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TWO LECTURES

ON

P H T H I S I S.

BY

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ASSISTANT-PHYSICIAN TO KING'S COLLEGE HOSPITAL, ETC.

BEING THE APPENDIX

TO "CLINICAL LECTURES ON PULMONARY CONSUMPTION,"

BY THE LATE

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LECTURE I.

Effects of medicines in modifying the condition of the blood—
Emaciation a compensating process—Inunction of neat's-foot oil
—Cocoa-nut oil—Analysis of oils—Varieties of tubercle—Nature
of the tubercle corpuscle—Hurried action checked by digitalis
and ozone—Venous hum.

To obtain a satisfactory insight into the nature of consumption, we must not regard it simply as a lung disease, nor merely as a blood disorder. We must consider it as an error in the organism, exhibiting itself generally in defective blood and imperfect, hurried action, locally in faulty cell formation.

In the present day, there is perhaps too great a tendency to trace all diseases to a depraved condition of the blood, whereas oftentimes modifications, more or less appreciable, in the tissues themselves, occur previous to this deterioration.

Attention has been directed, of late, both in England and abroad, to the blood changes that occur in phthisis, an attention even yet inadequate to the essential importance of the subject.

In the first place, it is not easy to carry out analytical investigations on a large scale, and until the suggestion made in these lectures (*vide* page 85)* is

* This and other references relate to the pages in the Lectures to which this pamphlet was first published as an appendix.

adopted, and our hospitals and medical schools add to their present organization a laboratory, and a professor of physiological chemistry, we cannot hope for much sound progress in our pathology.

Many important pathological inquiries, now undetermined, require solution.

It is doubtful, for instance, whether the alkaline reaction of the blood is as decided in phthisis as in health, or whether there is an excess of oxygen in the blood. The transformation of albumen into fibrine is no doubt rapidly effected, and the red corpuscles are not properly formed. The white corpuscles are in excess, and by their tendency to adhere to one another and to the walls of the capillaries,* retard the circulation, and give rise to effusion. The large colourless coagulum of phthisical blood is probably dependent on this excess of white corpuscles, and not, as usually supposed, on an excess of fibrine.

The beneficial effects of alkalies in the early stages of phthisis, may perhaps be due to their power of checking the over-adhesiveness of the corpuscles, and hence preventing undue retardation of the blood current. Ammonia prevents the deposit of fibrine and checks oxidation, but it quickens the heart's action, excites the circulation, and is said to disintegrate the corpuscles. Before we can successfully use chemical antidotes for the control of chronic disease, we must possess a more accurate knowledge of the state of the

* This tendency of the white corpuscles to stick to the walls of the vessels and retard the circulation, has given rise to the term "sluggish layer" (*träge schicht*). Chance's Translation of Virchow, p. 152.

blood, and of the changes which remedial agents undergo before they enter the circulating current.

It has been thought that—owing to an excess of acid in the stomach—oleaginous matters are not absorbed, and the quantity of carbon supplied for respiratory purposes is diminished; hence the oxygen inhaled being more than sufficient for the conversion of the carbon of the blood into carbonic acid, remains in the blood and acts on the tissues.

The extraction of oil from ordinary food requires very considerable digestive power; fluid fat, however, is readily assimilated, and not only supplies carbon to the blood and gives employment to the surplus oxygen, but also forms, with albumen, healthy chyle and blood corpuscles instead of the depraved ones which the disordered or diseased lymphatic and mesenteric glands have previously furnished. By giving cod-liver oil, or any other readily digested hydrocarbon, we may thus support the respiratory process, and by supplying fuel from without, prevent the consumption of the tissues.

It has been suggested by my friend Dr. Pollock, that the *emaciation* of phthisis is an effort of nature to bring down the requirements of the body to an accordancy with the diminished respiratory capabilities. If but part of the lung can exercise its function, a part only of the body can be supplied with oxygen for its efficient maintenance. The adipose tissues are first removed, afterwards the muscles and less easily dispensed-with parts of the organism.

“Discriminis ultima, quando
Præsidia afferimus, navem factura minorem.”

Juven.: Satire xii., 55.

Emaciation, it is true, often precedes the development of lung disease, but even in this case the rationale may be the same ; sufficient blood cannot be elaborated by the digestive and sanguiferous systems for the complete supply of the body. Every pulmonary cell has a corresponding portion of the body to supply with arterialized blood, and every part of the animal form has a special co-relation to every other.

Besides cod-liver oil, there are other oils which exercise a decided, although less marked influence on the progress of consumption.

The oil extracted from the foot of the young heifer (*oleum bubuli*) has been shown to be of great value, especially in cases in which there is too much irritation of the intestinal mucous membrane to bear the *oleum morrhue*, and from its slight odour, it is peculiarly suited for inunction. Two or three ounces of it may be rubbed in, warm, with a grain of iodine and a few drops of oil of lavender, at bedtime, the body being previously sponged with tepid water, to which a little soda may be added. After a week or two the absorbents become very active, the oil rapidly disappears, and the time necessary for the friction may be curtailed. The advantage of this mode of introduction has been supported by Dr. Simpson of Edinburgh,* from observations made in the manufacturing districts, where oil is largely used. He has adduced evidence to show that those who work with oil—in the woollen manufactories, for instance—enjoy

* *Obstetric Memoirs*, vol. ii. p. 507.

an immunity from phthisis.* That the ancients appreciated more than we do the advantages of inunction, is indicated in the words of Pliny, "Duo sunt liquores corporibus humanis gratissima; intus vini, foris olei."

The advantages derived from olive oil, as recommended by Simpson, are certainly inferior to those of the neat's-foot.

Cocoa-nut oil possesses the power—even more than cod-liver oil—of diminishing expectoration. It has but little taste, and in the form of coco-oleine—as prepared by Messrs. Price and Co.—is almost inodorous, but when rubbed into the skin, it produces a disagreeable and rather penetrating odour, which makes it unsuited for inunction. Coco-stearine, however, is well adapted for this purpose.

The following table, showing the ultimate composition of the four oils just mentioned, may prove of interest:—

TABLE I.

ULTIMATE ANALYSIS OF OILS.

	Carbon.	Hydrogen.	Nitrogen.	Oxygen.
Cod-liver Oil .	80.18	13.72	0.246	5.854
Neat's-foot Oil .	64.33	12.50	0.064	23.106
Cocoa-nut Oil .	69.63	12.49	0.060	17.830
Olive Oil . . .	69.38	13.47	0.058	17.092

* On the Degree of Liability to Phthisis in the Population of the Clothing Districts, by Theophilus Thompson, M.D., F.R.S., &c. Association Medical Journal, January 5th, 1855.

It will be observed that cod-liver oil differs materially from the other oils in elementary composition. The remarkable difference apparent between the proportion of these elements, especially of carbon and oxygen, in cod-liver oil, as contrasted with the other oils, might lead us to suppose that its superiority could be thus explained; but the inadequacy of such an explanation becomes obvious when we further pursue the inquiry, and observe a close correspondence in elementary composition between olive oil, which may be regarded, when introduced into the stomach, as medically almost inert, and cocoa-nut oil, which is fairly comparable in efficacy with the oil obtained from the cod.

That these oils modify the condition of the blood, there can be no doubt; and it is perhaps in this way that they accomplish more in correcting the morbid element on which phthisis depends, at whatever period administered, than any other remedy with which we are at present conversant. That they sometimes prove useful in other diseases, is equally manifest. In diabetes, for instance, I have found more advantage from cod-liver oil than from any other medicine. The permanganates (best given in the form of Condry's ozonized water) are sometimes of service; and chlorodyne often gives very marked relief.

The power possessed by cod-liver oil of increasing the number of red corpuscles was exhibited (in a paper read by the author before the Royal Society in 1858) by a chemical analysis of the blood in twelve cases of phthisis. In the instances in which the oil had been productive of manifest improvement, the

proportion of corpuscles was found to be very high—reaching, in some cases, to upwards of 170 parts per 1000 (*vide* Table II.)

TABLE II.

INFLUENCE OF COD-LIVER OIL ON THE PROPORTION OF RED CORPUSCLES.

No.	Name.	Stage of Disease.	Time during which Oil was given.	Gain or Loss in weight.	Proportion of Red Corpuscles.
				lbs.	
1	Edward D.	3rd.	None given.	98.20
2	David D.	3rd.	None.	119.64
3	James H.	3rd.	4 months.	- 7	114.39
4	Sarah W.	3rd on both sides.	5 months.	+10½	145.68
5	Edwin P.	3rd do. do.	6 weeks.	+ 4	145.56
6	Thomas N.	3rd.	Some months.	+13	157.78
7	Sarah M.	2nd.	6 months.	+ 3	172.56
8	Henry B.	2nd on both sides.	14 days.	No change.	144.76
9	George P.	1st.	7 weeks.	+13	174.35
10	Thomas C.	1st.	2 months.	+ 6	144.45
11	Thomas B.	1st.	12 months.	165.90
12	Martha W.	1st.	3 weeks.	142.62
13	Mary D.	3rd.	4 months.	+10	84.83
14	Sarah W.	3rd.	{ Some months. } { Ozonized Oil. }	+ 6	162.07

This influence on the red corpuscles seems to be exerted very rapidly, the oil supplying the blood with material suited for the formation of healthy instead of depraved chyle corpuscles; and, by increasing the red corpuscles (oxygen carriers), to produce a healthier state of the system. This oil seems to modify the condition of the granules which enrich the blood, and to dispose them to the calm progressive change by which they are made to contribute to the production of healthy structure.

It has been suggested that, had the analysis been carried a step further, and the amount of globulin and hæmatin ascertained, it might have been possible to explain why cod-liver oil was so far more useful in

consumption than in anæmia. Such investigations, however, have not been made.

A ready method of blood analysis was suggested a few years ago, by means of which Professor Welcker, of Giessen, succeeded in drawing remarkably accurate deductions regarding the quantity of red corpuscles present in any specimen, by spreading out in a thin layer a drop of blood mixed with a drop of alum solution, and observing its colour as contrasted with a standard example.

As we become practically familiar with the laws of dialysis—or analysis effected by the varying diffusibility of different liquids—we may attain to a more intimate knowledge of the changes that take place in the crystalline and albuminous elements of the blood.

By means of the microscope we may gain some information on this subject, the number of red corpuscles being estimated and compared with that of the white corpuscles in the field. In phthisis, as already mentioned, the white corpuscles are often present in unusual quantities, and from their number a relative estimate may be formed of the quantity of fibrine in the blood; I cannot adduce direct evidence in support of this view, but it is admitted by chemical physiologists that the pale corpuscles and fibrine cannot be separated; and it is also a prevalent opinion among physiologists that they increase and diminish together. Facts recently adduced show that, like recent lymph, coagula are formed of soft fibres which grow out from the white corpuscles, and place this opinion almost beyond question.

When, from depravity of constitution, morbid

secretion takes the place of healthy product, the material thus imperfectly formed, failing to pass through the usual changes, is left as a foreign body in the organ in which it originated. This is tubercle.

a. It may be an accumulation of morbid lymph in the lymphatic glands ;

b. Or a collection of inspissated pus ;

c. Or a material differing from inflammatory exudation only in being prone to degeneration and disintegration ;

d. Or a modified form of epithelium.

Of this last variety of tubercle, which is that met with in pulmonary phthisis (except in cases that are preceded by pneumonic inflammation, or in which the tubercle is formed by the drying up of an encysted abscess), we will now speak.

The changes that occur in the epithelial lining of the air-cells* and bronchi during the progress of consumption, may be traced without much difficulty by examining the expectoration at frequent intervals, with the aid of a carmine solution, and by comparing this with the post-mortem appearances.

* In deference to the opinion of my esteemed teachers, Messrs. Todd and Bowman, I was long disposed to question the existence of epithelium in the air-cells of the lung, but was first shaken in this opinion by observing, some years since, a distinct epithelial lining in the pulmonary vesicles of the cat, and shortly afterwards my friend, Dr. Andrew Clark, showed me a similar layer in the human air-cell. Recent observations with an ammoniacal solution of carmine, as employed by my colleague, Dr. Beale, in his minute researches (On the Structure and Growth of Tissues), have enabled me to exhibit these cells, the nucleus being coloured by the carmine and rendered distinctly visible.

In phthisis the expectoration may be simply frothy, as in catarrh; sometimes it is quite gelatinous, and contains granules, molecules, and a few scattered mucus corpuscles. If examined in water, the edge of this gelatinous matter looks like the margin of an epithelial cell: indeed, the structureless or molecular matrix seems to correspond with the scale of epithelium, the contained granular mucus corpuscle to its nucleus. Regarded in this light, epithelium differs only from mucus in being apt to break up into distinct pavement-like portions; whereas the mucus, which has not this propensity, forms a tenacious mass, resisting the pressure of the microscope glasses. May we not carry the analogy a step farther, and regard the corpuscle of the blood as a nucleus in the midst of a fluid matrix, which out of the body, or in certain diseased conditions, within the body, transforms the fluid matrix into a soft fibrous coagulum, or ultimately into fibrous tissue?

Tubercle may be at first nothing but mucus which, instead of passing from the lungs and being expectorated, collects in the air-cells and bronchi, loses its semifluid or gelatinous character, and concretes into an opaque mass, which, if the constitution is depraved, or the deposit is so extensive that nutrient matter cannot permeate it, deteriorates, softens, and forms pus.* The purulent expectoration of phthisis is not an inflammatory product, for it contains very little saline matter; its profuseness depends on the amount of free oxygen in the blood.

* For a description of the formation of pus, *vide* Dr. Beale's work already referred to, pp. 72—94.

If the constitution is vigorous, the tubercles miliary, and surrounded by healthy lung, they may long remain quiescent; and, by the drying up of their fluid portions, be converted into chalky pellets, which may be expectorated or remain, without injury, in the lung.

Sometimes large masses, even, undergo inspissation and cretification, giving rise to puckered cicatrices. The organic elements of the tubercle are absorbed, leaving calcareous salts, fat globules, cholestrine, and pigment. In the neighbourhood of unsoftened tubercle there is no undue vascularity, congestion, or inflammatory action, but simply an alteration in the cellular action of the part. This alteration leads to the abundant development of large corpuscles, containing little granular matter, which lose their vitality, burst, shrivel, and set free molecules and granules (*vide* plates in Illustration of Lettsomian Lectures, pp. 4 and 8, or Plate I. p. 242).

Those who deny the existence of a cell-wall describe the tubercular deposit as consisting of aggregations of molecules disseminating under pressure, not corpuscles bursting and setting free granules as usually described.

It is profitless to enlarge on the question whether the corpuscle is really a nucleated cell or a cell nucleus. As histological knowledge advances the extravagances of the cell theory will become modified, and we shall cease to be troubled by these difficulties. Like the epithelial cell, of which this corpuscle is but a modification, it consists of nuclear matter surrounded by a material sometimes fluid and structure-

less, sometimes by aggregated granules which may possess, or appear to possess, a boundary or limiting membrane, or cell-wall.

The so-called "tubercle corpuscles have not a characteristic form or definite chemical composition; they are but the enlarged normal cells of the part. It is impossible to determine whether the tubercular cell is from its first formation faulty, or whether its healthy development is checked during the progress of growth. It would seem, however, that the first indications of phthisical deterioration are met with at the time that the albuminous element gains on the fatty or granular."*

Before any alteration has occurred in the pulmonary tissue changes take place in the mesenteric glands, and it seems probable that the originating elements of phthisis are here first apparent; a disturbed and hurried function, "a condition short of that which induces obvious scrofula or enlargement, occasions an imperfect performance of their part in the elaboration of healthy blood."†

All the functions of the body are too rapidly performed; the less digestible constituents of the food pass through the body and appear unchanged in the ejecta; nutrient matter is not converted into healthy blood, but chokes up the lymphatic glands and ducts, and undergoes regressive change. Evidence of this hurried action is afforded not only by the quick pulse, but by the hastened respiration and

* Lettsomian Lectures, p. 6.

† *Vide* Pathological Transactions, vol. vi. p. 88, by Dr. Andrew Clark.

over-rapid secretion. The state of a patient suffering from acute phthisis may be compared to that of an animal living in an atmosphere of oxygen gas. Life runs out with undue rapidity; there is an exalted activity both of the physical and mental functions, tending to over-exertion, and indicated by that sprightly vivacity so often spoken of as pathognomonic. It may be maintained that this rapid vital change bears the relation of primary cause to the secondary changes we have described in the blood and in the tissues; the advantages likely to arise from controlling it have long been recognised. Digitalis has been deservedly praised for its calming influence on the circulation and on the system generally, and is largely used for this object.* There is, however, we may remark in passing, an interesting variety of opinion regarding this drug. Sir H. Holland says, "It diminishes the rapidity of the pulse in phthisis; but this is of less real moment than is generally supposed." Dr. Billing makes the following statement: "Darwin was sanguine as to the effect of digitalis, because it could make the pulse slower; but retarding the pulse did not retard the disease any more than the use of cod-liver oil. It is essential to the disease that the pulse is quick; but making it slower does not touch the tubercles. It is essential to the disease that the patient wastes away; but putting fat on his

* The *Mistura Acida Tonica Digitalis cum Opio* of the King's College Pharmacopœia has, by its calming and soothing influence, obtained an extensive reputation, due, in great measure, to the digitalis.

outside by means of cod-liver oil does not touch the tubercles." In thus placing digitalis on the same footing as cod-liver oil, Dr. Billing has said more in its favour than even Darwin could have done. Digitalis is often dangerous from its cumulative tendency, and the necessity of keeping the patient in a recumbent posture during its administration renders its use objectionable in consumptive cases, in which exercise and change of posture are very important.

Cod-liver oil, when it relieves, as it so often does, all the symptoms, seems to act last of all upon the pulse; and it is upon this account that we have been led to unite with it *ozone*, a remedy which, like digitalis, reduces the frequency of the heart's pulsations. The medicinal effects of this agent were first laid before the profession in 1859.* The experiments then detailed, confirmed as they have been by subsequent observation,† show that ozone exerts a remarkable influence on the pulse, lowering it in many instances ten, twenty, or even thirty beats per minute, not depressing, like digitalis, but strengthening and invigorating the system.

This table, which was shown before the Medico-Chirurgical Society, exhibits the results of the second series of observations which were made on the out-patients at King's College Hospital.

* *Vide* Observations on the Medical Administration of Ozonized Oils, by Dr. Theophilus Thompson. Med. Chir. Trans., vol. xlii.

† On the Influence of Ozonized Cod-Liver Oil on the Pulse, by Dr. E. Symes Thompson. Lancet, March 9th, 1861.

TABLE III.

TABLE SHOWING THE CHANGES OF PULSE UNDER OZONIZED
COD-LIVER OIL.

Name.	Sex.	Disease.	Time of taking Oil.	Pulse.	
				Before.	After.
J. P.	M.	Phthisis, 1st stage.	7 days.	116	98
J. S.	M.	Ditto.	7 "	120	108
W. B.	M.	Tuberculous larynx.	21 "	112	92
M. H.	F.	Phthisis, 2nd stage.	7 "	80	80
E. A. W.	F.	Ditto.	14 "	140	112
C. H.	F.	Phthisis, 1st stage.	14 "	100	104
R. N.	M.	Phthisis, 3rd "	7 "	150	116
E. D.	M.	Phthisis, 2nd "	7 "	138	112
J. O'D.	M.	Emphysema.	4 "	104	86
M. M.	F.	Phthisis, 2nd stage.	5 "	140	108
E. R.	F.	Anæmia.	4 "	120	111
M. S.	F.	Phthisis, 3rd stage.	2 "	94	92
E. H.	F.	Phthisis, 2nd "	10 "	104	88
W. S.	M.	Phthisis, 1st "	7 "	104	104
P. R.	M.	Phthisis, 3rd "	4 "	104	96
S. E.	F.	Phthisis, 2nd "	20 "	120	92
G. M.	M.	Phthisis, 3rd "	4 "	140	120
H. C.	F.	Phthisis, 1st "	2 "	108	95
W. H.	M.	Phthisis, 1st "	5 "	120	96
J. R.	M.	Phthisis, 1st "	9 "	120	98

In phthisis, owing perhaps to the great avidity which the blood has for oxygen, the influence of ozone is specially marked, either when introduced in conjunction with oil or in the form of *ozonized water* and the other permanganates. The peroxide of hydrogen, however, does not exercise the same control on the pulse.* Like digitalis, ozone seems to restore the natural susceptibility of the pulse to changes of posture (see pp. 57—60). If the anomaly of the pulse in phthisis depends on the presence of the tubercular element in the blood, this modification

* *Loc. cit.* Lancet, 1861.

seems to imply that some effect is produced by these agents on the disease itself.

The first indication of tuberculous blood is usually afforded by the bright red gingival margin described in Lecture X. and figured in the accompanying illustration. This is probably due to the undue avidity of phthisical blood for oxygen. The indications derived from this sign have been questioned in America on the ground that the line is often met with in those who have no chest disease. But it should be remembered that, although the blood is tuberculous, the lungs may remain unaffected for years after the appearance of the line in question.

Some light has been thrown on the blood changes in phthisis by observations conducted with the special object of investigating the causes of venous murmur. In 1859, the author made a series of analyses of the blood of patients in whom this murmur was audible in the jugular veins. The observation of the circumstance that venous hum is not a symptom of peculiar frequency in consumption, being less common in phthisical patients than in those affected with simple anæmia, first led to a comparison—chemical and microscopical—of the blood of patients in whom this symptom occurred, with that of others in whom it was not present. The statistics then collected afford ground for the conclusion that proneness to venous murmur is promoted by a low proportion of fibrine, low, at least, in reference to that of the red corpuscles, and by a deficiency of the pale corpuscles. “The thinness of the blood tends,” as has been suggested, “to the maintenance of its velocity, and produces an unusual

friction in the veins.”* Venous murmur is occasionally, although by no means frequently, present in extremely anæmiated subjects in the last stage of phthisis, when the vital powers are distinctly giving way. Under such circumstances, this symptom does not afford any encouragement in the way of prognosis; but, speaking generally of phthisis in its ordinary manifestations, the coincidence of venous murmur indicates a condition in which there is more than the average reason to anticipate favourable results from appropriate treatment. Regarding this observation in connexion with the inverse relation of a fibrinous character of the blood, and proneness to the sound in question, an argument is derived in favour of the opinion formerly entertained by Rokitanski, that a fibrinous crisis of the blood is characteristic of tuberculosis; and although this opinion has since been somewhat modified by that distinguished authority, I believe it is one which ought not lightly to be set aside. If there is any obstruction in the heart, this murmur—which requires for its production a rapid flow of blood through the veins—is not audible, and its absence may hence be occasionally of value in the diagnosis of cardiac obstruction in anæmic patients. It is probable, too, that the production of the murmur on one side rather than the other, may depend occasionally on the relative expansibility of the summits of the lungs, and that a regard to this connexion may also furnish assistance in some cases of difficult diagnosis. This murmur is audible twice as often on

* Dr. Davis has dealt with this subject very fully in his work, *On the Diseases of the Lungs and Heart*, p. 362, &c.

the right as on the left side. The explanation of this by the arrangement of the vessels, causing the venous current to be more direct on the right side, is rendered more plausible by the fact that the murmur is usually most distinctly heard during inspiration. The different strength of the sterno-mastoidei on the two sides may lead to the same result; unusual strength of the left sterno-mastoid has been observed in some instances in which the murmur was confined to the left side.

It has been argued that the murmur in question is really arterial, but it is usually continuous, and in the instances where it appears to be intermittent—in consequence of being confined to the period either of inspiration or expiration—it is not synchronous with the arterial pulse; moreover, it ceases during recumbency, whilst the carotid impulse is unchanged; occasionally, indeed, the venous and arterial murmur co-exist.

LECTURE II.

Consumption more remediable than other chronic organic diseases
—Diagnostic value of the microscope in early phthisis—Influence of counter-irritants (as fistula, abscess)—Of Occupation—Of Climate—Pneumonic and tubercular consolidation—Supposed prophylactic power of lead—Hæmoptysis from ulceration of the pulmonary artery—Bronchial polypi—Relation of wavy inspiration to miliary deposit.

THE careful study of individual cases of disease is at the very foundation of a sound knowledge of the science of medicine. A single marked illustration is often worth more than tables of statistics. In this chapter, which is strictly clinical, pictures of actual cases take the place of general description.

Cases of impending phthisis are among the most anxious and difficult that come before us, and it is in the prognosis that the difficulty chiefly lies: the distinct assertion that phthisis exists, is too apt to annihilate hope, for the public—and the profession even—are still unprepared for the admission that undoubted consumption can be eradicated. Into such an admission, however, we are most surely led by instances of unmistakeable improvement, and at times recovery in

cases the most advanced—extensive pulmonary disorganization even being not unfrequently arrested and repaired. We may fearlessly uphold this more sanguine view, and assert that there is no chronic organic disease more open to medical control.

Diseases of the brain, the heart, the liver, or the kidney advance more uncontrolled: few will doubt that over phthisis the medical art has more influence than over cancer. On the less vitally-essential organs disease often makes more resistless progress; when atrophy fastens on the muscular fibre,* for instance, we are baffled in our search for a remedy that will arrest it.

It sometimes happens that the parents of a delicate child have a suspicion of consumption, when the disease is neither impending or likely to arise: in other cases the medical man sees cause for fear long before the friends have any apprehension, for the threatening symptoms are sometimes slight, and apt to pass unnoticed.

Case 1.—Miss A., a delicate girl of twenty-two, with languid eyes and a bright flush, 5 feet 2 inches high, weighing 8 stone 3 pounds—10 pounds less than last year—came to me in the spring of 1861. Her mother complained that, owing to a recent disappointment, she was depressed and brooding, had lost all natural activity, and was disinclined for every kind of occupation. She complained herself of a constant pain in the left temple; her hands were blue, often chilblained; feet obstinately cold. Pulse 76 a

* For cases of Progressive Muscular Atrophy, *vide* paper by the editor in Transactions of Medical Society of London, 1861.

minute. She had pain in the iliac region and scanty menstruation. For several weeks had had an occasional short, but loud and deep, cough, with slight morning expectoration. Chest thin, especially beneath the clavicles; inspiratory movement impeded; at the right apex slight comparative dulness, most marked on deep inspiration; heart sounds clearly conducted; breathing wavy, with a dry *crumpling* sound* behind. There was no hæmoptysis or night sweat. The physical signs, verified on subsequent examinations, appeared threatening, not such as to warrant an unfavourable prognosis, though sufficiently marked to make one somewhat apprehensive; accordingly, without alluding to the danger of consumption, which, as she had lost a brother from that disease, would have had a most unfavourable influence,† I urged the importance of bracing the system, and suggested a visit to Benriddin (or rather Ilkley), in Yorkshire, thinking that active exercise and lively society might help to recover the physical and mental vigour. The mineral acids failed to restore the appe-

* This sound conveys to the ear the impression that the lung expands under difficulty. It may arise from thickening of the walls of the air vesicles, or superficial deposit. A similar, but harsher and more creaking sound, is sometimes heard on deep inspiration when the lung is contracted and puckered by old cicatrices.

† It is asserted (Hints on Thoracic Consumption, by Dr. J. C. Hall, p. 17), that depressing influences increase the quantity of fibrine in the blood. This, if true, is very instructive, as it shows why disquietude of mind tends, more rapidly perhaps than any other single cause, to the development of tubercle, and indicates the extreme importance of maintaining a happy and contented disposition.

tite, but liquor potassæ, with hop and cascarilla, had a beneficial effect. Cod-liver oil could not be taken alone, and was thus prescribed: Dilute nitric and hydrochloric acid, of each five drops, cod-liver oil, a teaspoonful, to be taken twice a day in an ounce of infusion of orange-peel. This pill—Extract aloes aquos., gr. iiss.; ext. glycerrh., q.s.; pulv. ipecac., gr. $\frac{1}{4}$ —was found useful in relieving the torpidity of the bowels. Great improvement has followed this line of treatment. The inspiratory wave continues, but the crumpling sound has disappeared, and the patient is considered well. I cannot but regard such a case as this as one in which actual change has occurred in the lung sufficient perhaps to leave some trace. The numerous cases in which cicatrices and other indications of old healed lung disease are met with in post-mortem examinations of those in whom no recent history of phthisis could be gathered, seems to support this view. Similar physical signs were met with also in this case.

Lady B., æt. forty, of a consumptive family, since an attack of "gastric fever" ten years ago has been subject to cough every night on lying down. There is no expectoration. Pulse 76, regular; bowels inclined to be constipated; tongue coated. Taraxacum, often so useful in removing hepatic congestion arising from an over-seasoned diet, was given with good effect. Chest well formed, expanding regularly and equally, resonant at the apices. A distinct creaking sound heard above the right scapula in inspiration and expiration. After the application of iodine this sound disappeared, but became audible at a similar spot on

the opposite side. The cough has since returned with greater severity, and has not yielded to treatment. The age of this patient, the absence of wasting, rapid pulse, or other marked phthisical indication, made me hesitate in acknowledging the presence of the disease. But the progress of the case has not been favourable.

In the following case the disease was so decided that it was thought right, five years ago, to inform the patient of her danger.

Mrs. C., æt. forty-five, a widow, tall, strong-looking, and very energetic, for years subject to influenza-like "colds," had in the spring of 1857 a severe attack of febrile catarrh, with much consecutive debility. There was a little morning expectoration, found, on microscopical examination, to contain small curls of elastic tissue. At the right apex a patch of circumscribed dulness was detected on percussion; here the expiratory murmur was slightly prolonged, and bronchophony was very marked. The patient completely recovered from this attack, and remained well, notwithstanding occasional ailments, until June, 1860, when she had a cold similar to the first; the dulness at the right apex became more extended, and the expiratory murmur more tubular in character, especially in the supra-spinous fossa. Since this time she has remained well. There is no emaciation, night sweating, or hæmoptysis, and the pulse is seldom more than 80 a minute. *Liquor potassæ* has given relief, and cod-liver oil has been occasionally taken during the winter months. She is careful in avoiding exposure to night air; but is not regarded by herself or her friends as an invalid. In this case we may expect

the tendency to phthisis to diminish as age advances. The presence of lung tissue in the expectoration five years ago was one of the earliest symptoms.

The following case differs from the preceding in that the disease has been of longer duration, had a still more serious commencement, and has left behind extreme constitutional delicacy.

Miss D. was threatened ten years ago with severe disease at the right apex; and although softening had not occurred, the physician in attendance considered the case hopeless. A less serious prognosis was given by my father, whose opinion was then consulted. During the following winter cod-liver oil was given, every care taken, and there has been no return of the chest symptoms. Severe pleurodynia, temporarily checked only by chlorodyne, chloroform inhalation, and the subcutaneous injection of morphia, is now the most distressing symptom. Blisters, too, give relief for a time. Belladonna and cannabis indica have each produced symptoms of poisoning. There is at present no cough or expectoration, but considerable emaciation, and the nervous system is highly susceptible. The bowels are habitually constipated. For eleven months the patient took a pill consisting of rhubarb and dried carbonate of soda every night; this proving insufficient, was changed for watery extract of aloes with henbane, and for the last nine months podophylline has been given in half-grain doses on alternate mornings; it does not purge, but produces a single natural motion about twenty-four hours after its exhibition. I may here observe, that I have occasionally found this drug to produce griping and very

violent purgation, even in doses of one-third of a grain.

This patient is now able to walk a mile—further than for seven years—and, though exceedingly delicate, is less subject to pleurodynia. She has just left England to winter in the Pyrenees. Evidence of the old lung disease is afforded by a patch of dulness, about the size of a dollar in circumference, beneath the right clavicle; here the breathing is rather tubular, and the voice bronchophonic.

Sometimes the occurrence of uterine derangement is followed by a cessation in the chest symptoms. In other cases the latter seem to alternate with intestinal irritation.

Symptoms of lung disease are often developed on the suppression of some habitual discharge, as epistaxis, menorrhagia, or hæmorrhoids. Fistula, when left to itself, retards the progress of phthisis (see p. 125); but when an operation is performed, lung disease is apt to advance very rapidly. I am informed that the proportion of phthisical cases among those who apply at the Fistula Hospital reaches almost as high as one-half; but I have not been able to obtain statistics on this subject.

The development of tubercle after other operations—besides that for fistula—is often very rapid. I have watched several cases in which, after the removal of a limb or excision of a joint, active phthisis has set in, and rapidly carried off the patient. Scrofulous abscesses often check the progress of phthisis, but when these are healed, the chest disease makes rapid strides. All purulent discharges likewise exert a retarding in-

fluence; even a blister kept constantly open may check the progress of disease, and by such an artificial counter-irritant much may be often accomplished. One of the most remarkable instances I have known of perfect recovery from the last stage of phthisis, was the case of a lady who kept a blister open uninterruptedly for twenty months.

It has been shown (p. 183, &c.) that those occupations which tend to depress the mind are most likely to lead to tubercular disease;* but there are various special trades which almost of necessity entail severe pulmonary disease.

A very troublesome form of chronic bronchitis, known as "Sheffield grinder's disease," is met with also in London among metal workers; but without this special source of irritation, the long hours and close confinement common to most in-door trades are very apt to induce lung disease. These cases are often of a very chronic character. Emphysema is sometimes present, and—like other disorders that interfere with the circulation through the chest—retards the progress of phthisis. Numberless cases of this kind are met with in out-patient practice, and it may be occasionally difficult to distinguish between the physical signs of cavity from those produced by a dilated bronchus, as in the following case.

An accountant more than fifty years old, sitting many hours at his desk, and taking no exercise, suffered for several years from cough, which left him in the summer; fancied his stomach the offending organ, and

* See a paper by the editor on the Influence of Occupation on Health and Life. Social Science Transactions, 1862, p. 587, &c.

accounted for his short breath by the fact that his father was asthmatic; expectorated flocculent sputa, occasionally stained with blood; sweated at night, and carried no superfluous flesh; chest rather barrel-shaped, expanding imperfectly. On percussion there was some dulness at the left apex, back and front, which had remained unaltered since he was first examined, three or four years before; the sounds to be heard here were sometimes moist and gurgling, at others dry and amphoric with re-echoed voice. Respiration harsh and wavy, expiratory murmur prolonged. It was difficult to determine on the first examination whether or no this was an instance of chronic bronchitis with dilated bronchi; but the diagnosis arrived at, after careful examination of the pulse and expectoration, was tubercular deposit with slight excavation, arrested, and, from the co-existence of emphysema, likely to be slow in progress.

The contrast between such as this and cases of acute phthisis, "galloping consumption," is very striking; but even these last must by no means be looked upon as hopeless; indeed, it is quite exceptional to see the first attack prove fatal; it is more usual for the sweating, emaciation, diarrhoea, or hectic, to cease for a time, but the patient "catches a fresh cold," the process of softening, or tubercular deposition, recommences, and the case assumes a more unfavourable aspect. But even then it must not be regarded as hopeless. The exhausting night sweats may be checked by oxide of zinc; diarrhoea by bismuth or spermaceti; expectoration, if not by tar and its allies, by acetate of lead; and if the other symptoms cannot be held in abeyance

by any single drug, we may often, by a combination of several, discover an antidote. In the following case arrest has twice occurred.

I was suddenly called to a hotel a few months since to see a gentleman who had been sent abroad ten years before in consequence of severe hæmoptysis and other indications of rapidly-advancing phthisis; his strength, which before leaving England was much reduced, was regained in the warmer climate, where he enjoyed fair health; but within three weeks of his return to England, the hæmoptysis recurred, and on examining the chest one apex was found dull on percussion, with bronchial breathing, and humid crackling—the latter sign possibly from the presence of blood in the air-cells; he was able, however, to embark, and since his return to South Africa has regained his health.

Cases of *arrested phthisis* where the disease has definitely and undoubtedly set in, made some progress, and then ceased to advance, are not uncommon, but in the following case there are some points of peculiarity. I was sent for to see a gentleman, æt. twenty-eight, who two years ago had hæmoptysis, and soon afterwards a slight attack of pleurisy. In January, 1862, had a second attack of pleurisy, but rapidly convalesced; in March, an attack of fever, for which he was leeches and blistered for supposed congestion of the liver, and he began to expectorate phlegm mixed with blood. When first seen, his face was flushed, skin hot and perspiring, pulse 96, respiration 28 a minute; respiratory movement almost confined to the left side. The right was absolutely dull on percussion as high as the spine of the scapula behind, and to

two inches above the nipple in front, with almost complete absence of respiratory murmur and voice sound. Respiration puerile over the other lung, expiration prolonged at the apex, and at the base large crepitation. Circumference of the right side on a level with the nipple, $19\frac{1}{4}$ inches, of left $18\frac{1}{4}$. The expectoration was flocculent, greenish yellow, occasionally streaked with blood containing lung tissue. Iodide of potassium was ordered, this linctus for the cough (℞ Morph. hydrochl., gr. $\frac{1}{2}$; sp. nucis mosch., syrup. limonum, āā ʒss), and ozonized cod-liver oil. The chest was rubbed with compound iodine ointment, and afterwards painted with iodine. The expectoration diminished, the cough lessened, and he gained flesh. Towards the end of May a general doughiness appeared over the right lower ribs in front, in a few days there was some redness, and in three weeks fluctuation was detected between the sixth and seventh ribs below the nipple. On June 2nd, about half a pint of thick pus was withdrawn at this spot by means of a trocar and canula, by my friend and colleague, Mr. H. Smith. A few ounces of purulent matter, gradually diminishing in quantity, continued to escape. The wound closed, and a second operation was decided upon, but a violent fit of retching occurred, which was followed by the escape from the old wound of some pints of serous fluid, differing entirely from the pus previously drawn off. With the exception of a few days, when the wound temporarily cicatrised, the discharge has continued, a probe being passed occasionally to prevent premature closure of the opening. Some flattening occurred, the circumference of the right side being three-

quarters of an inch less than the left. The dullness was now confined to the axilla, extending in front to two inches below the nipple; behind, the percussion note was not absolutely dull, but the breathing was bronchial from the spine of the scapula to the base of the lung; in a few weeks the tubular breathing was replaced by clicking sounds and crepitation, similar to that which had disappeared from the other side. A few weeks later, in the place of these sounds, cavernous and amphoric breathing, cough, and voice with gurgling, increased on coughing, occurred. The expectoration was flocculent, about one pint in twenty-four hours, of offensive odour, containing much lung tissue.

Although the patient took a tablespoonful of cod-liver oil three times a day, and a very nourishing diet, the profuseness of this discharge was evidently telling on the strength. A small blister had been kept open in the axilla, creasote was tried, without effect, and acetate of lead in two-grain doses twice a day was prescribed; under this treatment the expectoration diminished one-half in a few days, and the cough was less constant; but the bowels becoming confined, and colicky pains troublesome, the acetate of lead pills were discontinued, and aperients substituted. The kidneys then ceased to act, and considerable œdema of the legs occurred, relieved by diuretics, compound jalap powder, and dry cupping.

The cavernous sounds have now disappeared, and Dr. Pollock, who has, with me, watched the case throughout, and who verifies the preceding observations, considers that the vomica has closed. The dul-

ness on percussion has diminished. On the left side, and at the apices of both lungs, the breath sounds are now perfectly healthy. The wound in the side discharges but a few drops, the patient is quite stout, and can walk more than a mile without fatigue, and the expectoration is not more than ten or twelve ounces a day, of a purulent character, generally mixed with blood, but containing no lung tissue.

Occasionally the sputa has been gelatinous, exactly like isinglass. The corpuscles contained in this jelly-like matter were extremely regular in form, like mucus corpuscles, and less disposed to shrivel and discharge molecules, than the ordinary corpuscles of flocculent expectoration. These corpuscles or germs may—according to the condition of the body at the time—take on a higher development, and become organized, they may form pus, or if the constitution is depraved, tubercle. The intermediate gradations between inflammatory and tubercular exudations are quite undefined, and we cannot determine, at least during life, whether in a given case the pulmonary consolidation is of a tubercular character or not.

By declaring that consolidation, or even excavation of the lung, followed by recovery, was on that account of a non-tubercular character, we should be falling into the error of our predecessors, who considered the fact of recovery a conclusive proof that consumption had never existed. In the case just described, however, the existence of strong hereditary tendency and early hæmoptysis, when taken in conjunction with the symptoms and physical signs, seems to render such an hypothesis untenable.

In the following case, also, *arrest* occurred at an advanced stage.

A plumber's apprentice, eighteen years of age, was "given up as hopelessly advanced in consumption" by his doctor in the country. He obtained an order for an hospital in London, and was brought to the outpatient department. At this time (summer of 1860), percussion over the left upper lobe, back and front, elicited a dull sound; at the upper part there was large crepitation, gurgling, and pectoriloquy; a friction sound existed under the clavicle, where there was much tenderness on pressure. The cough was constant, night sweats very profuse; these were checked by a simple linctus, and by oxide of zinc. Cod-liver oil was recommenced in half-ounce doses in the middle of each meal, as in this way only the nausea, previously occasioned, was prevented. After a few weeks the appetite returned, and he was able to take beefsteak and porter two or three times a day. Improvement was from this date progressive—he gained flesh, and was able to do a little light work. The moist sounds entirely disappeared from the left lung, which, however, remained dull. In the winter, pain and tenderness, with expectoration and hæmoptysis, recurred, and he lost seven pounds in weight in six weeks. A small blister beneath the clavicle relieved all the symptoms; but the left apex remained permanently dull, though to a less extent than previously; the heart sounds, being loudly conducted, almost re-echoed, and bronchial breathing and bronchophony were present; but the "cracked-pot sound," at one

time very marked, became less distinct. In the following spring (1862), further improvement occurred:—the patient was stouter and stronger, and could walk several miles without fatigue or breathlessness. It was then suggested that he should occupy himself with painting, under the impression that lead had a counteracting influence on the progress of phthisis.* The exercise of the arms appeared useful, but the smell of paint was peculiarly disagreeable to him, and the general health appeared to suffer. This patient has now taken to graining, an occupation which suits him better.

In the second lecture of this work the subject of hæmoptysis is fully treated of. Occasionally there is some difficulty in determining whence the blood comes; its colour is usually regarded as distinctive, but when the blood is from the lungs it is not always florid or frothy; sometimes it is poured out in considerable quantities of a dark colour, mixed with clots, and ejected with an effort at vomiting. We must not in such a case conclude that the blood necessarily comes from the stomach, for it may be poured out in this way from the pulmonary artery, or one of its branches,† as may possibly have been the case in this instance.

* Much has been said in France about the beneficial effect of lead in consumption, and the exemption of painters from the disease. This exemption does not certainly occur in England, and there is probably no more in the painting trade to check the progress of the disease than in any other employment which diverts the mind and leads to active exercise in the open air.

† See case by Dr. Peacock in *Medical Times and Gazette*, February 12th, 1853, p. 160.

A pallid boy, fourteen years of age, who had lost his mother and sisters in consumption, came to me last August with this history. For several days he had brought up, after a coughing fit, and with an effort at retching, a quantity of dark blood, averaging nearly half a pint. He had been troubled with cough for some months, night sweats, loss of flesh; the pulse was quick, and he had clubbed nails, and a bright red festoon on the margin of the gums, but the most careful examination of the chest failed to elicit anything abnormal, except that on percussion over the tracheal bifurcation extended dulness was detected. There was not any indication of stomach derangement; no opportunity occurred of examining the blood microscopically, but the diagnosis of softening tubercle in a bronchial gland, involving a branch of the pulmonary artery, and communicating with a bronchus, was ventured on. The case has passed from my observation; and this conclusion has been neither verified nor disproved.

It is in instances of this kind, and in cases of aneurism opening by a minute aperture into the bronchial-tree, that "bronchial polypi," as they have been called, are occasionally formed; the polypi being nothing more than clots of blood, more or less de-colored; these, when detached, leave the aperture of communication unstopped, and profuse, even fatal, hæmoptysis results.* Fibrinous casts of the bronchi occur also at times in asthenic pneumonia, owing pro-

* See Dr. Hyde Salter's case, *Lancet*, July 20th, 1862.

bably to the great excess of fibrine in the blood.* The membranous variety, of which mention is made at page 48—and which may, like the last, occur without any hæmoptysis—seems to be dependent on what Rokitanski would call a “croupous crisis,” in which, without any inflammation, a fibrinous effusion occurs into the bronchi not necessarily involving the pulmonary vesicles; but if any irritation or inflammation is set up about the deposit, there is then an afflux of blood, very apt to be followed by hæmoptysis.

The observations made in Lecture IX. upon *Wavy Inspiration*, have a special relation to prognosis. This sound often indicates the presence of scattered deposits in the midst of healthy lung, and may be regarded as a favourable sign; for, as already shown, miliary deposits are inapt to soften and break down like larger masses of tubercle.

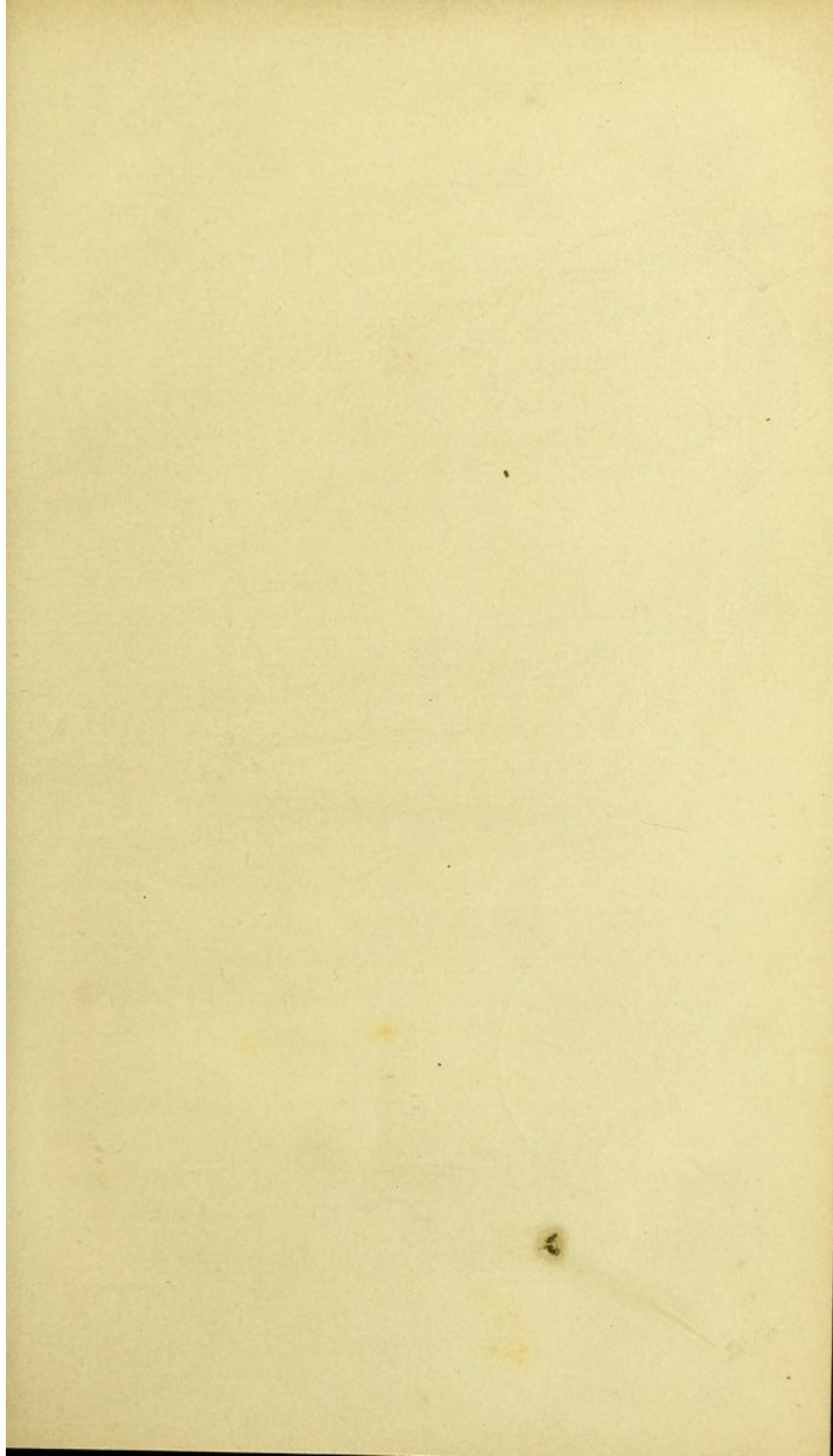
If the deposit is very widespread, the patient may die of the lung disease before softening has occurred, as in this case.

A tall girl, with blue eyes and flaxen hair, began to lose flesh and appetite; her expression, always animated, became anxious; movements hurried, sleep restless and disturbed. She was disinclined for exertion, though quite distressed at being thought an invalid; and seeming, involuntarily almost, by her rapid movements, anxious to dispel such a notion. She was without cough, expectoration, night sweats,

* See Dr. Wilks' observations in *Pathological Transactions*, vol. vi., p. 68.

or hæmoptysis ; nor had she diarrhœa or any dyspeptic symptoms. The catamenial flow was scanty, but quite regular. No medical advice was sought ; and those who were constantly with her scarcely perceived the gradual diminution of strength and power. A relation on a visit, being struck with the change a year had made, insisted that a medical man should be consulted. It was then found that the shoulders were prominent and the chest flattened beneath the collar-bones ; there was scarcely any superior-costal movement. A deep inspiration seemed impossible : on attempting it a catch occurred in the breathing, with a short cough. On close inquiry, it was now ascertained that this slight cough had long existed, though unnoticed. There was occasional morning expectoration, pains about the shoulders, skin dry, muscles flabby, extremities cold. Notwithstanding the thinness of the parietes of the chest, percussion was dullish, *inspiration wavy*, and the expiratory murmur audible *all over the chest*. This patient passed from my observation ; but I have since heard that, without any marked change in the symptoms, she became more and more wasted, and died in a few months.

A case strikingly analogous with the preceding is recorded in Dr. J. C. Hall's Hints on Consumption, p. 27, in which, after death, both lungs were found filled with miliary tubercle. In another case, attended by the author in conjunction with Mr. Beale, in which wavy inspiration was diffuse and extensive, the whole lung was found, on post-mortem examination, to be riddled with minute cavities ; the constitution being



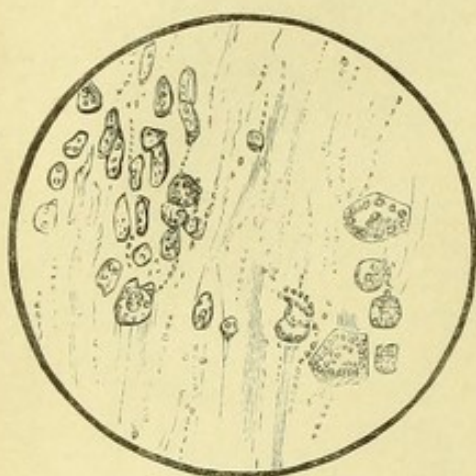


Fig. 1.



Fig. 3.

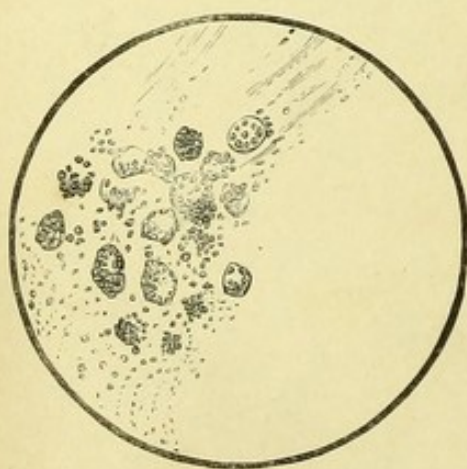


Fig. 2.

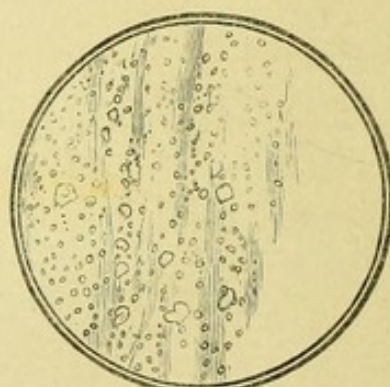


Fig. 4.

weak, the deposits, although miliary and surrounded by apparently healthy lung, broke down and formed vomicae.* In more favourable cases, however, the tubercular exudation dries up, from the withdrawal of its nutritive supply, and is expectorated in the form of calcareous particles, or the chalky matter may remain in the lung without interfering with its function.

* See paper, On a Mode of Restoration in Pulmonary Consumption, by Dr. T. Thompson. *Lancet*, May 17th, 1856.


EXPLANATION OF PLATE.

FIG. 1.—Gelatinous expectoration containing granules, molecules (not aggregated), cells (partly devoid of granules), and oil globules.

FIG. 2.—Gelatinous expectoration in a more advanced stage of disease.

FIG. 3.—Flocculent expectoration containing unmistakeable shrivelled cells, granules, molecules, and oil globules.

FIG. 4.—The same after the application of acetic acid.



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