, although in some cases a greater or less approach to an invigorating system of practice was tried, and, as it is said, with occasional good effect, yet it was altogether exceptional and never based upon pathological principles. In consequence, the general treatment of the profession has, until recently, been on the whole antiphlogistic, to combat supposed inflammation ; lowering, to subdue febrile irritation ; and palliative, to relieve occasional symptoms. It consisted of antimonials,

[1] See Report of Discussion in the Edinburgh Medico-Chirurgical Society—*Monthly Journal*, April 1853.

cough mixtures, and opiates, leeches applied frequently to the chest, and occasionally general bleeding; sulphuric acid to relieve the sweating; astringents to stop diarrhœa or hæmoptysis; now and then counter-irritants, and towards the termination of the disease, wine and stimulants. As diet, milk and farinaceous food were the rule, and meat the exception; whilst confinement to the house, warmed rooms, and hot climates were recommended. The idea of feeding the emaciated body did occur to some; but as they had no idea of introducing the element of nutrition required, viz. oil, it could not be effected. Under such a system of practice, it need not be wondered that consumption should be regarded as almost a uniformly fatal disorder. A few practitioners, it is true, adopted an opposite line of practice, and, like the late Dr Stewart of Erskine, they conjoined the exercise recommended by Sydenham, with the free administration of beef-steaks, porter, and cold bathing. But such practice, whatever partial success it may have met with, has only become general since the views connected with the administration of cod-liver oil were adopted, and this because it was opposed to the theory which ascribed the disease to inflammation, and the idea that inflammation must be combated by antiphlogistics. "Hence," says Sir James Clark, "the cases likely to be cured by the stimulating plan of treatment—by the beef-steak and porter system—bear so small a proportion to those which would be injured by it, that I do not consider it deserving of notice.[1] In 1840 Dr Craigie, after having advised large and repeated bleedings, emetics, antimonials, etc. etc., to put down the inflammation in the first stage of consumption, observes—"The remarks now made render it unnecessary to dwell on what has been occasionally called the tonic treatment of consumption. It is quite clear that this method of treatment is founded on erroneous notions of the nature of the disorder; and that in a disorder so complicated, and so various, allowing that the treatment were occasionally beneficial, it must be hurtful in a large proportion of cases."[2] During the last eighteen years,

[1] On Pulmonary Consumption. 1837. P. 397.

[2] Practice of Physic, vol. 2, p. 1020.

however, a revolution in practice has gradually been going on. The good effects of cod-liver oil have been apparent, the pathology of the disease has been advanced, and the necessity of causing assimilation of the fatty elements of nutrition is now recognised. Why a meat diet, tonics, and stimulants do not succeed in the majority of cases, I have previously explained; and how it is that oil and fat, when assimilated to the system, do produce the desired effect, we trust has also been made apparent. Should, therefore, the analeptic or reparative system of treatment become general, a perceptible diminution in the mortality of phthisis may be confidently expected, a result which, according to Dr Wood of Philadelphia,[1] has already been made apparent in the principal cities of the United States, where, since cod-liver oil has been extensively used, the deaths have diminished from 14.8 to 12 per cent.

I have not entered into the minute details of the hygienic treatment of consumption, because, although nothing can be easier than drawing up rules on paper, it is only a knowledge of general principles that will enable the practitioner to adapt them to individual cases. It is chiefly the wealthy, who derive benefit from emigrating to distant localities, because it is in their power to surround themselves with all the comforts of home. Even they, are sometimes obliged to admit that the advantages of a mild atmosphere are counter-balanced by the absence of such requisites, as pleasant society, a good cook, a warm house, etc., etc. As regards the middling classes, I have had too many occasions to satisfy myself that most of our Edinburgh citizens make a poor exchange of the spacious rooms, the well-dressed food, the watchful attendance and social companions of home, for the confined lodgings, numerous disagreeables, and economical arrangements which an expensive distant residence requires. Of the poor and working classes, while it is true that many of their occupations are directly injurious to health, it is equally so, that the physician can very rarely change them for anything better. Did he at-

[1] Practice of Medicine, vol. ii., pp. 63-95. 3d Edit.

tempt to stop their employment, they might well exclaim, with Shylock—

> "You take my life when you do take the means whereby I live."

It is important, therefore, to remember that the most highly praised hygienic remedies in consumption are not always applicable, and that, at best, they are only adjuncts or means useful for carrying out an analeptic treatment of the disease. This last is the only method capable of causing its arrestment, and subsequently of bringing about a permanent cure—a circumstance of which many facts recorded in the next chapter will, I trust, satisfy the reader,—perfect recovery having taken place among the lower and middling classes of society, irrespective of all those vaunted aids which wealth alone can procure.

CHAPTER IV.

SPECIAL TREATMENT OF PULMONARY CONSUMPTION.

UNDER the head of General Treatment of Phthisis Pulmonalis, I have pointed out the means of meeting the three indications which should never be lost sight of in this disease. But every case requires a special treatment in addition, which will depend on the unusual severity of this or that symptom, or the existence of peculiar complications. It is to the undue importance given to this special, as distinguished from the general treatment, that I attribute much of that want of success experienced by practitioners. Thus it is by no means uncommon to meet with patients who are taking at the same time a mixture containing squills and ipecacuanha to relieve the cough; an anodyne draught to cause sleep and diminish irritability; a mixture containing catechu, gallic acid, tannin, or other astringents, to check diarrhœa; acetate of lead and opium pills to arrest hæmoptysis; sulphuric acid drops to relieve the sweating; quinine, iron, or bitters, as tonics; wine to support the strength; and cod-liver oil in addition. I have seen many persons taking all these medicines, and several others at one time, with a mass of bottles and boxes at the bedside sufficient to furnish an apothecary's shop, without its ever suggesting itself apparently to the practitioner, that the stomach, drenched with so many nauseating things, is thereby prevented from performing its healthy functions. In many cases there can be little doubt that this treatment of symptoms, with a view to their palliation, whilst it destroys all hope of cure, ultimately even fails to relieve the particular functional de-

rangement to which it is directed. Hence, although the special treatment of phthisis is a matter of great importance, it should be subordinate to general rules.

One or more of the following symptoms may be complained of during the progress of an individual case, and require to be treated according to the curative indications formerly given.

Cough and Expectoration.—At first the cough in phthisis is dry and hacking. When tubercle softens or bronchitis is present, it becomes moist and more prolonged. When excavations exist, it is hollow and reverberating. In every case cough is a spasmodic action, occasioned by exciting the branches of the pneumogastric nerves, and causing simultaneous reflex movements in the bronchial tubes and muscles of the chest. The expectoration following dry cough is at first scanty and mucopurulent, and afterwards copious and purulent. When it assumes the nummular form,—that is, occurs in viscid rounded masses, swimming in a fluid clear mucus, it is generally brought up from pulmonary excavations. The accumulation of the sputum in the bronchial tubes is an excitor of cough; and hence the latter symptom is often best combated by those means which diminish the amount of sputum. But when the cough is dry, those remedies should be used which diminish the sensibility of the nerves. In the first case, the amount of mucus and pus formed will materially depend on the weakness of the body and the onward progress of the tubercle. Hence good nourishment and attending to the digestive functions are the best means of checking both the cough and expectoration; whereas giving nauseating mixtures of ipecacuanha and squills is perhaps the worst treatment that can be employed. There is no point which experience has rendered me more certain of than that, however these symptoms may be palliated by cough and anodyne remedies, the stomach is thereby rendered intolerant of food, and the curative tendency of the disease impeded. On the other hand, nothing is more remarkable than the spontaneous cessation of the cough and expectoration on the restoration of the digestive functions and improvement in nutrition. When the cough is dry, as may

occur in the first stage, with crude tubercle, and in the last stage, with dry cavities, slight counter-irritation is often useful, employed in various forms. Opium may relieve, but it never cures. (See also Chapter V.)

Loss of Appetite.—This is the most constant and important symptom of phthisis, inasmuch as it interferes more than any other with the nutritive processes. If food, or its substitute, cod-liver oil, cannot be taken and digested, it is vain to hope for amelioration in any of the essential symptoms of the disease. Here we should avoid a mistake, into which the inexperienced are very liable to fall. Nothing is more common for phthisical patients to tell their medical attendants that their appetite is good, and that they eat plentifully, when more careful inquiry proves that the consumption of food is altogether inadequate, and that they loathe every kind of animal diet. In the same manner they say they are quite well or better, when they are evidently sinking. We should never be satisfied with general statements, but determine the kind and amount of food taken, when sufficient proof will be discovered, in the vast majority of cases, of the derangement of the appetite and digestive powers formerly alluded to. Very commonly also, there will be acid and other unpleasant tastes in the mouth. In all such cases, especially if too much medicine has been already given, the stomach should be allowed to repose itself before anything be administered, even cod-liver oil. Sweet milk, with toasted bread, and small portions of meat nicely cooked, so as to tempt the capricious appetite, should be tried. Then ten drops of the Sp. Ammon. Aromat., given every four hours in a wine glassful of some bitter infusion, such as that of Columbo or Gentian, with a little Tr. Aurantii, Tr. Cardamomi or other Carminative. In this way the stomach often regains its tone, food is taken better, and then cod-liver oil may be tried, first in teaspoonful doses, cautiously increased. Should this plan succeed, amelioration in the symptoms will be almost certainly observed.

Nausea and Vomiting.—Not unfrequently the stomach is

still more deranged; there is a feeling of nausea and even vomiting on taking food. In the later stages of phthisis, vomiting is also sometimes occasioned by violence of the cough, and the propagation of reflex actions, by means of the par vagum, to the stomach. In the former case, the sickness is to be alleviated by carefully avoiding all those substances which are likely to occasion a nauseating effect, not overloading the stomach, and allowing it to have repose. In cases where too much medicine has been administered, a suspension of all medicaments for a few days will frequently enable the practitioner to introduce nourishment cautiously with the best effect. I have found a Naphtha mixture very effectual in checking the vomiting in phthisis. When it depends on the cough, those remedies advised for that symptom should be given. I have tried emetics for the relief of nausea and vomiting, but with no good result.

Diarrhœa.—This is a very common symptom throughout the whole progress of phthisis, at first depending on the excess of acidity in the alimentary canal, to which we have alluded, but in advanced cases, connected with tubercular deposition and ulceration in the intestinal glands. The best method of checking this troublesome symptom, is by improving the quality and amount of the food. The moment the digestive processes are renovated, this, with the other functional derangements of the alimentary canal, will disappear. Hence at an early period we should avoid large doses of opium, gallic acid, tannin, and other powerful astringents, and depend upon the mildest remedies of this class, such as chalk with aromatic confection, or an antacid, such as a few grains of carbonate of potash. When, on the other hand, in advanced phthisis, continued diarrhœa appears, and is obstinate under such treatment, then it may be presumed that tubercular disease of the intestine is present, and the stronger astringents with opium may be given as palliatives.

Pain.—It is very surprising to what an extent tubercular disease of the lung may occasionally proceed, without causing inconvenience in the chest. Frequently there are sensa-

tions of constriction or oppression which, however, scarcely excite attention; or, from their fugitive character, are attributed to any cause but the right one. If the disease be accompanied by pneumoniac symptoms, there may be more or less dull pain, but most frequently it is when the pleura are involved that it becomes acute. The best method of relief is to keep the parts at rest, and apply warm fomentations or a hot poultice. Slight counter-irritation is also sometimes successful. On the other hand, leeches and cupping, though they may relieve, are opposed to the general principle of supporting the strength. Opiates also do harm, by destroying the appetite and increasing the pain. At the same time, if pain be distressing and long-continued, and especially if it destroy sleep, they must sooner or later be had recourse to. Under such circumstances I have found chlorodyne to be the best anodyne.

Hæmoptysis.—This symptom sometimes appears suddenly in individuals in whom there has been no previous suspicion of phthisis, and in whom, on careful examination, no physical signs of the disease can be detected. On other occasions, the sputum may be more or less streaked with blood; and, lastly, it may occur in the advanced stage of the disease, apparently from ulceration of a tolerably large vessel. In all these cases the best remedy is perfect quietude, and avoidance of every kind of excitement, bodily and mental. Astringents have been recommended, especially acetate of lead and gallic acid; but how a few grains of these remedies, introduced into the stomach, can operate upon ruptured vessels in the lungs, I am at a loss to understand; and I have never seen a case in which their administration was unequivocally useful. Opium also has been largely given both as an astringent and anodyne. It is only by calming nervous excitement in such cases, that it can be beneficial; but it is so objectionable in other respects as to be seldom admissible. I have now met with many instances where supposed pulmonary hemorrhage really originated in follicular disease of the pharynx or larynx, and which, with the supposed phthisical symptoms, were removed by the use of the probang and nitrate of silver solution. (See Chapter V.)

Sweating I regard as a symptom of weakness, and therefore as a common, though by no means a special, one in phthisis. Here, again, the truly curative treatment will consist in renovating the nutritive processes, and adding strength to the economy. It will always be observed, that if cod-liver oil and good diet produce their beneficial effect, that the sweating, together with the cough and expectoration, cease. On the other hand, giving acid drops to relieve this symptom, as is the common practice, by adding to the already acid state of the alimentary canal, is directly opposed to the digestion of the fatty principles, which require assimilation.

It should not be forgotten that consumptive patients and all those suffering from pulmonary diseases, are especially sensitive to cold. The impeded transpiration from the lungs in such cases, is counterbalanced by increased action of the skin, which becomes unusually liable to the action of diminished temperature. Again, cold applied to the surface immediately produces, by reflex action, spasmodic cough and excitation of the lungs. Every observant person must have noticed how cough is induced by crossing a lobby, going out into the open air, a draught of wind entering the room, getting into a cold bed, etc., etc. The mere exposure of the face to the air on a cold day, takes away the breath, induces cough, and obliges the patient instinctively to muffle it up. The numerous precautions, therefore, that ought to be taken by the phthisical individual, should be pointed out, especially the necessity of warm clothing, to which large additions should be made on going out into the air. Thus, covering the lower part of the face is important as a means of extra clothing, and not as a means of breathing warm air, as the favourers of respirators imagine. The patient should always sit with his back to the horses or to a steam-engine, and if by accident his shoes or clothes become wet, they should be changed as soon as possible. In the house, ladies should have a shawl near them, to put on in going from one room to another, in descending a stair to dinner, etc. By attention to these minutiæ, much suffering and cough may be avoided.

Febrile Symptoms.—The quick pulse, general excitement,

loss of appetite, and thirst, which are so common in the progress of phthisical cases, are dependent on the same causes which induce symptomatic fever in general. Vascular distension, resulting in exudation and its absorption, is proceeding with greater or less intensity in the lungs, and frequently in other organs. This leads to nervous irritation and increase of fibrin in the blood, accompanied by febrile phenomena. The intensity of these is always in proportion to the activity of local disease, or to the amount of secondary absorption going on from the tissues, or from morbid deposits. Nothing is more common than attacks of so-called local inflammations in phthisis; and the careful physician may often determine, by physical signs, the supervention of pleurisy, pneumonia, or bronchitis on the previously observed lesion, and not unfrequently laryngitis, enteritis, or other disorders. In such cases, nature herself dictates that the analeptic treatment otherwise appropriate, is no longer applicable—food disgusts, and fluids are eagerly demanded. Under these circumstances, it has been common to apply leeches to the inflamed part, and extract blood by cupping, measures which undoubtedly cause temporary relief, but which are wholly opposed to the plan of general treatment formerly recommended, and to what we know of the pathology of the disease. Every attack of febrile excitement is followed by a corresponding collapse; and it should never be forgotten that in a disease which is essentially one of weakness, the patient's strength should be husbanded as much as possible. Hence the treatment I depend on in such circumstances, consists of the internal administration of the neutral salts, especially of tartar emetic in small doses, combined with diuretics, in order to favour crisis by the urine. I have satisfied myself, that such attacks are not to be cut short by leeches or cupping, and although, in many cases, as previously stated, temporary relief is produced, the exposure of the person, and unpleasant character of the applications, the trickling of blood, and wet sponges, as often irritate, and give rise to unnecessary risk. Still there may be cases where topical blood-letting, if it cannot be shown to advance the cure, neither can it be proved to have done harm, but these cases of late years have, as far as my ob-

servation goes, been very few in number. During severe febrile symptoms also, with furred tongue, no food or cod-liver oil can be taken. Under such circumstances, the judicious physician will content himself with giving strong beef-tea, milk, and such nutrients as can be taken, returning to the stronger nourishment the moment the tongue becomes somewhat clean. In the rapidly febrile cases, or the so-called instances of acute phthisis, mercury has been recommended, which I have never seen produce the slightest benefit. Quinine, on the other hand, is decidedly beneficial, especially in all those cases attended with rigor, returning, as it is does not unfrequently, in a more or less periodical manner.

Debility.—This is a very common symptom of phthisis from the first, and frequently leads the patient into indolence both of mind and body, a condition very unfavourable for stimulating the nutritive functions, upon the successful accomplishment of which its removal depends. It is to remove the weakness that tonics have been administered; but I have never seen quinine, bitter infusions, or even chalybeates, of much service alone, while the continual use of nauseous medicine disgusts the patient, and interferes with the functions of the stomach. Here again the great indication is to remove the dyspeptic symptoms, give cod-liver oil, an animal diet, and improve the appetite by gentle exercise and change of scene. Should the practitioner succeed in renovating the nutritive functions, it is often surprising how the strength increases, in itself a sufficient proof as to what ought to be the method of removing the debility. I have frequently seen patients who have been so weak that they could not sit up in bed without assistance, so strengthened by the analeptic treatment, that they have subsequently walked about and taken horse exercise without fatigue, and this after all the vegetable, mineral, and acid tonics have been tried in vain.

Despondency and Anxiety.—It is impossible for the careful practitioner to avoid noticing the injurious influence of depressing mental emotions on the progress of phthisis. Indeed,

the worst cases are those of individuals with mild, placid, and unimpassioned characters, who give way to the feelings of languor and debility which oppress them. Such persons are most amiable patients—they give no trouble, any thing will do for them—they resign themselves to circumstances, and state that they are eating well and getting better up to the last. These are cases of bad augury, and it is exceedingly difficult to inspire them with sufficient energy to take exercise, or to carry out those regulations which are absolutely essential to renovate the appetite or nutritive functions. Such persons are benefited by slow travelling, cheerful society, and everything that can elevate the spirits, and, insensibly to themselves, communicate a stimulus to the mental and bodily powers. Anxiety, on the other hand, though it may sometimes depress and interfere with the digestive functions, is often a most useful adjunct to the physician. They who experience it are most careful of their health, sometimes indeed too much so, but if once satisfied of the benefit of any particular line of treatment, they pursue it with energy. These are cases of good augury; and most of the permanent cures I have witnessed have been in such persons—medical men, and others acquainted with the nature of their disease, who have exhibited resolution, a noble fortitude, and bravely struggled against local pain, general debility, and nervous fear.

The excessive confidence placed in particular remedies, such as cod-liver oil, or especial modes of proceeding, whether a sea voyage or residence in a particular climate, has done much mischief in phthisical cases. For instance, it is rare that the administration of cod-liver oil will prove sufficient to conduct a case of pulmonary consumption to a happy conclusion. It is the more important to notice this, since it has become an object of commercial enterprise, and its use in every disease advocated; for, although it will frequently check phthisis for a time and nourish the exhausted frame, great attention to the future progress of the case, and a careful management of the various symptoms and conditions presented, will be necessary, before the crude tubercles become cretaceous

and encysted, or ulcerations in the lungs completely cicatrized. At present this remedy is very extensively given, and its temporary good effects are allowed; but few persons in this country have watched for a sufficiently long time the progress of phthisical cases placed under its influence, so as to enable them to speak with any confidence as to the ultimate result. To prevent disappointment, therefore, and the abandonment of a valuable remedy from its excessive and injudicious administration, it may be useful to detail, shortly, a few cases of phthisis which have been under my observation, for periods varying from five to sixteen years, and indicate the other circumstances it will be necessary to attend to, with a view of rendering even cod-liver oil of permanent advantage. It is only by thus studying individual examples of the disease, and observing the numerous and varied combinations of symptoms and indications that each presents, that the special treatment of phthisis and the difficulties the practitioner has to combat, can in any way be understood. Statistical details, by which the effects of any plan of treatment are tested, by jumbling together cases essentially different in their nature and progress, so far from assisting the practitioner, or advancing our knowledge, are not only useless at the bedside, but by causing an idea of certitude, which has no real existence, must ultimately lead to great disappointment.

The following case, which has been under my observation for ten years, will exhibit some of the numerous conditions that present themselves, and the watchful care necessary in order to conduct the disease towards a favourable termination :—

CASE XXI.—*Advanced Pulmonary Tuberculosis*, 1842; *A Large Cavity in the Apex of Right Lung, and Condensation in the Apex of Left Lung, with all the Phthisical Symptoms, including repeated Hemoptysis in* 1843; *Arrestment of the Disease, and complete Recovery in* 1846; *Health remains good*, 1859.

A medical student requested me to examine his chest, in the autumn of 1842. He was tall, thin, and sallow, aged

twenty, with frequent cough, accompanied by purulent expectoration. On percussion, there was marked dulness on the right side, beneath the clavicle. On listening in this situation, a loud mucous râle accompanied the inspiratory murmur, and there was loud bronchophony. On the left side the inspiratory murmur was harsh, the expiratory murmur prolonged, but no increased vocal resonance could be detected, and no dulness on percussion. I ascertained that his illness had been progressing slowly for at least several months, that he had latterly become much emaciated, that there was considerable perspiration at night, that his appetite had been very capricious, but was now good, and that there had been no diarrhœa. The pulse was quick, the tongue furred, and he complained of slight thirst. I learnt from his friends, however, that his appetite was wretched, and that it was very seldom that he could be brought to eat any animal food whatever. This young man, therefore, had a considerable amount of tubercular exudation in the apex of the right lung, which was softening, and a much slighter amount of it in the apex of the left lung, which was still crude. I prescribed a tablespoonful of cod-liver oil three times a day, and good diet. I told him to clothe himself well, avoid sudden changes of temperature and exposure to cold, and during the winter months to confine himself to his room, the temperature of which was to be regulated between fifty and sixty degrees.

I saw him occasionally during the winter of 1842–3, during which period it became necessary to suspend the use of the oil every now and then, on account of the nausea it occasioned. His health and strength, however, greatly improved, and the moist râles entirely disappeared, although he continued to expectorate a small quantity of viscous purulent matter. It was with the utmost difficulty he could be confined to his apartment, and it at length became so irksome, that he went out without my knowledge. At first he used considerable caution, and no ill effect arose; but, in May 1843, I was summoned to him in great haste. He had spent the previous evening with some companions, had drank more than usual, and walked home past midnight, the weather being rather

chilly. I found the cheeks flushed, strong febrile symptoms, laborious breathing; and, on auscultation, loud crepitating, passing into mucous râles were heard over the upper third of right side, with the same dulness on percussion as formerly. I prescribed quietude, with tartar-emetic and opium in large doses, frequently repeated. In a few days the fever had left him, but the moist râles in the right lung continued; the expectoration was again copious, the sweating at night had returned, and there was an unconquerable repugnance to every kind of food. Various means were tried to diminish the irritability of the stomach—effervescing powders, hydrocyanic acid, creosote, various anodynes, stimulants, alkalies, and bitters—but without avail. In June, he was reduced to a condition much worse than when I at first saw him, and was once more greatly emaciated, and so weak that he could not stand five minutes, without enduring great fatigue. I now ventured to prescribe the oil again, in teaspoonful doses, combined with a drop of the oil of cloves, three times a day. It was retained on the stomach, and was taken regularly for two weeks, at the end of which period he had greatly improved. After a time, the dose was increased to a tablespoonful twice, and then three times, a day. In August, all moist râles had again disappeared, and were replaced by a distant blowing murmur, with loud bronchophony. The apex of the left lung fortunately had undergone no change since I first examined it. He was now able to walk, his strength having been much restored; and I informed him of the critical position in which he was, and impressed upon him the necessity of great caution. He seemed thoroughly roused to a sense of his danger, and left Edinburgh to see his friends in the country.

In November 1843, he returned to continue his studies in the University. With the exception of being somewhat stronger, and in better spirits, he was in much the same condition as when I last saw him. The problem now was, how to get him over the ensuing winter. I was in hopes that if, during the next six months, no fresh exudations occurred, and the cavity or cavities in the right lung remained dry, that

they might ultimately cicatrise. I, therefore, advised him not to attend classes at all, and make up his mind to remain in his own lodgings, which were to be chosen especially for the purpose, and kept at an equable temperature. Accordingly, when the weather became cold—which, however, was not until January—he remained at home, and although the confinement was exceedingly irksome, he bore it with great resolution. It was about this period I first noticed strong friction or creaking murmurs at the apex of the right lung, which indicated that the pleuræ in that situation were greatly affected.

Matters remained in this condition until February 1844; I every day expecting that he would break from his confinement, or commit some imprudence which would induce fresh exudation in the lung. At this time I was sent for late at night, and found him greatly alarmed. In the course of an hour he had spat up about a pint of florid blood, and when I saw him he was coughing violently, and expectorating frothy mucus, deeply tinged of a red colour. I advised him to restrain the cough and efforts at expectoration. I sat with him some time, his excitement gradually diminished, and the cough and hæmoptysis ceased. He told me that for some days he had experienced considerable tightness and a sense of constriction in the upper and right part of his chest. On asking him whether this continued, I ascertained that it had completely disappeared. On auscultation, I heard loud friction râles, like the creaking of leather, over the apex of right lung. The inspiration was accompanied by a hoarse blowing murmur. The expiration prolonged; and there was the same loud bronchophony. Sounds over left lung the same as formerly. It was evident to me, from this examination, that the cavity was contracting; that in doing so, some blood-vessels had been ruptured, and that much was now to be feared from repeated attacks of hæmoptysis. For a period of four months, indeed, he now had occasional returns of spitting of blood, varying in quantity, but rarely exceeding three ounces in amount, and sometimes only slightly tinging the sputa. He was treated at these times by means of quietude, opiates, and acetate of lead, none of which, however, appeared to me to

possess any counteracting effect, as the hæmoptysis was evidently the result of changes in the lung, in connection with the contraction of the consumption ulcers. He always felt more or less constriction in the chest before any considerable hemorrhage, which was invariably relieved by it. Occasionally, also, he experienced considerable dyspnœa, and an intense longing for fresh air. On one of these occasions in April, he rushed out of his lodgings, and walked rapidly on the Calton Hill, when he found the dyspnœa left him. H insisted on repeating this on similar occasions, and he assured me it always produced the desired effect. As the season advanced, he prolonged his walks. A very common one with him was to the summit of Arthur's Seat, and in June all hæmoptysis and dyspnœa left him. He recommenced his studies also in the University at the commencement of the summer session in May.

At the end of July, I again carefully examined his chest. Although dulness under the right clavicle still continued, I was satisfied it was not so intense as formerly. On auscultation, there were loud friction noises, which completely masked the respiratory murmurs. The vocal resonance continued. On the left side there was still slight roughness of the inspiration, and prolongation of the expiration, but nothing more. His general health, though far from good, was much improved. He was still pale and thin. There was occasionally cough and tough expectoration. The appetite, he said, was good, and the bowels regular. I again cautioned him to avoid all exposure to cold and damp—to live well—to take exercise—and apply occasional counter-irritation to his chest, and he left Edinburgh for the autumnal recess.

In November 1844 he returned to Edinburgh. He was greatly improved in appearance, and described himself as being much stronger. During the holidays he had used horse exercise frequently, and been much in the open air. There was still occasional cough and tough expectoration, not tinged with blood. The physical signs were much the same as when I last saw him, although the intensity of the friction-murmurs had somewhat diminished. He positively refused to confine himself the next winter as he had done the last, being con-

vinced that he could not breathe the confined air of a chamber without injury; and it was with some difficulty that I obtained a promise from him not to go out during wet, or unusually severe cold weather. Every other precaution to avoid exposure to cold, and all exciting cases of exudation, was to be carefully observed. He attended his classes regularly for six weeks, when, owing to the weather, he lost several lectures. This caused him great annoyance,—the more so, as he intended to present himself for examination in the spring.

About the middle of January 1845, he sent for me. I found him with the face flushed, skin hot, rapid pulse, coughing violently, and expectorating a muco-purulent matter, tinged of a rusty colour. On listening over the apex of the right lung, there were heard crepitating and mucous râles, mingled with friction murmurs similar to those which formerly existed. The rest of the lung was free. The apex of left lung was not affected. It was clear that a new attack of pulmonary congestion and exudation had taken place. He confessed that he had been very unwilling to send for me; that he had felt himself getting worse for the last week, and was conscious that the attack had been occasioned by his persistence in attending classes, and sitting so many hours probably in damp clothes and wet boots. The same treatment as was adopted on a former occasion was again put in force—quietude, with small doses of tartar-emetic and opium. In a week, the febrile symptoms had much abated, but the pulse continued quiet; the appetite was destroyed, and his strength was again much reduced. All attempts to eat occasioned nausea and disgust—he could take no animal food. The tongue was loaded, and there were almost continued acid eructations. I ordered tartar-emetic ointment to the chest; and, instead of the tartar-emetic and opium internally, prescribed 8 grains of carbonate of magnesia, with ℈j. of sal volatile, to be taken three times a day in a bitter infusion. Three days afterwards, I was much alarmed at the occurrence of diarrhœa for the first time, which continued two days, and evidently diminished his strength. Fortunately it ceased on suspending the mixture, and giving aromatic and astringent powders, with a quarter of a grain of powdered

opium. In the beginning of February my patient was once again reduced to nearly the same condition that he had presented three years previously. I was encouraged, however, on listening to his chest, by hearing only the friction and dry cavernous râles at the apex of the right lung. The crepitation had disappeared, and occasional mucous râle was heard about the middle of the right back. I made every effort now to re-establish the appetite, and introduce nourishment. Solid animal food and cod-liver oil were immediately vomited. All that he could retain in the stomach was a little rice pudding and milk. It was evident to me that unless the stomach could be quieted and rendered capable of digestion, that he must sink. For two days I tried small doses of liquor potassæ and vegetable bitters, with effervescing draughts. I then gave a teaspoonful of cod-liver oil, but it caused insupportable nausea, and was vomited several times, although mixed with several essential oils in succession. The oil was therefore suspended, and ten drops of naphtha, with ʒj. of tincture of cardamoms in ℥j. of infusion of Colomba, given three times a day. This medicine evidently checked the tendency to nausea and vomiting, and after continuing it three days, the cod-liver oil was again tried, and was now retained in teaspoonful doses. During the next fortnight it was found necessary to suspend the oil on two separate occasions, and to have recourse to the naphtha mixture At the end of that time, however, he took it in dessert-spoonful doses, and from this period he once more began to recover.

It is unnecessary to record all the successive steps his improvement presented. In April he could again sit up, and at this time was taking four tablespoonfuls of the oil daily. At the end of that month he went out, and commenced taking gentle exercise whenever the weather permitted; and in May he was in much the same condition as at the commencement of the winter session. On examining his chest, I now noticed marked flattening under the right clavicle. All moist râles had disappeared. Friction râles could only be heard at the end of a deep inspiration—there was loud bronchophony, and considerable dulness on percussion.

During the summer session he attended his classes with tolerable regularity, and prepared himself for his examination. On this subject he was very anxious; indeed much more so, it appeared to me, than he was with respect to his health. Seeing now his anxiety on this subject, I also became desirous that his mind should be relieved. He accordingly left Edinburgh about the end of July for London, where shortly after he passed the examinations at the College of Surgeons and at Apothecaries' Hall. On the approach of winter he wrote to me, saying, that he was much better, and that he intended passing the winter with some relations in the West of England. He seemed to be impressed with the importance of avoiding every cause which could again excite a fresh pulmonary attack, and promised implicit obedience to my oft-repeated instructions. I heard from him from time to time, and he passed through the winter without accident.

It was in London during August 1846, that I once more examined my patient's chest. There was still marked dulness under the right clavicle, but it was by no means so deep or so extensive as formerly. There was a considerable hoarse murmur during inspiration, but the blowing character had disappeared. The expiration was prolonged and accompanied by a sibilant murmur. The vocal resonance was greatly increased. He was still pale and thin, but capable of taking considerable exercise. Every now and then he felt constriction in the right chest, which was removed by exercise in the open air. There was also occasional cough, but no expectoration. He gave me three cretaceous concretions, about the size of large pins' heads, which he had spit up the previous spring. He lived on the plainest animal food, and drank nothing but milk and water. His appetite had of late considerably improved, and he was now free from all dyspeptic symptoms. He had continued to take three tablespoonfuls of the oil daily up to a late period. I recommended his taking two tablespoonfuls of the following mixture three times a day:—℞ *Ferri Citratis*, ℈*ij.*; *Syr. Aurantii*, *Tr. Card. c. aa.* ℥*j.*; *Inf. Colombæ.* ℥*iv.* M.

He now established himself as a general practitioner in one of the midland counties of England, where he has been prac-

tising ever since. In the autumn of 1849, I again saw him. His appearance then and now is robust. He takes considerable exercise daily. There is no cough or expectoration. There is considerable flattening of the chest below the right clavicle; but he inspires freely, and without difficulty. On percussion the sound is still dull, but much less so, and more limited in extent, than formerly. On auscultation, there is almost complete absence of respiratory murmurs at the apex of lung, but a little lower down there is prolonged expiration, which is gradually lost in the healthy breath sounds. There is great increase of vocal resonance, probably owing in part to the density of the adhesions, and in part to the condensation and puckerings of the lung. The left lung is healthy. He took the chalybeate and bitter mixture for some time with marked advantage. The appetite improved, and his strength increased. At present he takes no medicine, eats heartily, and drinks only milk and water. His age is now thirty-seven.

In this case (of which, notwithstanding its length, I have only given a sketch, rather than a minute report), I presume there took place in the lung the same morbid changes as were described in Case I. (p. 47). In that case, cicatrisation of the tubercular cavity occurred spontaneously—in the other, the disease was subjected to a long treatment; and it may be fairly asked, whether art was in any way connected with the happy result? A reply to this question will be facilitated by paying attention to the facts of the following case :—

CASE XXII.—*Scrofula*; *Necrosis of the Femur and Pulmonary Consumption, with a large Cavity in the apex of Right Lung, and Condensation in the apex of Left Lung in July* 1849; *All the Phthisical symptoms complicated with Cardiac disease. Complete Recovery, Arrestment of the Disease, and Cicatrisation of the Cavern in December* 1851; *Health good in* 1853, *when last seen.*

Patrick Barclay was admitted, July 25, 1849, at the age of fifteen, into the Clinical Ward of the Royal Infirmary, under

my care. He was greatly emaciated, and complained of cough and difficulty of respiration, both which symptoms were easily excited, and occasionally severe and prolonged. His previous history indicated that he had been of scrofulous habit from infancy—that he had been the victim of poverty, and obtained a very insufficient diet. He had for some time been a member of the Industrial School, where he was learning the trade of a shoemaker. Twelve months previously, he had injured his right thigh by a fall, since which time he had been unable to walk much, and scrofulous disease of the femur, with a fistulous opening was induced, and was still present. He had continued to attend the school, however, until a week before admission, when the cough, expectoration, and dyspnœa became so urgent that he was confined to bed.

On examining the chest the day after his admission, percussion determined the existence of comparative dulness over the whole of the right side, most marked under the clavicle. On the left side there was slight dulness under the clavicle. On auscultation, distinct bronchophony, with loud friction and mucous rattles, approaching cavernous, were heard over the upper third of the right lung anteriorly and superiorly, becoming more faint inferiorly. On the left side, friction noises were heard above and immediately below the clavicle. Posteriorly on the right side, the bronchophony was not so loud, but the moist rattles were the same as in front. In addition to the severe cough and dyspnœa, there was copious expectoration of a viscid frothy sputum, tinged with blood. The pulse was 114, strong and sharp. The heart's apex beat below the sixth rib; impulse increased, but percussion did not indicate lateral enlargement. On auscultation, a chirping musical murmur was heard over the apex of the heart, at the end of the first sound becoming more faint towards the base. Over the left edge of the manubrium of the sternum, a bellows murmur took the place of the second sound, easily detected when the breath was held, but during respiration masked by loud friction sounds. The tongue was slightly furred; appetite good; some thirst; bowels regular; urine natural, specific gravity 1020, not coagulable. The chest, face, and arms were covered

with a pruriginous eruption. Profuse sweating at night. On the inner part of the right thigh, about four inches above the knee, there were several cicatrices, and three sinuses which led to necrosed portions of the femur, pouring out a profuse discharge. His general weakness was so great that he could not stand. He was ordered full diet, with half a pint of sweet milk morning and evening; a dessert-spoonful of cod-liver oil three times a-day; an anodyne and antispasmodic mixture to relieve the cough and dyspnœa; tartar emetic ointment to be rubbed over the upper part of right chest.

During the following fortnight, the moist rattle under the right clavicle became a coarse gurgling, but the chirping sound at the apex of the heart, although it disappeared and returned at intervals, became gradually more faint. The cough was occasionally so severe and suffocative as to induce vomiting, but appeared to be allayed on substituting a naphtha for the mixture formerly ordered. He than began slowly to improve, but he was ordered to omit the oil, as it occasioned nausea, and a seton was introduced below the right clavicle. In the beginning of August, all moist rattles below the right clavicle were replaced by hoarse dry murmurs. The suffocative cough and vomiting had ceased, and he was ordered a tablespoonful of the following mixture three times a-day:— ℞ *Ferri. Citratis*, ʒss.; *Tr. Aurantii*; *Syrupi. aa.* ʒss.; *Infus. Columbæ*, ʒv. On the 7th of September, his general appearance was much improved, and the sounds in the pulmonary cavity under the right clavicle continued dry. The seton produced so much local irritation that it was withdrawn. To take a tablespoonful of cod-liver oil three times a-day, and omit the mixture. October 28th, the report was:—Musical murmur of the heart has entirely disappeared. He is becoming quite fat, and so strong that he is able to go about the ward all day. Complains only of slight cough at night, and palpitation on exertion. The right infra-clavicular region is becoming flat, pulmonary sounds the same. To omit the cod-liver oil. November 18th—The cough has returned, with slight mucous expectoration, owing, as it is supposed, to some imprudent exposure to the weather on his part. On auscul-

tation, mucous and sibilant râles are heard all over the chest. He was ordered to take the oil again. From this time he rapidly improved. The cavity became perfectly dry, and respiration over it was accompanied by blowing murmurs. The cough and expectoration greatly diminished, and his general appearance became healthy, and he grew very stout. On January 13th, it is noted that, on percussion, a distinct crack-pot sound is heard in the right infra-clavicular region, and faintly also on the left side. On auscultation, the heart's sounds are loud all over the chest, the second sound being accompanied with a distinct bellows murmur. Musical murmur has never returned. There is bronchophony and prolonged expiration in the right infra-clavicular region, but no moist sounds. Sleeps well, and is very little troubled with cough. Does not sweat; is very fat; appetite good. This boy, as far as all general symptoms are concerned, may be regarded as having been in good health for the last two months."

He was dismissed from the Infirmary, February 27, and visited me on the following day, when I ascertained, on careful examination, his condition to be as follows, and made the following note:—"On percussion, the chest is tolerably resonant on both sides; but there is slight dulness under the right clavicle. On auscultation, the inspiration is loud, and of a blowing character, in right infra-clavicular region; but the murmur is much softer than formerly. Expiration is still prolonged, and there is considerable vocal resonance, but not amounting to bronchophony—no moist râles. In the corresponding situation on the left side, the inspiration is somewhat harsh, and respiration slightly prolonged; vocal resonance normal; loud bellows murmur, with the second sound of the heart, heard over nearly the whole chest. His general health is good; he expresses himself as being quite well. He appears stout and strong; but his countenance is somewhat sallow and cachectic. He has no expectoration or sweating, and the cough is trifling, and only present in the morning. He is about to return to the Industrial School, and resume the learning of his trade as a shoemaker."

He was re-admitted into the Infirmary, August 26th, 1850. After leaving the house he had been frequently exposed to cold, but had been at the Industrial School,—and latterly the cough and expectoration, which he said had quite left him, returned, and gradually became more severe. The sweating returned with the cough. A week before admission, he, with the other boys of the school, went to Portobello to bathe, and, notwithstanding his remonstrances, the master insisted on his going into the water, saying it would do him good. He, however, became much worse. On admission, the physical signs were, coarse moist râle under the right clavicle, imperfect pectoriloquy, and creaking friction noises; under left clavicle, harsh inspiration, and prolonged expiration, but the dulness in this position is very slight, when compared with that of the opposite side. He again, by means of cod-liver oil, good diet, and counter-irritation, became strong and stout; the cough, expectoration, and other symptoms ceased, and he was discharged March 7th, 1851. The report on that day is, "marked dulness and increased vocal resonance under right clavicle; the inspiration is harsh but dry."

He was once more admitted, July 5th, 1851, and it appeared that, on leaving the ward in March, two detached pieces of his right thigh bone were extracted by Mr Syme, and he remained in the surgical hospital for five weeks. Subsequently he had been constantly employed in light garden work, and notwithstanding poverty of food, he had continued in tolerably good health till a week previous. The report says—"On percussion, there is slight dulness only under the right clavicle, and posteriorly the resonance is good and equal on both sides. Under the right clavicle, the inspiration is heard to be harsh and blowing—no moist râle. There is also loud double friction murmur over the upper fourth of right lung, especially at the apex, and slight friction may be detected here and there over the whole of the right side. Under the left clavicle, inspiration somewhat exaggerated in tone, but the breath sounds everywhere normal. He looks pale and thin. There is severe cough, with mucous expectoration, but the appetite is good, and there is, on the whole, a marked improvement in his general appear-

ance. Impulse of the heart and loud blowing murmur at the base still present. Wound in the thigh nearly healed."

He continued to do well after his admission into the house. The cough rapidly diminished, and at length was only present in the morning on waking. His bodily functions were in every respect perfectly well performed. The wound in the thigh cicatrised, and were it not for the cardiac disease, this lad might have been considered in robust health. The following is the result of a careful examination of the chest, made December 23, 1851 :—"On percussion, slight dulness under the right clavicle. On auscultation, inspiratory murmur somewhat harsh under both clavicles, but most so on right side. The vocal resonance also is slightly exaggerated over the apex on right side. In every other respect, the lungs appear to be healthy. There is great impulse of the heart still, and over the apex there is heard, with the second sound, a blowing murmur, which is very loud at the base." He remained in the house until March 7th, 1852, when he was dismissed in all respects perfectly well.

August 9th, 1852.—Presented himself at the visit to-day. Since his dismissal in March, has been employed by a dyer, and during his occupation has been greatly exposed to wet and cold. He has only been able to earn five shillings a-week, so that his diet has been very poor, both in quantity and quality. His health, notwithstanding, has been tolerably good, although he is now much thinner than when he left the Infirmary. On percussion, there is clear resonance under both clavicles, but on the right side very slight dulness with increased resistance is perceptible. On auscultation, the inspiration under right clavicle is somewhat harsh, but the respiratory murmurs on the whole are very good. Vocal resonance slightly increased. Under the left clavicle there is harshness, with fine sibilation and friction during inspiration. The expiration is prolonged, and there is also slight increase of vocal resonance. The blowing murmur at the base of the heart with the second sound still very distinct. Otherwise is quite healthy. He has a sister settled at Philadelphia, and has formed the intention of joining her in the United States.

February 6th, 1853.—Presented himself at the Infirmary to-day, and was carefully examined by me, Dr Christison, the various clerks, and students. The physical signs were the same as at last report, the breath sounds, however, being more soft and natural. He has been prevented leaving for Philadelphia, as he intended last August, and since then has been carrying on the occupation of light porter to a dyer. His general health has been good, although he has undergone much exposure to cold and wet. He leaves for Philadelphia to-morrow, taking with him a letter recommending him to the care of Professor Wood of that city.

In a letter from Dr Wood to me, dated March 28th, 1853, it was stated that Barclay had presented himself a week previously. "Being at the time extremely busy, I gave the boy, who told me that he was quite destitute, a small sum of money, telling him to use it for his support; in the meantime to look out for employment, which is not difficult to be had in this country for persons of his class, and to call on me again before long. He promised to do so. I have not seen him since." In a subsequent letter (1856) from Dr Dunglison, who at my request asked Dr Wood concerning him, it appeared that he had not since been heard of.

I am not acquainted with any recorded case which, throughout its progress, has been examined with more care, in which phthisis in its last stage was more unequivocally manifested, and which was more decidedly the subject of a thorough cure, than the one above noticed. The lad was under my observation thirty months, and during twenty of these months he had been in the Clinical Ward, repeatedly examined by three winter and two summer classes, as well as by my professorial colleagues. Of the facts, and accuracy of the record in the ward-book, there can be no doubt; and it is equally certain that we watched the arrest of tubercular condensation at the apex of the left lung, and the cicatrisation of a tubercular excavation in the apex of the right lung. Moreover, a careful perusal of the case will show that this result was not brought about by the mere spontaneous efforts of nature. On

the contrary, great difficulties had to be surmounted, numerous symptoms removed, and most important complications guarded against. Indeed, the effects of treatment could never be more unequivocally manifested in any case than they have been in this. On admission he presented the wasting characters of the disease in its last stage. The emaciation was extreme; the cough and sweating most distressing; and the physical signs demonstrated a cavity as large as the fist in the right lung. Under the use of the oil his strength rallied. After a time it was given up, on account of his becoming so fat. Gurgling râles, and other signs of softened exudation, however, once more became apparent, and again disappeared when the use of the oil was resumed. He continued to take it from time to time until the cavity had completely healed.

During most of the time this boy was under treatment he experienced no difficulty in taking the oil. On the contrary, it was always retained in the stomach, and readily digested, and this although ordinary food was at one period frequently vomited, owing apparently to the violence of the cough. Its influence on his general health was most remarkable, as well as upon the local disease in the lungs. From a state of extreme emaciation, he became so stout that it was feared the oil would occasion obesity. It was also observed, that during its suspension the pulmonary symptoms returned, and that these, on again resuming the use of the remedy, once more disappeared. His appetite was always good—a circumstance that, from what has been previously stated, may easily be understood to have greatly facilitated the treatment, and contrasts strongly with the difficulties experienced in Case XXI.

The following cases are illustrative of the advantage of the treatment previously recommended, but their histories, for the sake of brevity, are more condensed :—

CASE XXIII.—*Hereditary Pulmonary Consumption; Condensation with Softening of the Upper Lobe of Right Lung, and Slight Affection of Left Lung in* 1843; *All the Phthisical Symptoms, with Hemoptysis, continued to* 1847; *Then marked good Effect of Cod-Liver Oil; Complete and Permanent Recovery in* 1850; *Health continues good*, 1859.

Mr B., whose father had died consumptive, first asked my advice in the spring of 1843, being at that time seventeen years of age. He was tall and thin, of sallow complexion, and had long been troubled with severe cough and expectoration, want of appetite, weakness, sweating, and indeed all the symptoms of advanced phthisis. On examining his chest, I found marked dulness on percussion, with loud mucous and crepitant rattles, and bronchophony over the upper third of the lung on the right side. The left side, with the exception of slight harshness during inspiration at the apex, was healthy. I recommended attention to the diet, which was to be nutritive, moderate exercise, counter-irritation, and cod-liver oil. I did not attend this gentleman regularly, although I had frequent opportunities of seeing him, as he shortly afterwards commenced the study of medicine in this University. I ascertained, however, that he never attempted at that time to take the oil, as he had an unconquerable loathing for all fatty substances, but that by means of exercise, nourishing food, and counter-irritation, his health was somewhat improved. He continued alternately better and worse for the next four years, pursuing his medical studies, the appetite being always defective, and occasionally sweating profusely. This latter symptom caused him great distress during his attendance on the botanical class in the year 1846. In the summer of 1847, being much worse, he sent for me, and I found him greatly prostrated, with copious expectoration, tinged with blood, most abundant in the morning. The dulness on the right side was still present, and there was loud mucous rattle, mingled with creaking friction noises. The left side was tolerably healthy. I again strongly recommended cod-liver oil, and shortly after-

wards he commenced taking it, at first in small doses, which he rapidly increased to several tablespoonfuls in the day. From this time his health improved rapidly. In November 1847 he called upon me, and I ascertained that all moist rattles had disappeared, and were replaced by dry blowing sounds under the right clavicle. The loud bronchophony continued. He could now, however, take long walks, and was enabled to sing for a considerable time without fatigue, as he had a good bass voice. One day about this time he spat up a calcareous concretion from the lung, the size of a small pea. In 1848 he commenced teaching medicine as a private tutor, an occupation he pursued for the next four years, occasionally undergoing great fatigue, and often being engaged from morning to night. His health, however, continued to improve; and he always found the oil act as a stimulus to him, creating an appetite, and greatly invigorating his bodily powers. In 1852 he might be said to have been thoroughly well for two years. He now obtained a commission as assistant-surgeon in the army, and after a short residence in London and Chatham, where he was considered as in perfect health by all his companions, he joined his regiment in Cephalonia in the autumn of that year. A letter received by his friends (September 9, 1852), informed them that his health is excellent, and that his old complaint seems to have completely left him. He has continued well up to this time (1859).

This case is highly illustrative of the value of cod-liver oil. When, in 1843, I first recommended the patient to take this remedy, it did not possess so much of the confidence of the profession as it subsequently acquired. Indeed, about that time it was openly ridiculed by many of those who are now its warmest partisans. It so happened that Mr B., himself a medical student, and closely connected with medical men, was induced to put no faith in its good effects, and refused to try it for upwards of three years. Its reputation having in the meantime extended, it was in 1847 that he was, for the first time, induced to take the oil, and, as stated in the case, with the most beneficial results. It is worthy of remark, that whilst

during the four years previous to his taking it, the disease steadily though slowly progressed; on the contrary, during the three years which followed, he gradually became restored to perfect health. It is, I presume, impossible to cite any single case more illustrative of the advantages of this substance. His own convictions as to its value were as strong as possible, and the remark he made as to the stimulating and invigorating powers of a single dose, especially of the brown oil, I have frequently heard dwelt upon by many other patients.

CASE XXIV.—*Tubercular Deposition, and Ulceration in the Summit of Right Lung, with the usual Symptoms of Phthisis in* 1843; *Arrestment of the Disease in* 1844; *Complete Recovery, but with Slight Emphysema; Health good at present,* 1859.

Mr B., æt. 35, a superintendent of chemical works, consulted me in 1843, labouring under cough, difficulty of breathing, slight purulent expectoration, and increasing weakness and emaciation. On examining his chest, I found on percussion, marked dulness under the right clavicle, and on auscultation a sub-mucous râle, with the inspiratory murmur, prolonged expiration with sibilant râle, friction sounds, and bronchophony. The left lung was healthy. He was ordered to take a tablespoonful of cod-liver oil three times a-day, and apply counter-irritation under the right clavicle. He continued his employment, took the oil regularly, and soon observed a marked improvement in his health. He took the oil uninterruptedly for nine months. Afterwards there was occasional diarrhœa, and every now and then a return of the cough and shooting pains in the chest. He had, however, been enabled to continue his employment, and felt satisfied that the oil had been of the utmost service to him. In 1850 he informed me that he sometimes experienced a sense of constriction at the upper part of right lung, and felt breathlessness on ascending a stair or making any unusual exertion. The slightest amount of free chlorine in chloroform brought on a paroxysm of cough. On percussion there was only slight dulness under the right cla-

vicle, but marked increase of vocal resonance. He was robust, and, with the exception of the occasional asthma alluded to, in perfect health. I examined his chest, September 6th, 1853, and found slight comparative dulness under the right clavicle, diminution of inspiratory, with prolongation of expiratory murmur. The breathlessness on taking exertion continued, and it was also excited by the fumes generated during the preparation of morphia. In other respects his health was good.

I carefully examined the chest on the 5th October 1859. Under the centre of the right clavicle was a dull space the size of a hen's egg, over which the inspiration continued harsh, and the vocal resonance much exaggerated. Around this the percussion note was good. The left lung was healthy, with the exception of slight emphysema, as indicated by loud resonance or percussion, and slight prolongation of expiration. During the six years that had intervened since I last saw him he had continued to be exposed to the fumes of morphia and chlorine in the chemical manufactory, which occasionally excite asthmatic attacks, and latterly have apparently caused feebleness of the heart's action. Unusual exertion also excites dyspnœa, but otherwise he is in good health.

In this case we can have no doubt that phthisis was arrested, as sixteen years afterwards traces of the pulmonary disease remain in the form of condensed lung tissue, and of slight emphysema, one of its most common sequelæ. As the patient resides in Edinburgh, and is kind enough to let me examine his chest from time to time, I have been enabled to follow the gradual condensation and disappearance of the tubercular exudation with the greatest care up to this time (October 1859).

CASE XXV.—*Advanced Pulmonary Consumption; Cavity in the Apex of Right Lung, with the usual Symptoms of Phthisis in* 1844; *Recovery, Arrestment of the Disease, and Slight Emphysema, in* 1846.

Robert Kerr, æt. 22, entered the Royal Infirmary, August 1844, in a state of extreme emaciation. Such was his weak-

ness that he could not stand without support. The disease was of at least two and a half years' standing. He has been more or less addicted to drink. The appetite had been uniformly bad, and there was often great thirst and occasional hæmoptysis and diarrhœa. There was profuse sweating at night, hollow suffocative cough, copious purulent expectoration, and great dyspnœa. On percussion there was complete dulness under the right clavicle, and loud gurgling râle could be heard in the same situation, with perfect pectoriloquy. The left lung was comparatively free, presenting slight tubular inspiration, prolonged expiration, but no increase of vocal resonance. He came under my care in November, the treatment having previously been directed to the relief of the cough, dyspnœa, diarrhœa, and other occasional symptoms. He was still excessively weak, with profuse sweatings at night, and copious purulent expectoration. The physical signs remained the same. He was now ordered a tablespoonful of cod-liver oil three times a-day, which he took regularly for three months. Two weeks afterwards he was much better, and could stand without assistance. Tartar-emetic ointment was then ordered to be rubbed under the left clavicle, and counter-irritation was kept up for three weeks. Gradually the pectoriloquy merged into bronchophony, the gurgling râle disappeared, and was replaced by dry, hoarse, and blowing sounds. The expectoration diminished, the night sweats ceased, the patient became evidently more robust, and during the whole of the third month that he remained under my care he considered himself quite well. It so happened at this time that numerous cases required admission, and I found one morning (January 15, 1845), that he had been dismissed by the visiting Committee of Management as no longer being a fit object for the charity.

I lost sight of this man for eighteen months ; but one day, in June 1846, I met him on the South Bridge, looking remarkably well. He told me that he had continued taking the oil for several months after leaving the Infirmary, and had obtained employment as a labourer on the North British Railway, where he was then employed. I took him into a common stair and

examined his chest. On percussion there was still marked dulness on the left side, under the clavicle. On auscultation, there was very feeble respiratory murmurs, with occasional friction sounds at the apex; but a little lower down the breath-sound was loud and the expiration prolonged. He stated that on going up a hill or a flight of stairs great breathlessness was excited, but that in every other respect he was in good health. He has not since been heard of.

CASE XXVI.—*Tubercular Deposition and Ulceration in the Summit of Right Lung, with the usual Symptoms of Phthisis in* 1844; *Recovery, and Arrestment of the Disease in* 1845.

Louisa ——, æt. 22, a milliner, applied at the Royal Dispensary with the usual symptoms of phthisis in its advanced stage, in the summer of 1844. At the apex of the left lung there was dulness on percussion, loud mucous râle, and bronchophony. The right lung was tolerably free of disease. For the last six months she had obtained very little work, and her food was deficient both in quantity and quality. Indeed, she lived almost entirely upon dry bread and a little tea. A tablespoonful of cod-liver oil was ordered to be taken three times a-day. She attended at the Dispensary two or three weeks, and, as the oil caused no nausea or sickness, four tablespoonfuls were ordered to be taken daily. I lost sight of this girl for twelve months; but she again applied at the Dispensary, in the summer of 1845, labouring under a slight bronchitic cough which she had contracted a few days previously. Her appearance was so improved that I did not recognise her; but she told me that she had taken the oil continuously for nine months, on account of the great benefit it had produced. Gradually all her symptoms had disappeared; she became stout and strong, and now considered herself in perfect health. On percussion all dulness had disappeared; and on auscultation, with the exception of prolonged expiration and occasional sibilant râle, nothing unusual could be heard. I was so struck with the perfect disappearance of the disease, that I called in my colleague, Dr Spittal, who was receiving

patients in another room, to confirm the absence of the physical signs characteristic of tubercular softening, which he did.

There could be no doubt as to the existence of softened tubercle in the apex of the left lung in 1844, nor of its disappearance in 1845. At both periods the girl was repeatedly and carefully examined, not only by myself, but by from six to twelve gentlemen, who constituted my poli-clinical class; and on both occasions she was the subject of lecture.

In the six last cases related, I consider that there was a permanent arrestment of phthisis pulmonalis in its advanced stage. In Cases XXI., XXII., and XXV., there were distinct cavities; in Cases XXIII., XXIV., and XXVI., the tubercle had softened, and probably occasioned small anfractuous cavities—but this cannot be determined. In Cases XXI., XXIV., and XXV., the healing was followed by permanent dulness, more or less consolidation of the apex of the lung, and dense adhesions between the pleuræ covering the diseased part. In Cases XXII. and XXVI., the lesion probably produced a fibrous cicatrix, without adhesion or great condensation; and hence the inconsiderable dulness and vocal resonance afterwards. In Cases XXIV. and XXV., the recovery was accompanied by an emphysematous condition of the lung—a frequent accompaniment of cicatrization in part of the pulmonary tissue. That the arrestment may be ascribed to art, and was not spontaneous in these cases, will, I think, be evident from studying the facts they presented. In all of them, improvement was contemporaneous with the period when cod-liver oil was digested, and rendered assimilable to the wants of the economy, and in this respect they confirm the views I have put forth with regard to the mode in which the remedy operates.

It must not be supposed, however, that cod-liver oil is the only means of producing this result, although, for the reasons previously given, I believe it possesses greater power as an analeptic than all others. As formerly stated, anything that

will rouse the nutritive functions, whether it be improved diet, change of occupation, exercise, or even tonic remedies, that improve the appetite, may, in particular cases, be shown to produce a similar effect. As an illustration of this, I may cite one, out of a considerable number of instances which have been furnished me by my medical brethren, which was treated before cod-liver oil came into use :—

It is that of a medical man, written by himself, and was sent to me by Dr Corrigan, who, in a note dated September 17, 1850, says of it, "Of Dr F.'s case I can have no hesitation in making a positive assertion. I never had clearer evidence of the existence of a cavity, than in my examination of his chest, when I saw him in 1840. He is now, as you will see, in rude health, in charge of a dispensary district, as its medical officer, in one of the wildest parts of Ireland." In the August of 1859 Dr Corrigan assured me that his health continued good.

CASE XXVII.—*Pulmonary Consumption with a Cavity in the Apex of Left Lung; All the Symptoms of Phthisis, with Hemoptysis, in* 1840; *Permanent Arrestment and Recovery in Fourteen Months; Health reported good by himself in* 1850; *Still well in* 1859.

"July 2d, 1850.

"MY DEAR DOCTOR,—I received your note, and as I am indebted to you for my life (under God), the least I can do is to remind you of the means you used to preserve it. In the end of May 1840, I got ill, and was treated for fever, though I think myself it was inflammation of the lung. I had great pain on the top of the left one, and behind, under the shoulder. I wanted them to bleed, leech, or blister me, but they would not. I got well, however, and went twenty-five miles inland for a fortnight. On my return the cough which had attended the latter part of my illness and convalescence increased, and one morning I spat up a quantity of blood. I was then blistered and leeched; got first acid sulph., then prussic. I had night-sweats, and lost flesh. In fact, I was a regular

shadow. Had three returns of bloody expectoration at intervals of about ten days, being in the intervals purulent. In this way I continued till about the middle of September, when, having been informed that three of my four medical attendants had not given me a very long day, to wit, a month, I started for Dublin by easy stages. On my arrival, Mrs F. called on you to know what time I would find you at home; but you most kindly insisted on coming to me, which you did next day, examined, and ordered me 20 gr. tart. of iron three times a-day, with four leeches to my chest. Having inquired into my habits, and finding that I took *three* or *four* glasses of punch every night previous to my illness, you ordered me a glass of porter and broiled meat about three every day. I improved, had no bad symptoms; but after a few days you put a seton in my chest, under the left clavicle. You also ordered me to wear flannel instead of cotton. Dr Stokes saw me after, both at his own and your house. I continued the tart. of iron for about six months; the seton wore out in about nine. I had another put in, which I wore for about five months, putting on, now and then, a very small blister or two leeches. I gave them all up about fourteen months after I put myself under your care, and have never since, thank God, had one moment's sickness, nor have I taken a grain of medicine of any kind, except while taking the tart. of iron, for ten years. I have lots to do, must ride or drive nine miles every day, and after all this work I am *twelve stone four* this day. If I have forgotten anything you will let me know, and always believe me to remain, my dear Dr,

"Most faithfully and sincerely yours,

"C. F.

"Dr Corrigan."

In this case, iron was given as a tonic; but I have written to little purpose if it be not evident to the reader that the generous diet, the porter and broiled meat, in short, the analeptic treatment, assisted perhaps by the change of scene, confidence, hope, and all those circumstances which tend to renovate the nutritive functions in a debilitated constitution,

were the real cause of the improvement. The recovery was permanent, and is now of eighteen years standing.

The four following cases are well-marked instances of the arrestment of pulmonary consumption, as the result of an analeptic treatment :—

Case XXVIII.—I saw D. W., æt. 33, in 1849, labouring under considerable cough, fever, and purulent expectoration mixed with blood. The upper third of the right lung was the seat of tubercular exudation; and loud mucous and gurgling rattles, with bronchophony, announced the existence of softening and ulcerative cavities. The apex of the left lung was similarly affected, but to a small extent. Under the influence of an analeptic treatment, with wine and great attention to diet and hygienic rules, he slowly rallied. He continued coughing and expectorating, and had several exacerbations of fever, with return of hemoptysis, during five years; on the whole, however, getting better, and the cavities contracting and getting much drier. At the commencement of 1855, I was called to him in consequence of profuse hæmorrhage, which had come on suddenly, and threatened dissolution from its amount. He recovered, however; and I ascertained, by careful examination, that both sides of the chest superiorly were flattened and retracted, but more especially the right; that the percussion note under the right clavicle was dull; and that the moist rattles were replaced by dry, blowing, harsh sounds and friction murmurs, most pronounced on the right side, but very evident also on the left. The lungs were evidently cicatrizing. This gentleman has continued in tolerable health ever since. There is breathlessness on great exertion, occasional cough, and slight sanguinolent sputum. I have not had an opportunity of examining him lately; but in September 1859, he was strong and capable of carrying on his public duties as a teacher, besides a large amount of fatigue in bodily and scientific labours.

Case XXIX.—Dr J. M. consulted me in the summer

of 1853, at the age of twenty-one years, in consequence of chest disease, manifested by frequent cough, expectoration tinged with blood, emaciation, sweating at night, and all the usual symptoms of phthisis pulmonalis. On percussion, there was marked dulness under the right clavicle, and on auscultation there was in the same place distinct crepitation and bronchophony. Feeling that he could not prosecute his medical studies, and that the preparation for his examinations was thoroughly exhausting him, he resolved, with my sanction, on going to Adelaide in South Australia. He called on me again four years afterwards (August 4th, 1857). There was now flattening and comparative dulness under the right clavicle. The respiratory murmurs, however, were healthy, with the exception of slight increase in the vocal resonance at the right apex; otherwise he was in perfect health. He informed me that he took cod-liver oil and followed an analeptic treatment for some months after seeing me in 1853, so that on reaching Madeira, he was so well as to be able to abandon all treatment. In Australia, he was almost constantly on horseback, ate large quantities of animal food, and followed my injunctions. He practised medicine a little, but principally occupied himself in the manufacture of wine. From time to time he spat up several calcareous concretions. Finding himself quite well, he returned and graduated at this University in 1857. He is now (1859) in good health, practising his profession in Dumfriesshire.

Case XXX.—Dr M. consulted me in the autumn of 1854. He was then twenty-seven years of age, and informed me that he had long suffered from dry cough and occasional slight hemoptysis. Latterly he had found that the anxieties and fatigue of a daily increasing practice were greatly affecting his strength. On examination, there was dulness over the upper fourth of the right lung on percussion, slight crepitation with inspiration on auscultation, and increased vocal resonance. The left lung was healthy. The symptoms were frequent cough, slight expectoration, great exhaustion, profuse sweating at night, pulse weak but not accelerated. He

was ordered cod-liver oil and the analeptic treatment generally. In January 1855 he was no better, and his practice was evidently wearing him down; so that I advised him to give it up, go abroad, and think of nothing but his health. In March he went to Algeria, and remained there until June, when I again saw him. He had used, instead of cod-liver oil, large quantities of butter, and of the pure olive oil when quite fresh, besides carrying out fully all the other injunctions I gave him. On examination, I found the disease had in no way progressed. The physical signs were the same, but his general health and strength greatly improved. He spent the winter of 1855–6 in Italy, where he examined the various medical schools and public institutions. In March he returned to Scotland, and attended the funeral of another member of his family who died of phthisis. In the autumn I satisfied myself that there was no crepitation, although the dulness existed with harsh respiration. There was also some flattening of the right chest superiorly. I advised him to spend another winter abroad, which he did, chiefly in southern Germany. He returned in June 1857, when it seemed to me that the disease was permanently arrested, and I sanctioned an attempt to enter once more into medical practice. Shortly afterwards he obtained a medical appointment which necessitated frequent journeys, and was in every respect congenial with his tastes; and at this moment (October 1859) he enjoys vigorous health, and carries out very laborious duties without the slightest inconvenience. There is still marked dulness over the upper fourth of right lung, with bronchophony, but no other physical sign.

Case XXXI.—On the 15th of February 1855, I was consulted in the case of Miss C., æt. 24, whose two elder sisters had died of phthisis in Italy. I found her with all the signs of a moist cavity in the apex of the right, and with slight harshness of respiration at the summit of the left lung. Under the idea that her disease was the result of chronic pneumonia, the treatment had been on the whole rather lowering, her diet chiefly farinaceous, and she had been confined

to bed for a considerable time. There was frequent cough, purulent expectoration, quick and weak pulse, profuse perspiration, loss of appetite, thirst great, emaciation, and extreme exhaustion. I recommended cod-liver oil, improved diet, exercise in the open air, and an analeptic treatment generally. I again saw her on the 28th, when she had greatly improved, and it was resolved that she should pass the spring at the Bridge of Allan. The following October I was requested to meet her medical attendant there in consultation, and was surprised at the great improvement which had taken place. She was now strong, and had lost all appearance of emaciation. She could take walking exercise without difficulty, and indeed was constantly on her feet. There was scarcely any cough and no expectoration, the pulse was natural as to strength and frequency, her appetite was good, and she took her food and cod-liver oil without inconvenience. On percussion and auscultation, the cavity was still evident, but it was quite dry and apparently contracting. I have not seen this lady since, but have been recently assured that at this time (October 1859) she is in perfect health.

I could easily cite a greater number of similar cases, but as they only exhibit the same fact, and indicate the advantage of the analeptic treatment in procuring permanent arrestment of pulmonary consumption, even in its most advanced stage, nothing could be gained by doing so.

Our ideas with regard to the good effects of treatment, however, would be very limited, if we confined our observation merely to such cases as could be shown to have undergone a permanent cure. Such is the difficulty of following the progress of these cases, that they must always be comparatively limited in number. I am disposed, however, to believe, that the more extended our knowledge of the pathology and diagnosis of phthisis becomes, and the more generally a treatment, founded on the principles I am contending for, is adopted, they will be found to be more common. But the advantage of an analeptic treatment may be observed in most

cases of phthisis, although a permanent cure is not attained. Life may certainly be prolonged, and the distressing symptoms greatly ameliorated. No doubt it will always be difficult to ascertain how much of the benefit is to be attributed to art, and how much to nature; but when we ascribe an analeptic power to an oleaginous substance, and find, on its administration, that the nourishment of the individual is improved, that his strength augments, and a check is given to the disease, our faith in the remedy increases the more frequently these circumstances are witnessed.

I could give a great number of cases observed in private, dispensary, and hospital practice, in which the apparent good effects of the treatment were extraordinary, but in which either the termination of the case is unknown, or where the disease ultimately proved fatal. The following are instances of this:

Case XXXII.—Agnes M'Laren, married, æt. 45, admitted into the clinical ward, No. 12, of the Infirmary, November 22, 1844, has suffered from ill health and occasional cough for the last four years at least. This is the fifth time she has been in the house, from which she has always been discharged as relieved, after a treatment varying from two to four months in extent, and consisting in addition to cough mixtures, anodynes, antispasmodics, astringents, etc., of good diet. At home, lives principally on a little tea and dry bread, with potatoes or porridge for dinner. About once a week she has broth or a little meat. On admission, a large cavity was detected in the apex of the left lung, and there were signs of crude tubercle in the apex of right lung. There was great emaciation, considerable sweating, purulent expectoration, and occasional diarrhœa and hemoptysis. She remained in the house four months and a half, having been treated with cod-liver oil, counter-irritation to the chest, and good diet. She was dismissed April 10th, at her own request; on which day the report is as follows:—"Dulness under left clavicle; dry blowing murmurs in this situation, both with inspiration and expiration, which have been present without change for at least two months. Cough and expectoration trifling. General

health good. She says she has not been so strong for the last five years."

In the course of a few months this woman applied at the Royal Dispensary, with the cavity full of pus, and a return of the emaciation and weakness. She was treated with cod-liver oil, but was unable to procure good diet. She again entered the Infirmary, and during the next three years she was alternately getting better in the house, and worse at home. I saw her for the last time at the Dispensary in 1848, when the cavity was evidently much contracted. The conclusion of the case is unknown.

CASE XXXIII.—Jane Maitland, æt. 30. This woman had a considerable cavity in the apex of the left lung, with loud gurgling, and perfect pectoriloquy. Between the years 1842 and 1847, she had been in the Infirmary, under different physicians, at least seven times, and probably oftener. Her history is almost the same as the last, with the exception, that she was never so much emaciated, and only felt great weakness; always getting worse on the bad diet she had at home, and as regularly getting better during her residence in the Infirmary. The termination of her case is also unknown.

CASE XXXIV.—When in Birmingham during the autumn of 1849, I examined, with Dr Evans, the chest of Mr W., æt. 24, a draper of that town. He had laboured under all the symptoms of phthisis with hemoptysis in 1836, from which, under a tonic treatment, consisting of the different preparations of iron, and a nutritive diet, he gradually improved. When I saw him there was comparative dulness under the right clavicle, harsh inspiration, expiration prolonged, and some increase of the vocal resonance. He was stout and corpulent, seldom coughed, had no expectoration, and was in all respects quite well. Latterly he took stimulants to excess; and I regretted to hear lately from Dr Evans, that after so long an arrestment as 19 years, he died with all the symptoms of phthisis in 1855.

CASE XXXV.—I was consulted in the case of J. M., a youth, æt. 17, in July 1855. At this period he was in the last stage of phthisis, and so weak as scarcely to be able to walk. There was a considerable cavity under the right clavicle, as evidenced by dulness and loud cracked-pot sound on percussion, with gurgling râle and pectoriloquy on auscultation. There was also infiltration of tubercular exudation into the superior third of the left lung, as shown by dulness on percussion, crepitating râle, and loud bronchophony. His symptoms were extreme emaciation, total loss of appetite, profuse perspiration, and constant cough, with expectoration of purulent matter occasionally streaked with blood. The treatment up to the time I saw him had been cough mixtures, acid drops, and confinement to the house. Instead of these, I ordered cod-liver oil, milk, animal food and nutrients, sponging the chest with cold water, and exercise in the open air on horseback or in a carriage. The result of this treatment was remarkable. The sweating and prostration disappeared, the expectoration became less, and he was able to enter on the duties of a clerk in a house of business. In 1856, the cavity in the right lung became dry, but another gradually formed in the left lung. In 1857, the two cavities were dry, and the disease was arrested. In 1858, the left cavity appeared to be cicatrizing; but that on the right side, though generally dry, occasionally became moist, and on auscultation loud gurgling and clicking noises could be heard in it. During all this time he continued tolerably well, and was able to walk and ride about without difficulty. In 1857 he abandoned business, and resided with a relation at a farm in the immediate neighbourhood of the sea, near Edinburgh. He bathed daily in sea water, took rides on horseback in fine weather, in a carriage when it was wet, besides walking considerable distances. He ate animal food, drank milk, took cod-liver oil, and carefully followed out, in every respect, the analeptic treatment I recommended. He continued in the same condition until June 1859, when he accompanied his relations to Buxton, where they were induced to go in order that one of them might obtain relief from gout. The journey (260 miles) was made from Edinburgh in one

day, was very fatiguing, and produced in him great exhaustion. Next day he had hemoptysis to the extent of six ounces. During his stay, though the air appeared to him invigorating, his appetite declined, he became breathless and weaker. These symptoms were increased by another fatiguing day's expedition that was made to see Chatsworth. Shortly after he desidered to return to Edinburgh, and, though very weak, insisted on performing the long journey in one day. He arrived greatly exhausted, and died two days afterwards.

This case, like those formerly described (Cases XXI., XXII., XXIII., XXVIII., and XXXI.), was in the advanced stage of the disease when I first saw him, but improved rapidly, and continued better for four years, under the treatment recommended. Unfortunately, a journey involving too great fatigue appeared to exhaust him, and after this he sank rapidly. At p. 135 I have, though not perhaps sufficiently, pointed out that "the extent to which exercise should be carried out, ought always to be short of anything like considerable fatigue." The history of the preceding case is well calculated to enforce this principle of treatment, as well as the caution given to travellers at pp. 132, 133.

I have been assured by the gentleman whose case is recorded (Case XXX.), that nothing more conduced towards his recovery than the avoidance of great bodily fatigue, and that he had observed, during his residence abroad, how a neglect of this rule in various ways had led to injurious results. The limited means of some parties obliges them to take cheap rooms in the foreign hotels, up five or six pair of stairs, the mounting which either makes previous exercise injurious, or prevents their taking exercise altogether. So also those who hire horses at rare intervals, frequently at an expensive rate, erroneously think that they will derive all the good that can be obtained from such exercise at once, and after a most fatiguing day find that their strength and appetite, instead of being improved, are exhausted and destroyed. A similar unacquaintance with the true principles of treatment leads persons who go abroad in search of a warm climate to live in small rooms, shut out the air, and in case of young men

to smoke, or otherwise deteriorate the atmosphere in the room, until it becomes positively asphyxiating.

It has always appeared to me that cases of this kind not only exhibit the best proofs of the advantage of treatment, but of the causes which induce and keep up the disease. Thus in cases XXXII. and XXXIII., the benefit invariably corresponded with the residence in the Infirmary, and the disorder became worse when, on going out, the patients were exposed to hardships and bad living. They also serve to indicate what are the imprudences which occasionally lead to a fatal result.

I have confined my illustrations of the treatment of phthisis to well-marked cases, in which it was far advanced; and I think that the facts recorded hold out to us great encouragement in the future management of this formidable disease. In the early stages this is not so difficult, and it is comparatively much more successful; not, indeed, that even then it is always easy to overcome the dyspepsia and other causes which tend to produce and keep up the disorder. When the stomach is deranged, it often requires a variety of remedies to counteract its irritability and acidity, before nutritive substances can be taken. In other instances, however, especially when it exists in the half-starved poor, food is taken readily, and then amendment is generally soon observed. The following case is a good illustration of that form of phthisis so frequently met with in practice, in which the appetite is defective:—

CASE XXXVI.—*Advanced Pulmonary Consumption; Great difficulty in introducing Nourishment, but when at length Cod-liver Oil was assimilated, marked Improvement; Death from want of perseverance in remedial measures.*

Jane Hamilton, a dressmaker, æt. 18, admitted into the Royal Infirmary, September 12, 1849. She stated that last April her general health began to fail; the appetite was bad; cough with expectoration came on; cold sweats appeared on the face, hands, and feet; the catamenia, which had never been very regular,

were suppressed; and she became so weak that she could not stand. Since then there has been a temporary improvement; but for some time back she has again become worse.

On admission, she was pale and emaciated, and so weak that she was unable to sit up above a few minutes at a time. There was copious perspiration during sleep, a severe cough, with abundant yellowish viscid sputa—no pain in the chest, which was well-formed externally. The tongue was covered with a brown fur; appetite capricious and bad; bowels open every second day. The treatment consisted of tonics, expectorants, and counter-irritation to the chest, which produced considerable amendment. I took charge of the case in the middle of October, and found, on careful percussion, dulness below the right clavicle, with loud mucous râle over the upper third of right chest. There were also sonorous and sibilant râles over the greater part of both lungs, anteriorly and posteriorly. By means of expectorants and counter-irritants, the bronchitic symptoms and signs were subdued by the 1st of November; but the dulness and moist râles under the right clavicle still continued. *A tablespoonful of cod-liver oil was then ordered to be taken three times a-day.* The remedy was suspended on the 8th, on account of a febrile attack she then experienced, which was ushered in with headache and rigors, and accompanied with accelerated but soft pulse, heat of skin, loss of appetite, frequent nausea and vomiting, and considerable spinal irritation. It was not until November 30th that these symptoms were so far removed, and the tone of the stomach augmented—by means first of antimonials, and subsequently of naphtha, alkalies, vegetable bitters, and stimulants—that the oil was again ordered. It produced considerable nausea, however, so that, after persevering in its use for ten days, it was again suspended. It was once more had recourse to on the 14th of December, and was readily retained on the stomach. A few days subsequently the dose was increased to four tablespoonfuls daily. *December* 30.—The report to-day is—"A very evident improvement in the general health. Her strength is so far increased that she sits up a considerable portion of the day. The perspirations have nearly disappeared.

The expectoration is still thick and purulent, but not so copious. She is evidently much stouter, and the skin is of a more healthy colour. The catamenia have also reappeared. There is still dulness under the right clavicle on percussion. The coarse moist râle has disappeared, and a fine crepitating murmur only is heard with the inspiration towards the acromial end of the clavicle. There is prolonged inspiration, and increased vocal resonance." From this time she continued to improve. On the 1st of January the oil was reduced to three tablespoonfuls daily. A small blister was occasionally applied to the upper part of right chest anteriorly, and an expectorant mixture given to facilitate the expectoration, which, though diminished in quantity, retained its viscid and purulent character. On the 30th of January the inspiratory murmur had acquired a certain degree of harshness, but here and there very fine crepitation could still be detected. Notwithstanding my earnest advice to the contrary, she insisted on leaving the Infirmary, and did so February 24th.

She called at my house on the 7th of March, when I examined the chest carefully. There was still dulness, but not so marked as formerly, under the right clavicle; no crepitation on auscultation, but harshness of the inspiratory murmur, prolonged expiration, some friction noises, and increased vocal resonance. She was stout, of healthy appearance, and expressed herself as being quite well; but the expectoration of purulent matter still continued to a slight degree, with occasional cough. Shortly afterwards, she went to Dundee to carry on her occupation as a milliner, where the confinement, late hours, and irregular food, soon caused a return of her more urgent symptoms. She again entered the Infirmary, and once more, after a few months, she was dismissed relieved. On the last occasion, she was admitted August 19th, 1852, the disease having progressed to its last stage during the interval. She died September 8th.

In some particulars, this case may very instructively be contrasted with several others in which the loss of appetite, and difficulty of nourishing the system, were not so well

marked. Suppose, for instance, we compare it with that of the boy Barclay (Case XXII.), although the local disease had not proceeded so far. The physical signs in the girl exhibited at most bronchitis, with softening of the tubercular exudation at the apex of the right lung; whereas in the boy they demonstrated that a large cavity existed in one lung, whilst the other was also affected. There was the same general prostration, however, and the same emaciation, excessive weakness, profuse perspiration, purulent expectoration, and distressing cough. But there was this difference in the antecedent circumstances of the two cases—namely, that the boy had a good appetite, but had been subjected to an insufficient diet, whilst the girl had no appetite, but possessed the means of gratifying it. In the first case, nutrition was affected from food being in deficient quantity, the digestive organs being tolerably healthy; in the second, it was brought about on account of the dyspepsia and disordered state of the stomach rendering it impossible that a sufficient quantity could be consumed. The result in both was the same—namely, impoverishment of the blood, and tubercular exudation into the pulmonary organs.

The practical management of these two cases was considerably modified by the circumstances to which I have just alluded. In the boy, there was no difficulty in overcoming the imperfect nutrition. We have seen that he took the cod-liver oil and digested it and his food with the greatest facility. In the girl, all thoughts of food caused disgust, and the cod-liver oil produced nausea, and for some time could not be tolerated. For a considerable period, therefore, my exertions in the treatment of this case may be considered as preparatory to the diminution of the phthisical symptoms, and directed to the removal of those complications which prevented any successful attack on the more important disease.

Thus my first efforts were directed to removing the bronchitis, which was accomplished by means of expectorants and counter-irritants. Cod-liver oil was then ordered, but it occasioned nausea, and was suspended on account of a febrile attack she now experienced. On her recovery from this, the nausea, vomiting, and dyspeptic symptoms were treated by

means of naphtha, alkalies, vegetable bitters, and carminatives, with apparent success; but, on recurring to the oil, they again returned; so that, after persevering for ten days, it became again necessary to give up its employment. In a few days, however, it was once more tried, and on this occasion with success. It was taken readily, a marked amendment followed; the dose was increased to four tablespoonfuls daily, and it was astonishing to see how rapidly she improved. Her strength increased, the emaciation and cachectic look disappeared, the skin assumed a healthy colour, and she became positively stout and fat, so that she was scarcely recognisable. The cough almost ceased, the expectoration greatly diminished, the perspirations did not appear at night, the catamenia returned, she sat up the entire day, and at length considered herself so well, that, on being allowed to leave the hospital for a day, she did not return. She called on me a few days afterwards, when I found that, although the constitutional symptoms had almost entirely disappeared, and her general health might be called good, traces of the local disease were still apparent, as stated in the report. This case, therefore, exhibits the obstacles which the physician has not unfrequently to overcome before he can carry out that line of treatment by means of which the abnormal nutrition is to be obviated, and the tubercular exudation checked; but it also inculcates the importance of perseverance, and exhibits the good effects which may result from persisting in a treatment dictated by correct pathological principles. This girl, when her general health became better, insisted on going out of the Infirmary, when, once more exposed to her unhealthy occupation and bad diet, her symptoms returned; the disease, which had been arrested, again made progress, and she died. But there is every reason to suppose that, if she could have been retained in the house as the boy Barclay was (Case XXII.), that then, as in him, the disease might have terminated in a perfect recovery.

The foregoing cases serve to illustrate the occasional success, as well as the difficulties and causes of failure, which attend the treatment of pulmonary consumption. These latter,

from being known, will serve to point out where the efforts of medical men should be directed, and how art may be brought to operate with the greatest effect. Nothing seems to have been better demonstrated from the past history of medicine, than that empirical rules and practice (understanding by empirical mere experience) have had little influence in checking the mortality of phthisis. It is to be hoped that principles founded on a correct pathology, and a practice directed to improving the nutritive functions, rather than the palliation of leading symptoms, may be attended with better success. For my own part, I feel convinced that the doctrines advanced in the foregoing pages are founded on truth, and that their recognition will commence the fulfilment of a prediction made by Dr Stokes, of Dublin, in the following words:—"There can be no doubt that, as medicine advances, the cure of consumption will be much more frequent; its nature will be better understood, its first stages more commonly recognised, and the disease prevented from proceeding to incurable disorganisation."[1]

It ought not to be supposed, however, that this most fatal and dreaded disorder, when far advanced, is capable, under the best system of treatment, of being permanently arrested in the majority of cases. Every morbid anatomist who knows the destruction of the tissues involved, and every pathologist acquainted with the progress and protracting character of the disease, must share this opinion. It should be remembered that it is only within the last fourteen years that the spontaneous arrestment of pulmonary consumption has been generally admitted by the profession, and that this has been established rather by the evidence of morbid anatomy than by the flattering accounts of individual practitioners. In all the cases previously given, upwards of twelve months have been required to produce the good result described; and many practitioners, who still believe the disease to be invariably fatal, argue that it may return in periods varying from fifteen to thirty years. As the experience of cod-liver oil and of an analeptic treatment does not extend, in this country, further

[1] Stokes on Diseases of the Lungs, p. 438. 1837.

back than eighteen years, this objection cannot as yet be met, although isolated facts incontrovertibly demonstrate (such as that described p. 47) that the pulmonary ulceration has been completely healed. I shall continue to watch the cases already recorded, as well as many others which have for a shorter period been under my observation, with a view to a further contribution to the pathology and treatment of this disease.

The chief danger now to be apprehended, is that many members of the profession, from a state of hopelessness with regard to pulmonary consumption, will run into the opposite extreme, and that we shall be inundated with successful cures of consumption. I have already met with instances where the positive assertions of the medical practitioner have not been warranted either by his diagnostic powers, or by the rapidly good effects of his practice. On the whole, however, I believe that the errors of diagnosis and of a sanguine disposition in this respect, will be more advantageous to the public at large, than those which have so long prevailed in connection with the supposed necessary fatality of the disease, and that a general adoption of the nutritive plan of treatment has already been followed by better results, than that which characterised the old palliative system.

CHAPTER V.

OBSERVATIONS ON THE USE OF LOCAL APPLICATIONS TO THE PHARYNGEAL, LARYNGEAL, BRONCHIAL, AND NASAL DISEASES WHICH ARE FREQUENTLY MISTAKEN FOR, OR ASSOCIATED WITH, PULMONARY CONSUMPTION.

To enter upon the pathology and treatment of the numerous diseases which may be complicated with pulmonary consumption, would be to write a work on most of the disorders to which the various textures and viscera of the body are subject. The treatment of the symptoms they occasion has been already alluded to. In this place, I propose to confine my remarks to the laryngeal, pharyngeal, bronchial, and nasal affections which are so commonly associated with phthisis, and to which many of those symptoms generally attributed to the pulmonary lesion are not unfrequently owing.

SECTION I.

Pharyngeal and Laryngeal Diseases.

My attention was first directed to this subject by the foling case :

Case XXXVII.—On the 11th December 1849, Captain B. entered my room, to consult me regarding an occasional expectoration of blood, which caused him, but more especially

his lady, much anxiety. He was a tall, vigorous-looking man, between thirty and forty years of age, who had no cough or any complaint whatever, but from time to time had hawked up a small clot of blood about the size of a pea. On a few other occasions, he had observed some mucous expectoration tinged or streaked with blood. His chest was finely developed, and its most careful examination failed to elicit anything abnormal. His appetite and digestive functions were excellent; and, as commandant of a depot in the neighbourhood of Edinburgh, he had never experienced uneasiness from his professional duties. After repeated examination, I had no hesitation in stating that the lungs and large vessels were perfectly healthy, and that I hoped the expectoration of blood would cease spontaneously.

The origin of the blood in this case appeared to me at that time to be very mysterious. It was not florid. There was no reason to suppose it to be of pulmonary origin. There was nothing in his voice to indicate laryngeal disease. I did not examine the pharynx, not being then aware of the importance which ought to be attached to it. I was consequently left in great doubt as to the origin of the blood, and of the best means of removing anxiety from my patient. My uncertainty, however, was partly dispelled by the following case:—

Case XXXVIII.—I was requested by an assurance office, in July 1850, to examine the chest of Mr M., a merchant, aged about 30, who said he laboured under no kind of complaint, with the exception of occasional sore throat, and expectoration of mucus tinged with blood. He was tolerably stout, took long walks without uneasiness, and suffered from no difficulty of respiration or from cough. Repeated examination of his chest failed to elicit any physical sign indicative of pulmonary disease. I therefore certified that his lungs were healthy. In October 1851, this gentleman called upon me again for advice, under the following circumstances. The soreness of the throat had latterly increased, and con-

siderable cough was induced, after which he spat up mouthfuls of purulent matter, frequently tinged of a red colour. He brought me some of this sputum to examine, which consisted of mixed blood and pus, of a dirty brick-red colour. Examination of his chest again convinced me that the lungs were unaffected; but in the interval I had paid attention to the writings and practice of Dr Horace Green, of New York; and I now examined his throat, when the cause of his symptoms was at once apparent. The fauces and upper part of the pharynx were studded over with nodular swellings, varying in size from a pin head to that of a pea. Many of them were bright red and fungoid in character, probably the origin of the extravasated blood, whilst considerable patches of purulent matter adhered to several parts of the mucous membrane. I applied a sponge, saturated with a strong solution of the nitrate of silver, to the affected parts. In three days he returned, having been much relieved, when the applicacation was repeated. I have not seen him since.

These two cases convinced me that certain symptoms which have hitherto been considered as indicative of phthisis might have their origin entirely in the fauces, pharynx, and upper part of the larynx. The cough so occasioned, with the purulent expectoration, often tinged with blood, frequently so resembles that occasioned by phthisis, as not only to induce alarm in the minds of the patients, but frequently to mislead the medical practitioner. I have now met with many such cases, which have been mistaken for phthisis, and which have been treated for that disease without any effect, until local remedies were applied, when they, for the most part, disappeared, or became much better.

The following case illustrates still further the occasional similarity of laryngeal disease to phthisis pulmonalis, and the erroneous treatment to which error in diagnosis may lead :—

CASE XXXIX.—Margaret D——, a staymaker, æt. 25, admitted to the Royal Infirmary, September 9, 1851, labouring under occasional vomiting, frequent cough with hæmop-

tysis, and copious purulent expectoration. There was considerable sweating at night, and her general health, owing to want of sleep and the harassing cough, was much broken down. At the commencement of the winter session in November, I found her taking an acid mixture to relieve the sweating, a cough mixture to diminish the cough, together with cod-liver oil. The chest had also been blistered. Careful percussion and auscultation convinced me that the thoracic physical signs were perfectly normal. I then examined the fauces, which were covered with purulent mucus, but presenting here and there red and prominent follicles. The cough was also ascertained to be convulsive, the voice hoarse and broken, and, on placing the stethoscope over the larynx, a loud ringing sound accompanied the inspiration. From these facts I had no difficulty in diagnosing laryngitis; and on ascertaining that the woman was a prostitute, and addicted to drink, there could be little doubt that it was of syphilitic origin. The fauces were freely touched with a solution of nitrate of silver (ʒss. to ʒj. of water). This was repeated on the following day, and on the next the upper part of the glottis was touched, causing severe convulsive cough. I subsequently passed the sponge, saturated with the solution, into the larynx every second or third day during the month of November, which at first caused very severe and prolonged convulsive cough, that gradually became somewhat diminished. On the whole, however, no great amendment was produced, although the expectoration and cough during the intervals were lessened. The local applications were then suspended; but it soon appeared that they had been beneficial in checking the symptoms, from their severity again increasing, especially the amount of expectoration streaked with blood, and the want of sleep at night, owing to the severity of the cough. In the second week of December, therefore, the topical applications were resumed, together with occasional blisters to the larynx, and once more a certain amount of benefit was obtained. But as this treatment, combined with the internal administration of iodide of potassium and bitter infusions, for a period of four weeks, seemed to produce

no further improvement, she was dismissed on January 7, 1852.

In this case all the symptoms of phthisis pulmonalis were present, including emaciation, profuse sweating, cough, expectoration of pus mingled with blood, bad appetite, hectic; and in consequence, cod-liver oil, cough mixtures, acid drops, wine, and good diet were administered, and all without effect. Indeed, her appetite was so bad, that the diet was not taken, and nutrition suffered. When a careful examination of the chest enabled me to form a correct diagnosis, the treatment was changed. The cough and acid mixtures were abandoned, the stomach gradually regained its tone, her appearance slowly improved; and although, from necrosis of the ossified cartilages, the local disease was not removed, it was considerably benefited by topical applications.

CASE XL.—Miss G., æt. 26, had been treated by an homœopathic practitioner for three years, who informed her that she was labouring under consumption, and at last advised her to go to Australia. Her friends, unwilling that this sentence of banishment should be carried out without further advice, brought her to me on the 19th of October 1852. I failed to discover the slightest disease of the lungs, either by percussion or auscultation. On the contrary, repeated examination convinced me that the inspiratory and expiratory murmurs both possessed their natural softness and duration. There was, however, frequent cough, with copious purulent expectoration. She had had constant sore throat since her childhood, and was labouring, in addition, under headaches, loss of appetite, constipation, leucorrhœa, excessive menstruation, hemorrhoids, occasioning frequent hemorrhage, so that she presented the anemic appearance, with all the symptoms of confirmed chlorosis. When I informed her that her lungs were not diseased, and that her cough entirely depended on some affection of the throat, she would not believe me. She had so long been convinced that her case was one of consumption, and that nothing but a change of climate could be of

any advantage to her, that I think it was with some reluctance she heard a different opinion advanced. To oblige her relations, however, she allowed me to apply the solution of nitrate of silver first to the fauces, and subsequently down the œsophagus. She then became convinced that there was a spot at the upper part of the throat which, when touched, gave rise to burning pain, induced severe spasms for a few moments, and subsequently left her free from cough and uneasiness. The applications were consequently continued every other day, and were conjoined with the internal administration of iron and vegetable bitters. Under this treatment she improved much in health. I soon perceived, on passing the sponge, that there was a constriction at the upper part of the œsophagus, the nature of which caused me considerable anxiety. The case, however, soon resolved itself into one of hysteria and spinal irritation, with all kinds of nervous symptoms, simulating in turn paralysis, spasms, uterine, abdominal, pulmonary, cardiac, and other painful functional disorders. She is now (1859) completely recovered from these, the pharyngeal disease has been completely removed, and she has been residing in Australia with her brother for the last four years.

Even when the lungs are decidedly tubercular, much of the cough and irritation may be owing to laryngeal complication, although, in the majority of cases, they are attributed to the pulmonary disease. I am satisfied that the constant cough and succussion of the chest so occasioned, increases, if it does not actually sometimes induce, pulmonary disease, especially the most common of all phthisical complications—bronchitis. I was very much struck with the amount of cough in the following case, which was removed by paying attention to the laryngeal complication :—

CASE XLI.—Dr C——n, a medical man, about 25 years of age, had long suffered from delicate health, and latterly the fatigue of his practice, which necessitated long journeys on horseback, frequently in the middle of the night, had induced constant coughing and thoracic pain. He had found such

remedies as cod-liver oil, expectorants, demulcents, and anodynes useless. On examining his chest in 1849, there was slight dulness on percussion under one clavicle, somewhat harsh inspiration, and prolonged expiration in the same situation, with a little increase of vocal resonance. The disease in this case was evidently incipient, and yet I noticed the violent suffocative cough, followed by expectoration of purulent mucus, and was struck with the evident disparity between the incipient pulmonary lesion and the advanced cough and expectoration. This was explained by inspection of the fauces, which were red, rugous, and covered with patches of pus. Further, it was clear from the symptoms that the glottis was also affected. The local application, every alternate day, of a sponge saturated in a solution of nitrate of silver, was soon followed by the best results, and in a few weeks the cough entirely ceased, and with good diet he regained his general health, although the pulmonary signs remained unchanged. Since then, this gentleman has slowly improved in health. I have not had an opportunity of recently examining his chest, but I know he is actively practising his profession (October 1859), at a town not far from Edinburgh.

The removal of the cough and expectoration in this case, although incipient phthisis was undoubtedly present, proves that the former were in no way caused by the latter, which continued to remain, notwithstanding the disappearance of his distressing symptoms. Expectorant and anodyne remedies in such cases are evidently useless, and even injurious. Useless, because it cannot be supposed that squills, ipecacuanha, etc., by being introduced into the stomach, can act upon the follicular disease of the pharynx and larynx; and injurious, because these remedies, combined as they usually are, with opium, occasion nausea, derange the appetite, destroy the capacity of taking food, and thus cause that diminution of vigour in the patient so favourable to the development of the pulmonary tubercular exudation.

Case XLII.—Dr B., æt. 34, a medical practitioner in the

island of Surinam, applied to me, during a visit he made to this country, in June 1850. He had frequent cough and sore throat, with copious expectoration, increased by exposure to cold. There were also the usual symptoms of incipient phthisis. On examining his chest physically, I discovered comparative dulness under the right clavicle, slight crepitation with the inspiration, prolonged expiration, with marked increase of the vocal resonance; the left lung was healthy; the mucous membrane of the fauces was of a dark-red colour, scattered over with prominent follicles. I applied the sponge first to the fauces, and afterwards introduced it into the larynx every second day, with evident benefit. He also took cod-liver oil, with an alkaline and vegetable bitter mixture. In the autumn he returned to Surinam, and soon afterwards informed me by letter that his health was greatly improved. He again visited Edinburgh in August 1851. The throat had latterly again become troublesome, from exposure to the inclemency of the weather; but on examining the chest, although there was still slight dulness and increased vocal resonance under the right clavicle, all crepitation had disappeared. He spent the following winter at Sligo, and in the summer of 1852 com menced practice in a large village in Perthshire. In August he again visited me, and asked if he could venture to propose the insurance of his life. On percussing the chest, no dulness could now be discovered, a mere shade of increased vocal resonance remained, and the breath sounds were perfectly natural. Under these circumstances I considered his phthisis to be arrested, and had no hesitation in sanctioning his application to an Edinburgh life insurance company, which at once admitted him without any extra premium. I am of opinion that the arrestment of the phthisis in this case was mainly due to the good effects of the applications applied to the pharynx and larynx, and that the diminution of irritation there, and the removal of the cough, enabled the exuded tubercle to become absorbed with more readiness than it would otherwise have done. This gentleman is still actively pursuing his profession, (October 1859), and enjoys excellent health.

I might give a considerable number of cases in which laryn-

geal symptoms have been more or less mistaken for, or complicated with, phthisis, and which have been greatly benefited by a local treatment. At the same time, I need not say that there are a large number of cases in which no such complication exists, and that they must be judged of only by a careful auscultatory examination of the lungs and larynx, and by inspection of the pharynx. I have also had abundant opportunities of satisfying myself that many so-called cases of chronic bronchitis in persons of advanced life, are entirely owing to throat disease,—a point, however, which has been so ably illustrated by Dr Horace Green, that I need not dwell upon it here. I cannot, however, resist alluding to one case in which the local application gave immediate relief to an extent seldom witnessed.

Case XLIII.—On the 15th June 1854, Miss P., æt. 40, consulted me, labouring under an incessant barking cough, which it was most distressing to see and hear. In the previous November she had been attacked with acute bronchitis, which in a fortnight became chronic, and the cough had continued since that time. Her father died of phthisis, and under the idea that the long-continued cough was of a consumptive character, she had not only been taking expectorants and other remedies for a bronchitis, but cod-liver oil for tubercular disease. On examination, I could detect no lesion of the chest whatever. The sudden explosive character of the cough appeared to me to be decidedly laryngeal, and I at once introduced a sponge saturated with the nitrate of silver solution through the rima and glottidis. The effect was remarkable—the constant cough immediately ceased, and she was at once relieved from the irritating sensations she had formerly experienced. She called on me three days afterwards, and said she had not coughed since. Two months afterwards she again caught cold, and applied to her medical attendant in Kirkcudbrightshire, who again applied the local treatment with the best effect.

The propriety of local applications in cases of tubercular ulceration of the glottis or larynx has in this country been

much doubted, although highly recommended by Dr Horace Green. The following case, in which the larynx was greatly involved, has served to persuade me of its occasional benefit:—

Case XLIV.—Mr P., an advocate, spent the winter of 1851–2 at Torquay, and consulted me in March following. He was thirty-nine years of age, and told me, in a hoarse whisper, that for three or four winters previously he had suffered from cough, with discharge of matter from the nose. During the summer he was quite well. While resident in Devonshire he gradually lost his voice, and his medical attendant there had passed a sponge, saturated with a solution of nitrate of silver, every day,—a treatment, however, that had failed to arrest the aphonia, which, when I saw him, was complete. On examining his chest, I ascertained that there was impaired resonance under both clavicles, with harsh and blowing murmur on inspiration, which left little doubt that the pulmonary organs had been long affected, but were now in a quiescent state. His countenance was expressive of much suffering; there was considerable emaciation, great weakness, profuse sweating; and he complained of almost constant spasmodic cough, which shook the entire frame. There was pain and dryness of the larynx and throat, frequent expectoration of purulent mucus, often streaked with blood; difficult deglutition, especially of fluids, which never failed to excite cough and prolonged spasms. On placing the stethoscope over the larynx, inspiration was accompanied with a hoarse sound; and on inspecting the fauces and pharynx, the mucous surface was seen to be rough, sprinkled over with red prominent follicles, and streaked with adherent purulent mucus.

As this gentleman assured me that the sponge had been daily passed into the larynx by his medical attendant at Torquay, I did not hesitate to introduce it at my first visit. There followed, however, the most violent general spasms, the greatest difficulty in inspiration, rendering suffocation imminent, and then prolonged cough shaking the body, accompanied with purulent expectoration tinged with blood. The violence of the spasm somewhat abated in from two to

three minutes, but he was unable to address me for ten minutes more. He then said that he had never experienced similar sensations previously, and was satisfied that the sponge had never been introduced into the larynx at Torquay, as he had been informed that it had by his medical attendant there. On visiting him the next day, I learned that the local application had been productive of the best effects, that the cough and spasms had entirely ceased, deglutition had been performed with more ease, and that he had passed a better night than he had enjoyed for many months. His appetite, I understood, was not good, and he had for a long time laboured under dyspeptic symptoms. I recommended him to remain quiet, not to speak, and to take a nutritious solid diet. In the course of the night the cough and spasms returned, and next day I again passed the sponge, which once more excited spasms and suffocation, but not to so great an extent as on the former occasion. I continued to pass the sponge every other day, and its good effects were well marked. In a fortnight it excited little irritation, and was invariably succeeded by a sense of ease, diminution of cough, which generally continued to the following night. He was now also enabled to swallow his food with more comfort and more abundantly, and in consequence his general strength was slowly improving.

During the months of April and May, the local application was continued every second or third day. Towards the end of that month he was enabled to take short walks, and instead of my going to him at Morningside, he came into Edinburgh and visited me. I had great difficulty, however, in preventing him from endeavouring to speak, and he was continually exciting the vocal cords. Indeed, there could be little doubt that the voice, though not distinct, was much better, and occasionally, on making an effort, he was pleased to hear himself utter articulate sounds. He now changed his residence, and it is presumed, from having slept in a damp bed-room, or from some other cause, a fresh attack of laryngitis was produced, attended with return of the cough, pain in the throat, and spasms, with fever and great restlessness at night. The pain was sometimes most severe on the right, at others on the

left side, but was diminished by counter-irritants, and afterwards by the local application.

In the middle of June, I found it impossible to pass the sponge fairly into the larynx, and it was singular to observe that the patient became worse, felt more pain, and especially complained of its extending back to the ear. It was apparent to me, however, that the ulcerated surface was cicatrising, although I felt some difficulty in understanding how the glottis was impenetrable. It then occurred to me that probably fungous granulations were obstructing the orifice. One day towards the end of June, he told me that, on making a deep inspiration, he felt something vibrating at the orifice of the larynx, and it then appeared to me probable that a small polypus had formed there. A few days afterwards, in attempting to pass the sponge, it was ascertained that this was really the case, as he immediately spat up a fleshy mass, the size of a pea, with a small neck at one side. The next day the sponge entered as usual, without any difficulty, and continued to do so till the middle of July, when it again met with an obstruction. His general health, however, had greatly improved; the appetite was tolerably good; the pulmonary signs throughout had remained stationary. In the early part of August he went to the country on a visit, and his health became much improved. During September he visited a hydropathic establishment, and submitted to a course of treatment, consisting of a wet sheet every morning, a sitz bath twice a-day, a wet belt round his abdomen worn from morning until dinner time, and a saturated towel round his throat every evening, with walking three times a-day in spite of all weathers. This heroic treatment caused the sweating and weakness, which had previously disappeared, again to return. He felt shivering on one occasion, after the sitz bath, and acute pain in his chest, violent cough and epistaxis, which fortunately subsided next day.

On his return early in October, I found him paler and thinner than when I last saw him, the voice, throat, and larynx were in the same condition; but he expressed himself as having been relieved of his occasional headache and dys-

pepsia. Towards the latter end of October, however, he complained of severe pain, deep in the nostrils, extending in the direction of the frontal sinus, and backwards to the ear on the left side. This continued to increase, and the discharge from the nose became more abundant, and formed inspissated moulds in the nares during the night, which were with difficulty discharged on the following morning. During November, two pieces of laminated bone were discharged at different times, one from the left nostril, the other by the mouth, it having fallen backwards into the throat. At this period he was seen by Mr Syme, who was of opinion that the vomer was the bone diseased, and that no surgical interference was warrantable.

During the winter of 1852–3, the laryngeal disease continued slowly to improve, the sponge having been passed into the larynx about once a-week. His general health also underwent marked improvement, from eating fat pork chops for breakfast. In May following, a third flat piece of bone, about the size of a pea, came from the nose, and a fourth in June. Since then, the discharge from the nostrils has greatly diminished. No applications have been since made to the larynx. In September 1853, his whole appearance was greatly improved. The discharge from the nose was trifling, and shortly after ceased. The voice also returned, but was hoarse, and liable to crack on speaking for any length of time. The pulmonary disease was permanently arrested. At present (October 1859) he continues in good health, only labouring under partial aphonia.

This case I regard as one of arrested pulmonary *and* laryngeal phthisis, complicated with ulceration and necrosis of the nasal passages, a complication of disorders which not long ago might well have been considered hopeless. The local treatment of the larynx, to use his own expression, "made him a new man,"—and it is in this respect that the case is instructive. The removal of the small laryngeal polypus also adds to its interest. No doubt the severity of the hydropathic treatment exposed him to unnecessary risk; for had a fresh inflammation seized either upon his larynx or lungs, it would have been

most injurious, if not fatal, and it must be obvious he very narrowly escaped this. On the other hand, his general health was no way improved by it, if we except the better appetite, dependent probably on the increased amount of exercise he was induced to take. During the winter of 1853 I recommended his eating pork chops, instead of taking cod-liver oil; and as he relished them, and the appetite remained good, he was conscious of considerable improvement in the nutritive functions.

The local treatment practised in these cases was first recommended by Dr Horace Green of New York. The instruments to be employed are, first, a tongue depressor, with a bent handle, by means of which the tongue can be firmly pressed down, so as to expose the whole of the fauces, and the upper edge of the epiglottis. In doing this, some patients experience no inconvenience, whilst in others there is such excessive irritability, that spasmodic cough or even vomiting is occasioned, which prevents the possibility of seeing the epiglottis. Secondly, a whalebone probang, about ten inches long, having at its extremity a round piece of the finest sponge, about the size of a gun or pistol bullet. The probang, towards the extremity, must be bent in a curve, which, according to Dr Green, ought to form the arc of one quarter of a circle whose diameter is four inches. Sometimes, however, the curve must be altered to suit particular cases. It is important that the sponge be fine, and capable of imbibing a considerable quantity of fluid; that it be *sewn* firmly to the extremity of the whalebone, and that this last should not be cut in the form of a bulb, but tapered as much as is consistent with firmness.

The solutions of the nitrate of silver which will be found most useful are of three strengths. One is formed of ℈i., the second of ℈ij., and the third of ʒj., of the crystallised salt to an ounce of distilled water. On some occasions a solution of the sulphate of copper has been found beneficial, and it is very possible that, as our experience of this kind of treatment extends, the application of other substances in solution may

be found capable of meeting particular indications. Dr Hastings, of London, speaks highly of the bicyanurate of mercury employed in this way, and Dr Scott Alison recommends the occasional use of olive oil.

The method of introducing the sponge which I have found most successful is as follows:—The patient being seated in a chair and exposed to a good light, the medical practitioner should stand on his right side, and depress the tongue with the depressor held in the left hand. Holding the probang in the right hand, the sponge having been saturated in the solution, it should be passed carefully over the upper surface of the instrument, *exactly in the median plane*, until it is above or immediately behind the epiglottis. The patient should be now told to inspire, and as he does so, the tongue should be dragged slightly forwards with the depressor, and the probang thrust downwards and forwards by a movement which causes the right arm to be elevated, and the hand to be brought almost in contact with the patient's face. This operation requires more dexterity than may at first be supposed. The rima glottidis is narrow, and unless the sponge come fairly down upon it, it readily slips into the œsophagus. Its passage into the proper channel may be determined by the sensation of overcoming a constriction, which is experienced when the sponge is momentarily embraced by the rima, as well as by the momentary spasm it occasions in the patient, or the harsh expiration which follows,—symptoms which are more marked according to the sensibility of the parts. Some individuals are so irritable that the pressure of the spatula on the tongue causes vomiting or œsophagial spasm. In such persons, I have succeeded, after teaching them how to breathe and hold the mouth, in passing the sponge without the use of any other instrument.

If the probang be properly prepared, and the operation well performed, the actions which take place are as follows:—1st, The sponge, saturated with the solution, is rapidly thrust through the rima into the larynx, and frequently into the trachea; for if the distance of the probang be measured from that portion of it which comes in contract with the lips, the

extent it has been thrust downwards can be pretty accurately determined. I am persuaded that on many occasions I have passed it pretty deep into the trachea, not only from the length of the probang which has disappeared, but also from the sensations of the patient, although this may be thought by some a fallacious method of determining the point. In this first part of the operation, the rima glottidis is, as it were, taken by surprise, and the sponge enters, if the right direction be given to it, without difficulty. But, 2d, the rima glottidis immediately contracts by reflex action, so that, on withdrawing the instrument, you feel the constriction. This also squeezes out the solution, which is diffused over the laryngeal and tracheal mucous membrane. Now, if the sponge be a fine one, it will be found capable of holding about ʒss. of fluid, the effect of which upon the secretions and mucous surface almost always produces temporary relief to the symptoms, and strengthens the tone of the voice,—results at once apparent after the momentary spasm has abated. 3d, The action of the nitrate of silver solution is not that of a stimulant, but rather that of a calmative or sedative. It acts chemically on the mucus, pus, or other albuminous fluids it comes in contact with, throws down a copious white precipitate, in the form of a molecular membrane, which defends for a time the tender mucous surface or irritable ulcer, and leaves the passage free for the acts of respiration. Hence the feeling of relief almost always occasioned; that diminution of irritability in the parts which is so favourable to cure, and why it is that strong solutions of the salt are much more efficacious than weak ones. It may be easily conceived that such good effects must be more or less advantageous in almost all the diseases that affect parts so sensitive, from whatever cause they may arise; and that this treatment is not adapted to one or more diseases of the larynx, but, like all important remedies, meets a general indication which the judicious practitioner will know how to avail himself of.

The mucous membrane of the larynx consists of ciliated epithelium externally, a basement layer below this, and areolar tissue internally, richly supplied with blood-vessels. Scattered

over its surface are numerous follicles, which secrete mucus. It is liable to the same structural alterations as all other similar membranes, which may be divided into—1st, Exudation into the areolar tissue, between the basement membrane and epithelium, or upon the external surface; 2d, Abrasions or desquamations of the epithelial layer; 3d, Ulcerations extending more or less deep into the areolar tissue; and 4th, Obstruction, swelling, and subsequent ulceration of the mucous follicles, a lesion particularly described by Dr Horace Green, and denominated by him "follicular disease of the air-passages." These different lesions may be more or less complicated with each other, and will vary in intensity according to the rapidity of their progress, and the extent to which the mucous membrane is implicated. Sometimes the exudation is thrown out quickly, and infiltrates the textures, as in œdema glottidis, or in malignant angina. At other times it is poured out on the surface, as in croup. More frequently it is partial, occasioning subsequent abrasion or ulceration, and is allowed to become chronic. Perhaps the most common form it assumes, is when it is chronic from the commencement, sometimes dependent on atmospheric changes, at others following repeated attacks of "cold;" in a third class dependent on too much straining of voice, as occurs in public speakers, clergymen, singers, etc., and occasionally is connected with some general constitutional disorder, as syphilis, scrofula, or some form of cancer. All these forms of laryngeal disease may be further associated with similar lesions of the fauces, tonsils, uvula, pharynx, and nose.

The symptoms will of course vary according to these different circumstances. The acute forms are accompanied with general fever, considerable local pain, more or less obstruction to deglutition and respiration, and loss or alteration in the character of the voice. As a general rule, it may be said that lesions of the fauces, tonsils, and neighbouring parts, are indicated by greater or less difficulty or uneasiness in swallowing, whilst the laryngeal disorder is shown by changes in the character or power of sustaining the voice. Then, as a common result of the local irritation, spasmodic action is evinced, and

we have cough, at first dry, but afterwards attended with mucous or purulent expectoration, and not unfrequently with discharge of blood. This last symptom has been far too generally considered as evidence of a pulmonary lesion, an occasional error that has been ably treated of by Dr J. Hastings,[1] of London. Elongation of the uvula may produce many of these effects. In the more acute and extensive cases of exudative laryngitis, the spasms are more violent and prolonged, and the greatest caution is necessary in watching persons so affected, lest, from sudden and continued closure of the glottis, fatal asphyxia be induced.

SECTION II.

On Local Applications to the Trachea and Bronchi.

In 1849 the following case convinced me that not only might solutions of the nitrate of silver be applied to the trachea with impunity, but occasionally with advantage:—

Case XLV.—Hugh Martin, æt. 35, a labourer, was admitted under my care to the Royal Infirmary, with extensive ulcerations in the pharynx and larynx in consequence of excessive mercurial treatment, on two occasions. His speech was inaudible; respiration impeded and accompanied by hoarse tubular breathing, heard by placing the stethoscope over the larynx; chest healthy, although the breath sounds were feeble; great pain on deglutition, which always excited cough; muco-purulent expectoration copious. For two or three days topical applications of solid nitrate of silver were made to the pharyngeal ulcers, and of the salt in solution to the glottis; but no amendment taking place, and suffocation being threatened, tracheotomy was performed. During fourteen days the pharyngeal ulcers healed, but the laryngeal disease continued. It then occurred to me that the ulcerations might be reached better from below than from above; and I consequently, by

[1] On Diseases of the Larynx and Trachea, 1850, p. 88, *et seq.*

means of a bent piece of whalebone, carried a sponge through the opening into the trachea, and applied a solution of ten grains of nitrate of silver in an ounce of distilled water freely to the mucous membrane of the trachea and larynx, below and covering the vocal cords. The result was rapid amendment, partial return of voice, and cure.

At the time this case was treated, the mode of application by means of sponges to the interior of the larynx was unknown. The Infirmary record shows, however, that in 1849 I applied topical remedies to the trachea and larynx through the aperture made by tracheotomy, and with good effect. It was observed on this occasion that the patient made no complaint of pain, the healthy mucous membrane being apparently insensible, but that the amount of muco-purulent secretion was considerably checked. When, therefore, in 1856, I received an account from Dr Horace Green, of New York, of a method he had discovered of injecting the trachea and bronchi, I was well disposed to believe in its good effects. In the publication[1] he was so good as to send me, there is a table of 106 cases of pulmonary disease, which were treated by injections into the bronchi of a solution of nitrate of silver. A flexible catheter was introduced through the larynx, into the right or left division of the trachea, and by means of a glass syringe, the injection was thrown into the lung. This bold proceeding was described as producing great benefit in cases of pulmonary consumption, bronchitis, and asthma. Whilst tuberculosis is at first a constitutional disease, its localization in any part influences more or less the general health; and the opinion I have long entertained, that any means which could enable the physician to act directly on the tissue of the lung or inflamed bronchi, would assist his efforts at cure—at once led me to take a favourable view of this new mode of treatment. The nitrate of silver ought to act as beneficially on the mucous membrane of the trachea and bronchi as on that of any other hollow viscus. The difficulty was obviously to get it there

[1] Bronchial Injections: A Report, with a Statistical Table, etc. New York, 1856.

through the rima glottidis. I therefore wrote to Dr Green, requesting him to send me the instruments he employed. In a letter which I received from him in reply, dated New York, January 30, 1856, he says :—

"I would with much pleasure send you the instruments I employ, but they are simple, and may be obtained at any surgical instrument maker's shop. They consist of an ordinary flexible or gum catheter, and a small silver or a glass syringe. The catheter is Hutching's gum-elastic catheter (Nos. 11 or 12), which is 12½ inches in length; and as the distance from the incisor teeth to the tracheal bifurcation is, ordinarily, in the adult, about eight inches, if this instrument is introduced so as to leave only two inches of the catheter projecting from the mouth, its lower extremity must of course (if it enter the trachea) reach into one or the other of its divisions. I first prepare my patients by making applications with the sponge-probang, for a period of one or two weeks, to the opening of the glottis and the larynx, until the sensibility of the parts is greatly diminished. Then, having the tube slightly bent, I dip the instrument in cold water (which serves to stiffen it for the moment, and obviates the necessity of using a wire), and with the patient's head thrown well back, and the tongue depressed, I place the bent extremity of the instrument on the laryngeal face of the epiglottis, and gliding it quickly through the rima glottidis, carry it down to or below the bifurcation, as the case may require. It is necessary that the patient continue to respire, and the instrument is most readily passed during the act of inspiration. The tube being introduced, the point of the syringe is inserted into its opening, and the solution injected. This latter part of the operation must be done as quickly as possible, or a spasm of the glottis is likely to occur. Indeed, if the natural sensibility of the aperture of the glottis is not well subdued by previous applications of the nitrate of silver solution, or if the tube, in its introduction, touches roughly the border or lips of the glottis, a spasm of the glottis is certain to follow, which will arrest the further progress of the operation. The *epiglottis, which is nearly insensible* (and this you may prove on any person, by thrusting two fingers

over the base of the tongue, and touching, or even scratching with the nail, that cartilage), should be our guide in performing the operation. The strength of the solution for injecting is from 10 to 25 grains to the ounce of water. Commencing with 10 or 15 grains to the ounce, its strength is subsequently increased, and the amount I now employ is from ½ to 1½ drachms of this solution.

"In cases of bronchitis, asthma, and in phthisis, even the employment of the tube once or twice a-week diminishes the cough and expectorations with great certainty, especially in the two former diseases; and many cases have recovered under the local treatment after other means had failed. The applications of the sponge-probang are continued in the intervals of the employment of the tube."

My period of attendance on the clinical wards having expired in January, it was not until May 1857 that I had an opportunity of making a series of observations on this subject. I was then fortunately assisted by Professor Barker of New York, who showed me the kind of catheter he had seen Dr Green employ, and demonstrated the manner in which the operation was performed. Without entering into minute particulars, I have only to say that I then confirmed the statements made by Dr Horace Green. I introduced the catheter publicly in the clinical wards of the Royal Infirmary, in several patients affected with phthisis in various stages, in laryngitis and in chronic bronchitis, with severe paroxysms of asthma. In other cases in which I attempted to pass the tube, it was found to be impossible; in some, because the epiglottis could not be fairly exposed, and in others on account of the irritability of the fauces, and too ready excitation of cough from pressure of the spatula. I have been surprised at the circumstance of the injections not being followed by the slightest irritation whatever, but rather by a pleasant feeling of warmth in the chest (some have experienced a sensation of coolness), followed by ease to the cough, and a check for a time to all expectoration.

In making these injections, I have observed very great differences in the form of the epiglottis, as well as in the

irritability of the fauces and root of the tongue, in different individuals. In some persons the epiglottis is easily exposed, and on depression of the tongue may be seen standing erect, quite insensible, as stated by Dr Green, so as easily to permit the passage of the catheter. In other cases, the top of the epiglottis can only be reached with the greatest difficulty, and in several is not to be seen at all. In such cases I have not as yet attempted to pass the catheter. Again, while some individuals can bear without difficulty forcible depression of the tongue, and considerable freedom in touching the fauces and rima glottidis, others are thrown easily into violent spasms, or exhibit great irritation in the parts, from the mere pressure of the spatula. This appears to me to be more dependent on constitutional than on local disease; some persons being more irritable or easily excited than others, and I have observed the same difference in individuals who are in all respects perfectly well. On one occasion, I put the sponge through the rima, and allowed it to remain some seconds, completely obstructing respiration, but without causing cough or any other inconvenience. In the following case of bronchitis with emphysema the injections caused great relief, checking the expectoration; but not causing a cure:—

Case XLVI.—Eliza Dawson, a servant, æt. 24, was admitted into the Royal Infirmary under my care, May 27th, 1857, with chronic bronchitis and emphysema, which followed exposure to damp and cold fourteen months previously. There were severe cough and dyspnœa of a paroxysmal cha racter, the respiration being laboured even in the intervals. There was considerable expectoration of frothy fluid, with tough gelatinous mucus. The asthmatic paroxysms were of great severity, causing lividity of the face and great prostration. Æther, expectorants, morphia, and counter-irritants, were administered with little benefit. At the commencement of July the attacks of dyspnœa returned almost every night. During the fit she sat up in bed; the whole chest heaved; the head was thrown back during inspiration; the face was unusually pale and moist with perspiration; lips pallid; articu-

lation slow and measured; and respiration accelerated, with great prolongation of the expiration. On the 13th of July, after the previous application, for a few days, of the sponge to the throat and larynx, I injected, by means of a catheter introduced into the trachea, ʒij. of a solution containing ʒss. of nitrate of silver to ʒj. of distilled water. The operation was repeated next day, and produced on neither occasion any irritation whatever. There was no return of asthma until the evening of the 15th, when she had two paroxysms, both followed by vomiting. She had a third paroxysm at 4 o'clock A.M., which left her very weak, the respiration at 2 P.M. being very much embarrassed. On the 17th of July, ʒij. of the solution of nitrate of silver were again injected into the bronchi. No difficulty was experienced in passing the tube, nor was any inconvenience felt by the patient during or after the injection. That the catheter was really in the trachea, was demonstrated by her blowing through it when the lips were firmly closed round it, and by the forcible propulsion of two or three drops of fluid from the orifice to a distance of three feet during violent expiration. After the operation, she passed a much better night; the cough and expectoration being very much less, and the respiration perfectly easy. On the 22d of July the operation was repeated, and she remained comparatively free from cough and dyspnœa till July 30th, when a re-accession occurred. On the 1st of August ʒij. of the solution were again injected, and on the 4th she left the Infirmary to obtain change of air.

In this case, the introduction of the tube into the larynx was greatly facilitated by the high position of the epiglottis and the comparative insensibility of the glottis. A sponge saturated with the solution of nitrate of silver, when pushed through the larynx, caused no uneasiness whatever, nor did the passage of the catheter produce any irritation. She has frequently breathed through the tube, after closing her lips round it, for a minute at a time, and by forcible expiration made the air quite sensible to the finger, as well as extinguished the flame of a candle. No one could doubt, therefore, that the injection must have passed deep into the bronchi. It produced only a

feeling of warmth in the chest, but always, as she frequently declared, greatly diminished the cough and expectoration for one or two days afterwards. After her dismissal I continued to see her, and subsequently increased both the strength and quantity of the injection. Latterly I threw in ʒss. of a solution with ℈ij. of the salt to ℥j. of water. But as the paroxysms of asthma continued, she resolved, with my sanction, to seek another climate, and emigrated to Australia in May 1858.

As regards cases of pulmonary consumption, it is rarely that I have been able to pass the tube with so much ease as in those of bronchitis. When, however, this could be accomplished, the same temporary effects followed. Whether in advanced phthisis permanent benefit is likely to arise, I have not yet been able to determine. There are so few cases in which I have ventured to try it, and the length of time required to test its advantages is so great, that I refrain in the present state of the inquiry from expressing any opinion. The system of clinical teaching in this University, which obliges the professor to be on duty only for three months at a time, is altogether opposed to any continuous effort being made by such investigations to improve the treatment of chronic diseases, and more especially of phthisis. I have seen enough, however, to convince me that very great caution should be exercised, in advanced cases of the disease, in introducing the tube, and never persisting in the attempt if it excites much irritation. One gentleman, who derived much benefit from the application of the sponge to the larynx, was desirous of trying the effect of injections. I thought the parts fully prepared, and at length the tube was fairly introduced. At the moment the injection was made, however, he experienced great agony in the chest, which continued upwards of an hour, and gave rise to acute inflammatory symptoms. It appeared that, seeing the operation on the point of completion, he violently suppressed a strong inclination to cough; and whether he thereby caused the rupture of a small abscess, or otherwise injured the lung, I do not know. Fortunately, he recovered in a week or so, and died more than a twelvemonth after-

wards from the ordinary effects of the disease. The circumstances of his case, however, are well calculated to produce caution, and induce us to wait for further facts before coming to a conclusion as to the benefits of this practice.

SECTION III.

On Local Applications to the Nasal Passages.

Very shortly after I had commenced the local treatment of the pharynx and larynx, it became apparent to me that follicular disease of the mucous membrane frequently extended upwards behind the soft palate, into the nasal passages. In addition, therefore, to sponging the pharynx and larynx with the nitrate of silver solution, I directed the instrument upwards, so as to reach as much as possible of the mucous membrane that lay behind the *velum pendulum palati*. For this purpose I bent the whalebone in different curves, and caused the sponge to be flattened or pointed as the nature of the individual case required. I was thus frequently enabled to produce a cure, when sponging in the usual way had failed. Even this, however, sometimes did not succeed; and the first case that convinced me that disease in the throat, with cough and chest symptoms, was sometimes caused and kept up by lesions in the nose, was the following:—

Case XLVII.—Mrs W., a lady, æt. 45, had long been subject to cough attributed to bronchitis, for which she had been treated by counter-irritants, expectorants, antispasmodics, and opiates, without the slightest benefit. She consulted me in November 1853; and, on examination of the chest, I could find nothing to account for her symptoms. On looking into the throat, however, I saw the back of the pharynx covered with patches of pus, and scattered over with enlarged follicles. I therefore sponged this portion of the mucous membrane freely, and at subsequent visits carried the sponge into the larynx, always producing temporary benefit, but not removing

the disease. One day I observed a streak of pus flowing from under the soft palate, and therefore directed the sponge upwards as far as I could into the nasal passages. After two weeks of this treatment, the disease was still stationary. One morning the patient informed me that she had caught a severe cold in the head, to which she was subject; that she could not blow her nose; and that the throat was much worse and cough incessant. There was also considerable deafness in the right ear. This drew my attention to the nose; and finding on examination that the fauces were more covered with pus than I had ever seen them previously, I came to the conclusion that the real disease was situated somewhere in the nasal passages, above where the sponge had reached, and that the pus, flowing backwards and downwards, was the cause of the pharyngeal and laryngeal symptoms. Acting on this idea, I resolved to attack the disease from the nostrils; and introducing a probe into the right one, found that it was completely obstructed by inspissated mucus and pus. With some difficulty I contrived to overcome this obstruction, and subsequently introduced small sponges of a conical shape, attached to a whalebone rod, saturated in the nitrate of silver solution. From this moment recovery began to take place, and it became evident that the mucous discharge, being unable to escape in a natural manner from the nostrils, was the cause of the incessant irritation in the throat, the cough, and other symptoms. In a few weeks she was quite well, and has continued so ever since.

Since the occurrence of this case, I have seen numerous instances of chronic coughs which have resisted the influence of topical applications applied to the pharynx or larynx, but which have recovered by discovering that the disease originated in the nasal passages, and by directing a treatment to them. In most cases, however, it is very difficult to make out the nasal complication; the patient never having thought of his nose, or supposed that his distressing cough could be attributed to anything in that region. The following is an example of this:—

Case XLVIII.—Mr S., æt. 26, consulted me in January 1857 for chronic cough and sore throat, that all the efforts of numerous medical attendants could not remove. The chest was quite healthy, but the pharynx was red and sprinkled over with enlarged follicles and patches of pus. On the left side was an ulcer, the size of a small pea, with ragged edges. A local treatment applied to the pharynx and larynx in the usual way produced great relief, the ulcer healing up in a week; so that in a fortnight the symptoms were so ameliorated that the patient took leave of me. In April, however, he returned as bad as ever; and on again examining the throat I found the pharynx covered with green-looking, offensive-smelling pus. The same treatment was once more had recourse to, with the same relief. I observed also that the pus seemed to come from above, and I freely sponged the mucous membrane behind the soft palate. At the end of May, however, though greatly relieved, he was not well. At this time he went to Glasgow, and on his return in June, he was again much worse. Careful inquiry now elicited that, as a tea merchant, he was obliged from time to time to choose teas. In doing this, he was in the habit of burying his nose in handfuls of tea, in order better to perceive the aroma, and that it was after occupying himself in this way at sales that he was always worse. His recent visit to Glasgow had for its object attending one of these sales. This account led me to examine the nose, and, as in the last case, I found the right nostril nearly obstructed and very painful, and the left one also considerably affected. I succeeded, however, in gradually introducing a sponge about the size of a small pea through the right nostril, and ultimately passed it back into the throat. At first, considerable irritation and bleeding were thus occasioned, but slowly I was enabled to increase the size of the sponge, and dilate the passage in both nostrils. By the end of July both nostrils were free, and it was evident that the pharynx was greatly better. Towards the end of August he might be regarded as quite well, the cough and sore throat having quite disappeared. He was of course cautioned not to inhale more irritating particles up the nostrils when engaged in the purchase of teas.

I have no doubt that the habit of taking snuff is a common cause of that thickness of voice and cough which is so frequent among elderly persons. On some occasions I have seen the fauces studded over with patches of tobacco, and satisfied myself that, unless the practice of snuff-taking was abandoned, the cough and sore throat would never disappear. In a few cases I have succeeded in persuading clergymen, who had long complained of bronchitis and imperfect voice, to give up snuff, with the happiest effect, as local applications were then enabled to accomplish what previously they had failed to do. In the following case of incipient phthisis I was enabled, by treating the nose, to produce recovery, when there were no indications of a lesion in the nasal passages.

Case XLIX. Miss A., æt. 22, of delicate habit, consulted me in May 1858, with all the symptoms of incipient phthisis. She had some months previously expectorated a few streaks of florid blood; there was frequent hacking cough, but little expectoration; no appetite, progressive emaciation, perspirations at night, and considerable languor. Physical examination of the chest elicited no dulness on either side on percussion, but fine crepitation under the right clavicle, with prolonged expiration and slight increase of the vocal resonance. In other respects she was quite well. I recommended the analeptic treatment formerly described, but in a short time observed that the cough was more frequent and annoying than the condition of the lungs warranted, and on examining the fauces and pharyax, discovered extensive follicular disease there. A local treatment was now practised, and with such good effects, that, considering herself well, she took leave of me June 13th.—In August, however, she returned. The cough was again very irritating, but her general appearance had much improved. There was no crepitation under the right clavicle, only harsh respiration. The appetite had improved; the general languor, weakness, and sweating at night had disappeared. On examining the pharynx it presented the same appearance as formerly; and I resumed the local treatment, but with little but temporary benefit. Conceiving that I might

not be able to reach the whole of the diseased mucous membrane through the mouth, I one day passed a sponge through the left nostril. She immediately complained of sharp pain at a particular spot which the sponge passed over, and on the withdrawal of the instrument there was some hæmorrhage. The right nostril was healthy. I now sponged the left nostril every other day in addition to the pharynx, with the effect of completely arresting the cough. From this time she rapidly improved, and at the end of October she was perfectly well. The most careful examination of the chest also convinced me that not a trace of the pulmonary lesion was detectable.

This case affords an instance of what may frequently be observed, viz., that the disposition to pulmonary consumption is very much increased by circumstances which keep up constant cough. If laryngeal or pharyngeal disease be associated with phthisis, it must be clear that the want of rest at night, the frequent straining and succussion of the chest, must augment the symptoms. In the present instance these complications were evidently kept up, if not caused, by a limited disease in the left nostril; and although the general treatment produced arrestment of the pulmonary affection, I have little doubt that if the tickling cough originating in the throat had not been overcome, this would have been more permanent than it proved to be. In the following case the nasal symptoms were so apparent at first, as at once to indicate the correct treatment:—

Case L.—Miss G., æt. 43, had for two or three years been labouring under cough, sore throat, and general ill health. On first seeing her on the 14th of May 1859, she was slightly jaundiced, and complained of pain over the liver; but what distressed her most was the state of her throat and the cough. For many months, she told me, the nostrils had been completely closed up, and she was partially deaf on the left side. On examination I found the chest healthy; a blowing murmur with the first sound of the heart; the pharynx covered with a dense, dirty-green, adherent mass of pus; and considerable

fulness and soreness in the nostrils. I treated this case locally by commencing with the nostrils at once, and after some trouble succeeded in getting through both of them a small whalebone sound. At the same time I sponged the pharynx and back of the nose, as far as I could reach, with a sponge from the mouth. I persevered in this plan for seven weeks, slowly dilating each nostril, and at length applying to them the nitrate of silver solution by sponges, gradually enlarged in size, until the discharges from the nose passed externally, instead of going down the throat. At the end of that time the local disease was removed, and her general health greatly improved by an appropriate treatment.

In this case there was a dread of consumption on the part of the patient, so that here, as in several other instances I have seen, pulmonary symptoms and especially cough were altogether dependant on the nasal disease.

The cases previously given, with others that might have been adduced, have satisfied me that lesions of the pharynx, larynx, bronchi and nasal passages, ought to occupy the serious attention of the practitioner in all cases of pulmonary diseases, and that the following practical conclusions may be drawn from them :—

1st, That not unfrequently diseases, entirely seated in the larynx or pharynx, are mistaken for pulmonary consumption.

2d, That even when pulmonary consumption exists, many of the urgent symptoms are not so much owing to disease in the lung as to the pharyngeal and laryngeal complications.

3d, That the nasal passages are frequently obstructed or diseased, and may cause or keep up laryngeal and pulmonary symptoms.

4th, That a local treatment may not only remove or alleviate these complications, but that, in conjunction with general remedies, it tends in a marked manner to induce arrestment of the pulmonary disease.

THE END.

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