EXAMINATION OF SPUTUM

in the Cases of two hundred Out-patients at the Victoria Hospital for Consumption and Diseases of the Chest

Edinburgh.

1896

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Ζητεῖτε, καὶ εὑρήσετε.

Graduation Thesis

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Part I. Preliminary

Subsegently to my earliest acquaintance with the appearance of the Tubercle Bacillus and with the process of counter-staining employed in the Pathological Laboratory at the Western Infirmary, Glasgow, I had gained further familiarity with similar methods and appearances by examinations in cases occurring in private practice, and by a course of practical instruction in Bacteriology at the British Institute of Preventive Medicine.

When I entered upon the duties of Assistant Physician at this Hospital in April, I decided to keep notes of all the examinations of sputum which I should make, with a two-fold object in view:-

i To determine the proportion of Tubercular cases

ii To observe the significance of other micro-organisms.

I must candidly admit that my success in connection with each enquiry has been but partial. Yet the work done with these two objects constantly in view seems worthy of permanent record for its own sake, apart from them.

My practice of taking detailed notes has of course compelled careful observation in every instance; and this, I trust, has conduced to accuracy.

The degree of reserve with which my numerical statistics must be accepted is apparent from the actual statements made in part 2, which will indicate the partial nature of my results in the former enquiry.

* I mean sputum uncontaminated in its passage through the mouth.

With regard to the latter it must be mentioned that for results of great value to be obtained in such a wide field, there would be need to be continuous observation not only of pure sputa, but of cultures also, and frequent experiments, such as were quite beyond the scope of my opportunities to carry out.

The microscope at my disposal is one by Leitz with iris diaphragm & Abbe's condenser, with objectives 3 & 7 and oculars 1 and 3, capable of giving a magnification of about 500 diam^ts. Every examination enumerated has been made with this microscope by daylight and wholly by myself, so that uniformity has been in this way secured. It will be readily appreciated that the use of an immersion lens would have been in many instances an advantage; but not being able to employ it uniformly I make no mention of the appearances disclosed by its occasional use.

Moreover, during the very capricious weather of this recent pseudo-summer I have often found it difficult to take advantage of an interval of clear light, on account of my other engagements. The work of visiting certain advanced cases at the patients' own homes must, for obvious reasons, be carried out during the day, as well as the consultations at the Dispensary.

I ought to acknowledge the encouragement which I have received in this work from Dr Philip, as well as occasional hints from him & from my predecessor Dr A. H. H. Sinclair and my colleague Dr E. D. W. Greig.

My observation has been trained, and to some extent

perhaps my conclusions influenced, by various allusions to the subject in current medical literature as well as by free & frequent reference to the following works :—

Among elementary text-books :—

Finlayson : Clinical Manual
Fenwick : Medical Diagnosis
Colman : Section cutting and staining
Carter : Elements of Medicine.
Coats : Manual of Pathology
Wyllie : Notes upon Physical Examination &c

And special treatises :—

Schenk (Dawson) : Elements of Bacteriology
Crookshank : Manual of Bacteriology
Powell : Diseases of the Lungs.
Watson Williams : Diseases of the upper Respiratory Tract
Oertel (Yeo) : Respiratory Therapeutics.
Philip : Pulmonary Tuberculosis

Hunter Mackenzie : A Practical Treatise on the Sputum
Thoup : Sputum; its prognostic & diagnostic significations

* a few of these consulted previously at some distant date, and on returning after an interval of not less than six months they have been recorded as new cases.

Let it be here stated once for all that the following pages contain a record of my own observations, not a summary of other peoples'. On this account, I have not collected references to all the points which will be incidentally alluded to. Many are the common-places of all the text books; some which are unique have their sources accurately indicated; the majority will however be found substantiated in the last two works cited, where in most instances detailed references will be found.

Part 2. The purport of Part 2. Categorical sufficiently explains itself. It will be seen that a comparison is instituted with regard to the proportion of Tubercular cases between the whole series of 200 Patients (including both recent and chronic cases), and a consecutive series of 87 cases, which represent the sputa obtained for examination from among all the patients who paid their first visit* during the three months, June, July & August.

Part 3. The various descriptions which follow, and the significance which I attach to them, have been arrived at as the result of the whole series of more than 300 examinations in 200 cases. In every instance I have written out a tabulated summary of the patients condition & progress, and I have made a careful collation of the same with my recorded examinations of the sputum.

Part 4 follows as a direct issue from the work described.

Pt. 5. The collation between the patients' condition and the nature of the sputum is here exemplified. In addition to details of the 87 cases already alluded to, there will be found notes of certain others to which reference is made in the text in connection with any points of interest. The abbreviations employed in this part are explained at the beginning and end of it (p. 52 + 70)

In the text of Parts 2 & 3 will be found abbreviations and signs used in accordance with the following table:—

A.O. Another Observer, (on some other occasion previously unless date is specified)

E.F. Elastic Fibre

E.T. Elastic Tissue

T.B. Tubercle Bacillus

— not present on one, = two, or more ≡ examinations

\+ Present on one, ± two, or ∓ three examinations.

\+ + Many in several successive fields; or abundant (in one or two parts)

\+ + + Abundant everywhere

※ Illustrated by accompanying microscopic slide

℘ phthisis

Part 2. Categorical

1* The needles are common steel ones mounted in wooden handles. They are heated in the flame before and after every manipulation. This treatment, of course, rapidly corrodes them, but they are quite efficient for the purpose.

2* Coverslips after being cleaned in Nitric Acid are preserved in Methylated spirit. They are wiped dry upon a rag which is used for no other purpose. When thus kept quite free from grease the film spreads out evenly upon them and dries uniformly and rapidly.

I have preserved notes of more than three hundred examinations in more than two hundred cases during the last 6 months. Each examination implies the preparation and careful scrutiny of a pair of coverglasses, ~~prepared~~ according to the following method, which combines the practical advantages of the various systems under which I have studied.

The sputum is transferred to a shallow glass saucer; if it is very tenacious a little water is shaken round about with it until it is freed from contact with the bottle, jar or cup in which it has been sent.

With two needles* the least possible drop is removed from the densest portion and placed on a coverslip* resting beside two others on a tiny rack. A similar minute portion is placed on a second coverglass, which is reserved for examination in the fresh condition. The same process is repeated from 5 or 6 different parts of the sputum, each conferring a sample upon two coverglasses.

One of these is immediately inverted upon a slide and subjected to microscopical examination; the other is pressed upon the third coverglass, and these two, thus coated with a fine film, are placed on the rack meanwhile to dry. I prefer not to dry the films rapidly by means of the flame; usually they are dry (if the coverglass has been free from grease) by the time that the examination of the fresh specimen is completed.

The film is passed three times through the flame.

* Forceps must have flat surfaces, not serrated, and must meet at the point.
In manipulating I always keep the film side next my thumb.

** The first of the pair of films always into the first of the pair of watchglasses; the second into the second.

It is then floated for two minutes on the surface of a little Ziehl-Neelsen staining fluid (in a watch glass) which has been previously heated ⇆ until steam begins to rise. Being removed by forceps*, it is rapidly rinsed in water, rolled an instant on its edge over absorbent paper, and floated during one minute on Gabbett's (acid) blue stain in a watch glass.

A slight rotatory motion imparted by the finger and thumb as they drop the coverglass will cause it to float on the surface of fluid: occasionally it sinks, especially if the glass is immersed immediately after being heated in the flame.

Thus the actual staining occupies 3 minutes for one film. If the second film be placed in a second watchglass at the end of the first minute, it can follow immediately the removal of the first from the acid stain, and the two films be thus stained in 4 minutes. In the same way, with a series of three or four pairs, each may be dropped upon the Carbolfuchsine stain in one of the two coverglasses in strict succession* every minute, and the whole process thus occupies for each film (after the first pair) one minute only.

The film is again removed from the acid stain with forceps, rinsed thoroughly, and inverted, wet as it is, on a slide. The upper surface may be dried by means of absorbent paper if necessary.

I have found the use of Farrant's medium unnecessary, in fact unsatisfactory: and a rinsing or drying by means of spirit is superfluous.

Examined thus in water the appearances are quite characteristic. Should the water dry up before the preparations are examined they can be immediately restored by allowing a drop of water to run under the cover slip again; or it may be removed and (bearing a drop of balsam on the film) be inverted on a clean slide to form a permanent mount.

All the counterstained specimens which I present have been prepared in this simple manner by allowing the water to evaporate spontaneously, and mounting after a day or longer.

It is stated that the aniline colours persist longest if the balsam employed for mounting is dissolved in xylol, and during the last two years I have for these purposes used no other.

The sputum is then immediately destroyed by the addition of a large quantity of corrosive sublimate solution sufficient to cover over the surface completely.

On this account it is seldom convenient to make a second examination from the same specimen, but in several cases I prepared four films in the first instance.

The difficulty is increased when several specimens have to be examined one day, sometimes as many as twelve, and the shallow glass dishes have to be used more than once.

Before giving any numerical summaries it is necessary to state that among the patients are several cases of dyspepsia and cardiac disease, and many without any respiratory symptoms whatever who are recommended to the hospital by other patients, and so come up once for consultation. Taken over all, about two thirds of the cases are regarded as phthisical.

The indications afforded by examination of the sputum however disclose the Tubercular element in a much smaller proportion, viz. in about half the sputa submitted for examination.

This proportion was very constant for each group which I examined, each day affording some recent and some chronic cases. Perhaps we might expect some variation according to the season of the year, because on wintry weather Consumptive patients, especially from the country are less likely to attend, and further because the proportion of simple inflammatory conditions is then much greater.

During the present year July furnished (among the fresh patients) the largest proportion of Tubercular Sputa. During that month from among 56 consecutive new cases (5699 to 5754) 23 sent sputum for examination, and in 20. T.B. was present, i.e. 87 %.

Out of the whole series of 240 cases I found T.B. present in 93, nearly 47 %.; Out of the 39 chronic cases on Monday, about 28 %; while of the 161 recent cases I was able to

detect the bacillus in as many as 82, i.e. just more than half.

These 161 represent all the 406 fresh cases occurring during the six months, and so it is seen that only 2 in 5 return sputum for examination. Usually every patient who expectorates is required to send a sample of sputum; it is seldom that the examination is omitted as unnecessary for diagnostic purposes. In some instances the patient who has been referred merely for consultation never returns. Yet among those who attend regularly I have found a great reluctance to comply with this requisition, so much so that it has become necessary to institute and insist upon the regulation that no medicine will be supplied until the patient has obeyed the injunctions in this matter.

I have experienced the same difficulty in private practice, when of course the same coercion cannot be brought to bear. Patients will send up a sample of urine merrily enough, but there seems to be some sanctity about the pulmonary secretions which makes patients cherish to the last their exclusive possession of the same. Occasionally I have gained my object by preparing a pair of films at the bedside, which are conveniently carried in a capsule adapted for the purpose, and are subsequently stained at home.

It is only with regard to this question of the proportion of Tubercular cases that great disparity exists between the results of examination of the sputum in recent & chronic cases. In other respects my statements can not be accepted from the series of

recent cases detailed in part 5.

These 87 recent cases comprise all the examinations of the sputa of 210 consecutive Patients who attended during the Months of June, July and August; at this period I was able to bestow the greatest amount of time and care both on the observations of specimens and on their permanent preparation.

Considering then these 87 cases, it will be seen that a single examination revealed the presence of T.B. in 46, rather more than half; in only two other cases was it found on a further examination. In fact, among all the 200 cases, with T.B. present in 93, in six instances only have I found T.B. on a second or third examination, made on the same day, or after a short interval, when I had failed to detect it on the first.

Among the 48 positive results

One was positive once after
One was negative once after
One " " once before
One " " once after and once before
One " " once after and once before (by A.O.)

Of the 35 negative results

Three were confirmed on one other occasion
One was " " two other occasions
One was " " three other occasions

In these respects similar proportions obtain over the whole series

Special reference will be found in part 3 (p. 47) to the six cases in which one examination or more gave an uncertain result.

Part 3. Descriptive

i. Physical Characteristics

The most convenient method for me to pursue will be to comment on the various appearances in the same order as that in which I recorded them, viz., i. Physical Characteristics ii Structural Features iii Structureless or Inorganic Elements iv Infection by other organisms v. Presence of T.B.

It is not my purpose to recount the familiar principles which underlie the study of these subjects, nor to reiterate the instructions which text-books afford in this connection, but, taking these for granted, to intimate only such points as are strikingly exemplified, and such as appear to call for amplification or modification, in the light of my recent work

Before entering upon any descriptions it is necessary to state that the patients receive instructions to send the morning expectoration. This is usually prepared for examination within a few hours. In some instances it is brought by the patient at the next afternoon's consultation; in that case it stands over night untouched. In a few cases it is sent by post.

These (in themselves) afford somewhat uncertain guidance to the diagnosis of Tubercular disease. They often however, elucidate the significance of the Signs + Symptoms which the patient presents. I have found the media in sputa exhibiting widely diverse appearances, every variety of consistence, and great dis-

1. Physical Characteristics

Certain Types.

Apparent Composition

parity in amount. On the other hand, repeated examination has failed to disclose the presence of the bacillus in some sputa whose appearance suggested the expectation of discovering it.

This last sentence implies that while I regard as conjectural the inferences based solely on observation of the physical characteristics, I nevertheless recognise that there are certain types of sputa in which the bacillus will very often be found, and others from which it is almost invariably absent.

These are appreciated best from individual experience; the usual descriptions, in so far as I have relied on them, I have found misleading.

In the subjects of advanced of the sputum in one class of cases consists of purulent nodules which often float separately in a quantity of clear limpid mucous fluid; or which unite together into a dense coherent mass; and in another class, of semifluid pus mixed more or less intimately with a small quantity of mucus.

In order to indicate in the latter class the degree of admixture of the mucous and purulent elements, I have employed the terms 'homogeneous' and 'discrete', which will materially assist the mind in appreciating the appearance which the eye recognises instantly, but which it is very difficult to describe accurately in words. The descriptions which I have read usually omit to mention this important distinction.

Nodular Purulent Sputa

[1] 4 Cases 5600, 5617, 5680, 5699, 5736, 5754, 5777, 5791

[2] 4792. p. 67.

[4] R. J. E. p. 53

[3] Dr. Mackenzie cites the authority of Biermer for the assertion that "typical nummular sputa may be also met with in simple chronic bronchitis." Op. cit p. 18.

Mucopurulent Sputum (Discrete)

Now instances of all these types are found in non-tubercular conditions.

The appearance of dense nodules with clear bluish mucous fluid is one which more than any other is suggestive of phthisical softening and excavation. Yet I record the case of one patient (R.I.E.) whose expectoration was of this nature, in appearance almost identical with that of case 4792, and in whom the signs & symptoms pointed at first to a diagnosis of G. But the progress and duration of the case, together with repeated failure to detect the bacillus, justify the view that it is one of bronchial dilatation.

With regard to this class of sputa it is necessary to emphasize the fact that the appearance may become greatly changed in transmission. On one occasion I visited a patient who was expectorating a large number of these purulent nodules, which were lying quite distinct in the spit-pot at home. But when I received the sample an hour or two later for examination, it appeared as one viscid, coherent, purulent mass.

The sputum which I describe as 'muco-pur. diarr.' often contains only a small quantity of pus in pale yellow streaks. It is frequently observed in sub-acute catarrhs and conditions of chronic congestion of the upper respiratory tract. Hence it is quite common in non-tubercular cases. But, as often as not, such sputum contains T.B., sometimes in large numbers, alike in early cases as in those more advanced.

Mucopurulent Sputum (stomach contents)

[1]* cf. 4794 (p. 67)

Particles of Food

Mucous Sputa

[2]* 4620 detailed at p. 67 [3]* 5819 p. 69.

Occasionally a secretion white and quite watery is seen; and in some instances it is possible to detect T.B. in the same. I have seen it in only a few instances, and I am not aware of its precise indication, when of an acid reaction it is partly or wholly derived from the stomach.

* but see p. 71.

The 'mucopurulent homogeneous' sputum, which is quite common in phthisical cases, is similar to the discharge in the middle and later stages of a nasal catarrh, or acute bronchitis. Sometimes, too, in chronic bronchitis* patients expectorate during long periods a large quantity of sputum of this character.

In this connection I may mention that one of the most reliable indications is derived not from the composition of the sputum itself, but from its contamination with particles of food. Such Sputum, small in quantity, with but few pale streaks of pus or almost wholly mucous, and containing many scraps of farinaceous or fleshy food, very seldom harbours the T.B.

The scanty sputa which consist almost wholly of mucus, whether fluid, viscid, or gelatinous, while usually characteristic of simple inflammations, are by no means infrequently associated with Tubercular processes, most often in their earlier stages. Hence in these cases, in which probably the symptoms are equivocal and the physical signs inconsiderable, the discovery of the bacillus of Tubercle in the sputum is of paramount significance.

In this connection suggestive examples will be found in cases 4620*, 5737 & 5738. 5819*.

In one advanced case (5678) the sputum presented this appearance.

Odour

* 5543 p. 69

* 5696

It is a well recognised fact that Tubercular sputum is seldom foetid; and when regard is had to the circumstance that certain sputa which I describe as slightly foetid had stood overnight or been sent from the country, it will be seen that my results entirely coincide with this long established principle alike with regard to positive and negative results.

One interesting case* which I record is that of a lad who presented severe symptoms of respiratory disease with phthisical signs. The sputum consisted of a large quantity of thin granular yellow pus, in which I could discover neither T.B. nor E.T. Later on the patient was found to be able to empty at will the cavity (which was situated in the left mammary region), and the physicians were then led to regard it as bronchiectatic. He was admitted to hospital; but he absconded before any special remedial measures could be undertaken.

In one other case* with highly stinking sputum the condition appeared to be somewhat similar. The patient after his first visit returned home to the country, to be attended by a local practitioner.

These two, the only highly offensive sputa which I have handled, were non-tubercular, and of a yellow colour (not green). I have not observed any case of gangrene of the lung.

There is occasionally a slightly putrid odour accompanying sputum of a green colour.

Colour

※ 15668

※ 5707, 5772, 5799.

※ 5707, 5721, 5754, 5772, 5794, 5798, 5799.
※ but see p 71.

※ 5794

※ 5710, 5617

※ 5617. as also 5754

※ 5703, 5729, 5749, 5792.

※ 5729 ※ cf. p. 22.

On the whole little assistance in diagnosis is afforded by the colour. The green colour which many phthisical sputa present is found occasionally in non-tubercular cases*. It is alleged to be due sometimes to the presence of bile pigment (an assertion which I have no grounds for controverting) and sometimes to the retention of blood. Mention of its occurrence will be found in not less than ten cases in part 5, and it will be seen that T.B. was present in 9, being abundant in 3*. In 7* of these I observed E.T. also, and in one* the microscope showed a few red blood corpuscles. The other two* (as well as some of the foregoing) were associated with a history of haemoptysis, and one* of the two was blood stained.

It should be remembered that the colour of (so-called) grass-green vomit is due to the presence of an elliptical bacillus which I have found on cultivation to produce a similar colour in nutrient media (which it liquefies). But I have not made similar experiments in connection with green sputum.

Still more significant is a uniformly drab colour, like that of putty. This tint is in medical diction called 'clay-coloured'. I have recorded it in four cases*. The microscope shows it to be due to the presence of red blood corpuscles, sometimes disseminated, sometimes aggregated. Three of these sputa contained T.B. In one* some blood-stained mucous pellets were also present. The physical signs were not pronounced. The patient, a girl 26 years old, had paralysis of the left vocal cord.

Blood.

1881 to 1882

* 5650, 5680, 5792

** 5617, 5627, 5699, 5747, 5754, 5772

cf. p. 23.

cf. p. 21. * but see p. 71.

While in the eyes of the public haemoptysis is regarded as the most certain and the most alarming symptom of consumption, physicians long ago recognised that its significance was by no means conclusive, even when its source could be correctly ascertained. And since Kochs discovery of the Tubercle Bacillus in 1875, which has afforded invaluable assistance to diagnosis in these equivocal cases, far less importance has been attached by the physician to the occurrence of haemoptysis (per se), not only concerning diagnosis & prognosis but also with regard to treatment.

It will be seen that among the series of 87 cases which I record, 14 patients sent expectoration which was partly or wholly of a red or brown colour. In 9 of these cases T.B. was present; 3* with the signs & symptoms slight, 6 with them pronounced. In none of the cases was the presence of blood a transient indication of an acute pneumonic process

The 5 cases from which T.B. was absent demand further inquiry. One (5614) is evidently a case of chronic bronchitis, the patient is 52 yrs of age. In another (5761) aged 55 years there is some ground for suspecting a tubercular process in addition.

In two others the signs & symptoms of chest disease were very slight, one being the girl (5729)* alluded to on p. 21.; and the other (5595) a girl with masses of enlarged glands in the neck & axilla. These evidenced a local reaction to Tuberculin; and after three or four injections during a few weeks' residence in the Victoria Hospital they showed a diminution to less than half of

Blood

cf. p. 27.
cf. p. 22.

ii Structural Features

Pus Cell

their original size and extent. The fifth case (5876) is that of a woman (aged 67) with considerable dyspnoea & exhaustion, but no distinct physical signs. The left mamma and axillary glands were removed two years ago for cancer. A gland can now be felt in the left subaxillary region about the size of a small bean.

Four of these patients were females and one (5761) a male. I recollect a few other instances in which young women have complained of frequent haemoptysis and in whom hitherto no pulmonary lesion can be recognised

I find that there is great diversity, and apparently great uncertainty in the description of the chief cellular constituents of the sputum. Without pursuing the details of various 'pathologists' definitions, I prefer to designate the appearances which I distinguish by the terms I purpose to employ.

I do not profess to distinguish between the appearance of the pus cell and the leucocyte in sputum. Hence I must for present purposes apply the term 'pus cell' to include both, whether the contents are granular or fatty or translucent; and whether there can or cannot be distinguished a nucleus (small or large, simple or multiple, not necessarily tripartite, as we are usually taught)

Dr Philipp has remarked to me that he can often judge from the appearance of the pus cells the probability of finding T.B., but I have not been able to appreciate any constant characteristic indications.

Catarrhal Cell

⁑ p. 67 p. 31 ⁑

Round Epithelial Cell.

The greatest uncertainty, with regard not only to its origin and its history but also to its appearance, hovers round the cell which is described as 'catarrhal'. Let the term in these pages be held to refer to a cell of variable size and shape; whether rounded or drawn out into elongated form; sometimes smaller than the pus cells, but oftener about twice as large; less conspicuous than the pus cell, its contents being not so dense and more translucent; often presenting the appearance of fatty degeneration, but sometimes that of granular disintegration; and in many cases containing abundant specks of dark pigment.

I will predicate with regard to it nothing further than that it is most frequent in the mucous portions of sputum; and that I am led to regard the abundance of pigment as an indication (in the individual case) of its origin in the alveoli of the lung.

Cells of this nature are abundant in the fresh specimen 3935.*

These two being the principal cellular components of every sputum, no mention is made of them in part 5, unless either is disproportionately abundant or conspicuously absent.

Epithelial cells, apparently round or slightly angular, either clearly nucleated or in a state of fatty or granular disintegration, are also frequent. Their significance is uncertain because of the similarity between the cells of the epithelium in the pharynx and those of the alveolar lining. The former are present in the sputum of common nasal and pharyngeal catarrh: they are usually clearly nucleated and they sometimes lie in plates of three or four contig-

* Unless there is evident ulceration of the nasopharyngeal tract.

** Columnar + Ciliated Cells.

*

Squamous Cells

nous cells. When I see round epithelial cells pigmented or much degenerated, I regard them as being of alveolar origin.

These are recognised in the fresh sputum not only by their distinctive form, but also by their brilliance, which is often almost crystalline. To this point allusion will be found again on p. 34. The cells can often be seen quite well without staining.

In some cases in which I have seen them I have had reason to believe that they came from the nose; but in many they doubtless arise from the bronchioles. Seeing that they constitute the surface of the whole respiratory tract between the epiglottis and the alveoli (except the vocal cords) as well as that of the nasal passages, it is necessary to have regard to symptoms & physical signs before ascribing their import to these cells. Such observation tends to show that they are frequent in cases of ♀ and in cases where there are slight inflammatory changes at the apices, as well as in definite cases of bronchitis.

It may be of interest to state that good specimens may be readily obtained from the surface of a nasal polypus after removal.

Large squamous cells are of buccal origin. They appear intact except when the sputum is not fresh; they are usually surrounded and invaded by various micro-organisms.

Elastic Tissue

But by far the most significant of the structural elements in the sputum is Elastic Tissue. I have described on p. 8 the method in which I sample the sputum for examination in the fresh state. The staining process appears to dissolve the fibre, or at any rate to render it invisible; perhaps it is washed away from the film. I have only on two or three occasions observed its presence in specimens after counter-staining, and on these it was much swollen and altered.

The elaborate method described by Fraenckel I adopted once (after I had recognised E.T. in the sample) but I found the appearances to be far less characteristic. Its chief merit appears to me to consist in collecting all the sputum over a long period and allowing it to form a deposit. I believe that more characteristic appearances as well as more certain results would be obtained by examination of this sediment in the fresh state than by boiling it with soda. If this is the method usually adopted for clinical purposes, I can understand why the text-books provide such an array of other substances which might be mistaken for E.T. Very few of these actually bear the least resemblance to the fibre.

In examining the fresh specimen it is necessary to transmit but little light. E.T. is then recognised by its distinctive refraction as well as by its slender substance, its unbroken contour, and its graceful form. A very small shred, of course, does not present all these characteristics; and it must be understood that the few cases in which I have recorded "E.T.?" are those

Elastic Tissue

※ but see p. 71.

※ 5638, 5691, 5703, 5748

※ 5707 cf. p. 21. p. 43

Op. Cit. Fourth Ed.ⁿ p. 83.

in which so little was present that all the characteristics could not be demonstrated; yet I had very little doubt as to the nature of the various shreds I noticed, and a reference to the cases will show that whenever I recorded E.T. the inference that the fibre was present was quite in accordance with the signs & symptoms.

All these cases would have been cleared up, had I been able to make repeated examinations, or to select for observation part of the deposit from a whole day's sputum. One of the instances was the case of Cancer (5676) already cited, and in all the others* T.B. was present.

It will prevent misconception if I mention again that the examination of the sputum was always conducted on its own merits, without regard to the patients' condition; and that the structured elements were always recorded before ever the films had been stained.

Only once* have I noticed what might have been E.T. covered over with debris so as to resemble a birds' toes, or the shell of a caddis-worm. In this case some typical fibres were also present. It will be seen that T.B. was also present +++. It is the salient feature of Fenwicks' method that the fibre must be looked for among the rubbish, "clinging to hairs and other foreign bodies present in the sputa". But in the pure state it is wonderfully clear and distinct, and it usually presents quite a beautiful appearance.

Small shreds of silk and wool may be difficult to distinguish from E.T., but it should be observed that if the foreign bodies are present in continuity, their difference from E.T. is readily perceived;

Elastic Tissue

and further that where small shreds of E. F. exist, there will probably also be larger portions presenting the absolutely characteristic appearances, if these have not been mangled by boiling with soda.

Doubt may also exist with regard to a fragment of a slender non-septate hyphal filament; but usually a dense matted mycelium will be discovered on searching adjacent portions of the preparation.

It is of far greater value to become familiar with the appearance of the tissue itself than to study a host of fallacious resemblances.

[This method of leading the student to compare one object, disease, condition or symptom with others, under pretext of teaching him how to distinguish between them, presents one of the most fallacious and pernicious methods of instruction —— nor is it the only one that is so —— to which we are subjected. Points of distinction are categorically drawn up between — let us say — the poppy capsule, the pomegranate and the bael fruit. But any one who has frequently handled poppy capsules will never mistake anything in the world for them. The same plan of instruction is pursued with regard to the recognition of tube-casts in the urine, and many other subjects.

An observer notices some foreign substance, and he immediately perceives the difference from the organic

Laryngeal Tissue

structure. There is not the least possibility that he would ever mistake one for the other. Yet this answer seems to be insufficient for the purposes of examinations, or else too profound for the sagacity of professors. We shall be better Educated when we have learned to familiarise ourselves with whatever we wish to recognise, than we find ourselves at present after having striven to remember all about the Nature and appearances of alien objects. Let me revert from this digression on didactics to the subject which we have in hand]

I confess my inability to appreciate the distinctions drawn by Dr. MacKenzie & Dr Tromp between the fibres of pulmonary & laryngeal tissue. The descriptions which they gave of the latter do not seem to my mind to correspond with the microscopical appearances which they depict, nor can I corroborate them from among the instances which I have observed.

I conclude that all the elastic fibre I have seen has been of pulmonary origin; in fact the great preponderance of the amount of tissue derived from the lung over that which the vocal cords contribute when disintegration is advancing in both organs, must render the detection of laryngeal fibre in the Sputum a comparatively rare occurrence. I should never imagine that a given fibre had been derived from the Larynx, if there were any signs of softening in

Relation of Elastic Tissue to Tubercle

the lungs, or even persistent signs of bronchitis with general symptoms of phthisis.

The determination of tissue in secretions removed from the larynx during life must be fallacious. The probability is very great that the brush would remove some pulmonary secretion on its way up from the lungs. Even Fiehl's tracheotomy case is not entirely free from this fallacy.

I accept the statement that E.T. may exist in cases of disintegration of the lungs which are not of tubercular origin, but such cases must constitute a very small proportion.

Some observers maintain that sometimes the presence of E.T. in the sputum precedes the arrival of the bacillus. This appears reasonable if we consider that an ulcerative process has preceded the advance of the disintegrating tubercle toward the surface of the alveoli. The two Edinburgh observers already named agree in their results as to the detection of E.T. in all but one instance out of more than 200 Tubercular Sputa. They state that they made repeated examinations from the deposits of whole days' sputum.

But the very simple and rapid method which I have described gives definite results from a single examination in five eighths of the cases. Out of the 48 Tubercular sputa recognised among the 87 consecutive cases, I found E.T. demonstrably in 26 and presumably in 4 more (see p. 27). In addition to the case of cancer (5.6.76) there were two cases further in which E.T. was

* 5791 and (a chronic case) #274 (not detailed)

* 1 spirals

also p. 24. *

Op cit. p. 196

present (quite characteristically) but T.B. was not observed. In both instances* it would appear from the signs & symptoms as though the specific process was temporarily arrested, but that the lung had not been able to discharge all its detritus. In 4274, A.O. had found T.B+; and 5791 had been discharged from the navy two years previously on account of C. In neither of these cases did I have the opportunity of making further examinations.

Since certain writers seem to regard the objects known as Curschmanns Spirals as being of a structural origin I include a mention of them under this heading, although I am inclined to regard their striking appearance as indicating purely mechanical causes. Their most conspicuous feature is the long bright slender central thread; this, in fact, often occurs quite separately. Dense matted spirals without this brilliant thread, and consisting in large part of conglomerated columnar (ciliated) cells are likewise described under the same name. One is seen in specimen 3935 (p. 67)

Curschmann mentions the occurrence of forms with clubbed infundibular moulds at either end, and Dr Troup describes in the sputum of hooping-cough "also glittering plugs of fibrinous material, lumpy and clubbed at one end". A few such, in which however the central stem does not possess its characteristic brilliance may be seen in the same fresh specimen 3935. One which I noted in another case presented the appearance of alveolar form at each end of a short angular stem, and this seems to afford a clue to the [illegible] of the formation of the spiral.

Spirals

The sputum in which the typical forms occur is viscid and elastic, evidently from its pulmonical character very difficult to expectorate. The nature of the substance of which they are composed appears to be different from that of the surrounding mucus, for the slender thread is seen to be brilliantly refractive. Whatever may be the constitution of the spiral, it appears to consist at one stage of its formation of a string connecting two plugs in adjacent infundibula.

When the lung contracts these plugs would close up the duct of air toward the bronchioles, causing the greatest embarrassment in coperation. After a while, one infundibulum expels its burden which is shot into an alveolar canal but retained by the thread connecting it with some adjacent infundibulum. It is possibly the case that the plugs originate independently and that a process from each becomes united with the one proceeding from its fellow. After liberation the plug is rolled to and fro with every respiratory act, while it slowly advances, drawing out the thread, under ciliary action toward the Bronchi. At last under the combined influences the second plug also is released and (like the 2 American boles) the two are rolled on together through the bronchi.

Probably too the ciliary motion is spiral, this arrangement being universally exemplified in Nature. We find it in the phyllotaxis, and in the disposition of the florets in a capitulum. It is present in the inimitable helix of the Mollusc. In the vessels of the umbilical cord the spiral arrangement is conspicuous, and it prevails in the layers of the cardiac muscle. Moreover in lowly organisms such

Spirals

⁂ 5831 ⁂ ⁂ I have preserved these simply by allowing the fresh
⁂ 5537 sputum to dry partly, and then adding a ring of balsam
(not detailed)

Bronchiolar Casts ⁂

as Rotifers and Vorticella, the spiral movement of the ciliary wave is appreciable by means of the microscope; as also is the rotatory and spiral motion (not merely undulatory) of flagellate bacteria.

The probability of picking up fragments of cells and other matter in their onward course is very great, and hence the slender central thread is often seen to be enveloped in a confused mass composed of structureless as well as cellular debris.

If this be actually the manner of their formation, it is evident that the mitigation of the dyspnoea follows the release of the plugs of plastic exudation from the infundibula. This is presumably effected naturally by their shrivelling and partial drying. Any attempt to diminish the viscosity, by promoting secretion would probably have the effect of causing them to swell more. Again, little benefit could be derived from effecting an increase in ciliary movement until the plugs are out of the alveolar passages; and then no treatment is necessary: the dyspnoea is relieved.

It is said that these spirals do not occur in tubercular cases: I have found this to be usually true. But the most striking forms which I have seen were in a sputum* containing also E. T and T. B., and I record observing one likewise in another Tubercular case.*

These are referred to as common objects in sputum, especially in bronchitis, and as being readily seen on floating the specimen in water. I have only in two or three cases noticed what might have been such. Possibly they are broken to pieces in transmission, or swollen and dispersed by absorption of the fluid constituents of the sputum.

iii Structureless and Inorganic Elements

Charcot's Crystals

X 5558 (not detailed)

I found to my disappointment that these crystals dissolve in glycerine. But the comprehensive specimen 3935 shows a few not very typical forms.
They are soluble also in acid, and therefore they are never seen in the counter-stained specimen.

Op. cit. p. 99.

X 3935, 5845, 5846.
(p. 69) (Not detailed)

By reason of the method which I adopt of transferring the sputum to a flat dish, such bodies as crystals have been less conspicuous than they might have been if I had allowed them to gravitate and had then examined the deposit. The crystals of cholesterin, palmitin, stearin, tyrosin & haematin, referred to by various writers, I have never recognised.

In two cases I have observed large numbers of Charcot's crystals: One of these sputa also contained T.B. The other presented the history & physical signs of asthma. I have seen them also in a specimen containing some imperfect spirals. Very often one or two may be seen.

Oertel mentions that he has witnessed their formation from the putrefactive microorganisms in the sputum. Curschmann supposed that they were due to retrograde changes in the round and spindle cells among which they lie. If such be the origin of the crystals, the formation of cholesterine & cystine might be adduced as somewhat similar, as also the crystallisation of the fatty acids. The whole process is to some extent comparable with the transformation of organic tissues into adipocere.

But Dr Toomb argues that they arise directly from a process of transformation of the columnar cells. This idea seems extravagant, and it fails to account for the great variety in size which they present. It would rather appear as though the crystals grew larger by marginal accretion like an inorganic crystal growing from solution. Yet I must admit that in two or three cases in which both cells and crystals have been present, I have observed bodies as though in a state of transition between the two, exhibiting the brilliance of the cell, and showing a granular

Crystals

sometimes also 

they appear as a wide sector of a circle in form. In these cases the radiating streaks are best seen.

Amber masses

½ 5753 ½ but see p. 71. of p. 42.

Oil Globules

¾ I have noticed that they are not always conspicuous in the sputum of patients who are receiving oily injections. IV. Other organisms.

appearance not seen in the crystal; while they possess perfectly neither the angles of the crystal nor yet the curving outline of the cell.

I have also often seen semi-elliptical colourless transparent crystals, sometimes with radiating streaks. These bear most resemblance (but not always a close one) to those figured in the books as leucin. They are of common occurrence, but I cannot attach any signification to them.

I have been struck with the frequent presence of large irregular amber-coloured masses, of crystalline refraction, resembling lumps of resin. I have sometimes imagined that these were the remains of aggregations of red corpuscles, and in some cases in which I have observed them there has been a history of haemorrhage. In one instance* the mass assumed a stellate form

In nearly every case in which I have observed either these amber masses or the transparent semi-elliptical crystals, the sputum has contained T.B.

Oil globules may often be observed, even when no cells undergoing fatty degeneration are actually seen.*

The significance of other organisms present in the sputum is not readily determined from observations such as I have been able to make, no special precautions having been taken to cleanse the throat & mouth. Hence allowance must always be made for this source of infection. Especially is this the case when the sputum contains less than its ordinary proportion of pus, and most of all when it is contaminated with particles of food and buccal epithelium. Such specimens present a great variety of large & small bacteria, staphylococci

Various Micro-organisms

Op. cit. p. 21.

Diplococci

Koch Mittheilungen Band ii

Gaffky Archiv. Langenbeck. Band xxviii Heft i

Fischer Deutsches Archiv. f. klin. Med. band 36. p 344

(often with a symmetrical or tesselated arrangement) some diplococci and a few streptococci. Whenever I have observed all these types in one specimen I have employed the comprehensive term 'mic. var.'

Tetracocci also are by no means uncommon and in several instances I have judged that they were derived from the lung.

The presence of numerous squamous cells in the sputum indicates the mouth as the source of infection with micrococci; on the contrary, the intimate association of cocci with the pus cells, especially in a specimen of fresh sputum which is almost wholly purulent, implies their multiplication at some intrapulmonic focus. In this relation small groups of staphylococci are frequent. A fact cited by Watson Williams appears to have an important bearing in this connection. "Recent investigations, such as those of W. H. Park, have shown that staphylococci and streptococci, which are always present in the healthy mouth, increase greatly in number & virulence in damp weather & winter months, and are then capable of setting up acute pharyngitis if applied to the throat." We are justified in extending the inference so as to apply it likewise to inflammatory processes of the bronchi and lungs.

I have bestowed considerable attention also on the presence of diplococci. Reference has been made to these by several observers, among whom I may cite Koch & Gaffky. The subject has been exhaustively examined by H. Fischer, who describes their presence in the sputum in many diseased conditions. He states, likewise, that a Sarcina form occurs normally in the mouth of one person in every four.

Diplococci

⁂ p. 68. p. 44

⁂ six preparations

Op. Cit. p 360

The use of inverted commas implies that the names were those which the patient or friends employed, and that I did not myself ascertain the accuracy of such statements

⁂

The most striking example of her presence, evidently in the pulmonary secretion, is that afforded by case 5396*. Here the individual cocci were of large size, and often associated in multiple pairs within a single capsule, which was sometimes half as wide as a pus cell. These appear to correspond with the description given by Oertel of certain "schistomycetes" prevalent in cases of advanced phthisis.

The chief symptom in this case was a paroxysmal cough, and for a while T.B was present in only very small numbers. Later on T.B. became abundant after removal to another house) and the signs & symptoms progressed. With regard to this other house it ought to be mentioned that about six months previously a death from "consumption" had occurred in it. Patient's family entered into occupation at the End of May, and soon after the walls were stripped and a great deal of cleaning was carried out. On June 2nd the sputum, for the first time, showed T.B present in large numbers. On Aug 5th the patient had a sore throat which he attributed to a smell on the stairs. Toward the End of September the eldest daughter suffered from a severe attack of "erysipelas", which threatened at one time to prove fatal.

It must however be observed that the patient's previous history is suggestive of tuberculosis, and further that his occupation as brass finisher had led him to be continually exposed to the fumes of nitric acid. The elements in the case, both with regard to diagnosis and progress, are thus seen to be very complicated.

For the specific purpose of destroying these diplococci I

Diplococci

Pneumococci

practised treatment by injection twice or thrice weekly of about 3i of menthol in olive oil (25 %) into the trachea. The cough was greatly relieved; but before I examined the sputum again the patient was hindered by the stormy weather from attending during three weeks. At the end of this time (Sept 28th) crepitation was much less frequent, and the rhonchi were not so pronounced. The sputum still contains large numbers of the characteristic Encapsuled cocci but I cannot discover T.B. I examined only one coverslip with this object in view. The other I left stained with carbolfuchsine only, in order to perceive the appearance of the capsule. In this instance it is rather more distinct in the counter-stained specimen.

In the case of a patient whom I treated similarly by means of intratracheal injections in private practice in England, a disappearance of the putrefactive & pyogenic organisms was noticeable.

The large proportion of cases in which I have observed smaller diplococci has induced me to regard the diagnosis of pneumonia (to the exclusion of Ƒ) based upon their presence as probably fallacious. I have repeatedly seen Encapsuled diplococci in the sputum of tubercular patients who at the time presented no acute symptoms, as also in non-tubercular cases.

The descriptions and figures of the pneumococcus in various text books indicate a considerable disparity in size and disposition. I have examined the sputum in a few cases of acute pneumonia, and, when a diplococcus has been abundant, I have observed this great variety in size, some individuals being twice as large as others.

Pneumococci

Virchow's Archiv. Band 87. xxxvii et seq.

And with regard to the capsule in these cases I may mention that in some instances, when conspicuous after staining with carbofuchsine it has hardly been appreciable in the specimen stained afterwards with Gabbet's blue.

I pursued this twofold examination in a series of several consecutive cases among the sputa of all diseases, and often noticed a similar effect. But this change did not always take place; in fact sometimes I observed the contrary.

Moreover Friedländer himself admits the resemblance of the pneumococcus to other organisms, so that diagnosis could hardly be complete without experiment by means of culture and inoculation. Friedländer further admits the existence of other causes capable of giving rise to acute pneumonia, and affirms likewise that the specific organism is not always demonstrable in this disease.

Certain articles published in the medical papers two or three years ago would appear to point out the bacillus coli communis as one such probable cause when roaming from its natural habitat.

The fact that tubercular sputum often contains a larger number of encapsuled diplococci, apparently coherent in it, and not accidentally acquired afterward from the mouth, suggests the view that an exacerbation accompanied by their multiplication is only a part of a more comprehensive whole. In this way we may perhaps account for those atypical pneumonias which frequently occur, and in which the diplococci, when present in the sputum, are not conspicuously abundant.

Again the view has been propounded that T. B. falls before the

Antagonism

Relation of organisms to symptoms.

Temperature

Lancet Vol I. 1881. p. 971

invasion of certain organisms, e.g. bacterium termo; and German physicians on the strength of this supposition have instituted treatment by means of spray containing this fungus. Hence if, as some observers suggest, the presence of numerous diplococci does indicate a struggle against T. B., this may clinically account for the temporary absence of the bacillus during an acute illness.

Nevertheless, in the light of these German therapeutic experiments, this view has not gained acceptance; and it must further be recognised that cultivations of T. B. can be made from old putrid sputa; and so its vitality must be long maintained even in presence of abundant putrefactive organisms.

The conditions which I expected to be possibly affected by the presence of other organisms in tubercular cases are chiefly cough, temperature, and sweating. I have already (p. 37) detailed a case in which a paroxysmal cough appeared to be associated with the presence of a large encapsuled diplococcus; but on the whole I have not been able to determine any distinct correspondence between this symptom and the presence of the various micro-organisms of the sputum.

It must first be stated that in most early cases of ♀ the temperature is subnormal (97°–98° F.) with a definite evening (or noonday) rise to 98° or 99° F. Of this fact the charts at the Victoria Hospital afford abundant evidence; and it was maintained so long ago as 1881 in a paper by Williams in "The Lancet."

High fever characterises the later processes, and it is then

Severe symptoms.

an indication of what is virtually a septicaemia, the absorption of toxic products of various microbes into the general system.

The general principle at which I have been able to arrive will be found exemplified in many of my cases, viz:- that having regard to the whole number of infective organisms (specific as well as non-specific) their increase does correspond with an exacerbation of the symptoms, especially with regard to Temperature & Sweating. Thus it will be seen that severe symptoms prevail when T.B. are few in number and the non-specific organisms abundant, as well as when on the other hand the latter are not numerous, but T.B. is prolific.

The same conclusion is borne out by the cases in which fungi and large putrefactive organisms prevail along with but few T.B. In this respect again clinical observation alone fails to determine whether the true relation of all these organisms to the symptoms is one of cause or one of effect, but their association is manifest.

The results effected by inhalation in heated chambers have seemed to justify the inference that the temporary palliation of the symptoms following this treatment was due to the copious expectoration which the means induced, and which enabled the patient to rid his lungs of those stagnant lakes of pus where every kind of organism had been multiplying and discharging noxious products for absorption.

While it may be reasonably contended that both the severity

V. Tubercle Bacillus

of the symptoms and the multiplication of the organisms are alike incidental to the advance of the tubercular process which is the common cause of each. Yet such an inference as that just named affords, so far as it goes, support to the theory that the elaboration of the various toxic products of all the micro-organisms is directly responsible for the variation in the symptoms. And herein, I consider, is to be found the explanation of the marked improvement in the patients' general condition, even in an advanced case, which follows this removal to the country, and the striking palliation of these severe symptoms upon admission into the well ventilated wards of a hospital.

The following cases will be found to have direct bearing on these topics:- 5611, 5620, 5662, 5680, 5687, 5736, 5745 *5753, 5777, presenting severe symptoms with T.B. present in varying degree and (5611), (5620), 5627, 5638, (5662) 5691, 5703, 5710, 5723 5738, 5756, 5794, in which non-specific organisms were abundant.

More and more unreservedly are we coming to recognise the T.B. as the index of phthisical processes. With regard to its causal relation too, there is an increasing unanimity of conviction. It still remains to be ascertained whether the bacillus is in every case the primary cause of the disease, sole & sufficient, or whether in some instances (notably phthoid &) its presence is to be regarded as a second-

Tubercle Bacillus.

Quantity

* cf. 5691. 5707 (cf. p. 21. p 27)

* e.g. 5680 5745 5777

* 5491 p. 68

* but see p. 71. cf. p. 21

any adjunct. These are points which cannot be altogether determined clinically. I purpose therefore to allude to the bacillus in the sputum chiefly from that standpoint which I have suggested, viz., as the index of pathological processes in the respiratory organs.

Allowing for the variations associated with large numbers of other micro-organisms, it may be asserted generally that the number of the bacilli when small or very great indicate a corresponding degree in the severity of the processes; a large number being thus usually found in association with severe symptoms and advancing disintegration. But this general principle is by no means absolute.

Sometimes the sputum is teeming with bacilli when both signs & symptoms are only slight*; on the contrary a very few bacilli may be found in the cases* of patients whose symptoms are severe and whose condition is somewhat advanced. Such cases however constitute the minority; and reasons have been already explained at length which will in many instances afford some explanation of the exception.

If inferences are to be drawn from quantity alone, those which the amount of E. T. in the sputum affords will be found to be more uniformly reliable than any based on the number of bacilli. Moreover several portions of sputum should be examined in order to obtain a correct average estimate of the number of bacilli, and allowance must be made for the possibility of variation in number, and occasional apparent absence from time to time. Such a precaution finds illustration in Cases 5620, 5664, 5721.* Another case (5491)* affords illustration of the very interesting fact that the bacillus which has been abundant

Tubercle Bacillus

Quantity

※3 p.69 ※2 p.68. p37.

※1 5664, 5690

※2 p.68. ※

It seems certain too that the lungs may become the seat of disease through infection derived from other sipstems.

There must further be considered the significant fact that no other tubercular lesion arises superficially; the affections of the skin and of the larynx, for instance, commence in the deeper tissues of these parts.

during the formation of a cavity may altogether disappear after its completion. This patient made a very good recovery

During my early clinical instruction in the Western Infirmary I was warned not to attach much importance to the discovery of one or two bacilli in the sputum. Such, according to Zichl's supposition, might have been accidentally inhaled, or have been lodged in the mouth.

My own experience has led me to a very different conclusion. The discovery of one bacillus, or a pair, would induce me to examine again with the expectation of discovering a greater number at a later date. There can be no doubt, for instance, of the phthisical nature of case 5627. Cf. also 5510* and 5396*. In other instances* again the presence of one or two bacilli is accompanied by very slight physical signs; and it is probable that under suitable treatment these will clear up, and the bacilli disappear completely. Nor have I ever met with any recorded case of the discovery of an 'accidental' bacillus in the sputum of a patient who did not then or soon after show signs of P.

These results accord with the conclusion that the primary tubercular focus is not superficial, as the growth of a colony on a culture plate might be. Possibly when there is already a lesion, the bacilli may multiply on the surface, and perhaps case 5396* is one such. I cannot say. But in miliary tubercle there is evidently a distribution by metastasis, and there is no evidence that the earliest infecting bacilli do not likewise enter the local circulation & become lodged in the peribronchial tissue before they effect any lesion, the superficial inflammation arising from proximity.

Form.

Op. cit p. 72

Deutsche Med Wochenschrift Nov. 20. 1890.

I am not sure what is denoted by the term 'biscuit form' possibly that the outline of the bacillus was biconcave

I believe that more careful observation will enable us to recognise in the alterations in form of the T.B. certain phases in its life history, and to draw important inferences therefrom. Great variety in form is evident in nearly every preparation in which the bacilli are abundant. Some are short and thick; others long and thin; many present a beaded appearance; some are mere specks. These observations lead me to accept with reserve the assertions which several physicians have made with reference to the effects of treatment on the form of the bacilli. The variety is evident both in young patients and old; in early cases and late; with slight symptoms & severe; when conditions are advancing as well as when being held in check.

Dr Hunter Mackenzie writes that in one case after residence abroad "they seemed shorter than before" but he judiciously draws no inferences.

On the other hand Prof" Fränkel & Dr Rumbrecht of Berlin reported in 1890 that in certain well marked (but not very advanced) cases of after treatment by Koch's method, the general & local improvement was accompanied by "a manifest effect on the tubercle bacilli themselves, even when they did not disappear from the expectoration.

Firstly, The bacilli were observed to become smaller and thinner, so that they were with greater difficulty distinguishable;

Secondly, some bacilli assumed a distinct biscuit form;

Thirdly, others were found broken into two pieces; and

Fourthly, when not actually broken in two, they were manifestly disintegrated into several fragments which remained fixed together like beads on a necklace."

Tubercle Bacillus. Form.

* We must remember that, in the case of most spore-forming organisms, it is considered to be an unfavourable environment which provokes this process.

It is that word "effect" to which I take exception. I have already mentioned that such variations may be recognised in some of the bacilli prior to any treatment in nearly every case. Hence they may be regarded as presenting phases in the natural life and death of the organisms.

Whether the beaded appearance is due to disintegration, vacuolation, or spore-formation, is yet, I believe, uncertain. Hitherto spore formation although asserted by some observers has not been conclusively demonstrated in the case of the tubercle bacillus. But I have heard Dr Philip refer to "that appearance of the presence of spores which indicates active new-formation", an inference from the same appearance precisely opposite to that just cited. In the absence of the details of the life cycle of the organism I consider it premature to ascribe these variations in form & size to the effects of treatment.

We ought to reflect that there may well be a considerable departure in point of size & form of the normal individual from the average type, as well as a different degree of susceptibility to the effects of fluid and of staining reagents. Moreover there is no reason for believing that micro-organisms are immortal. Especially when we consider all the hostile efforts of the tissues we must conclude that rapid multiplication is accompanied by large destruction, and that therefore in every sputum there will be some bacilli dead before the application of any chemical reagents, and broken fragments of others undergoing disintegration. These will react to the staining media in the same way as those which are freshly killed by immersion in them.

Tubercle Bacillus

Grouping.

Ueber Tuberkel und Tuberculose. I Theil. Berlin 1885

T. B. ?

5635

cf. p. 21. 5668.

Mention of these various appearances will be found frequently in part 5 and they are illustrated in several of the specimens.

The grouping also is often of significance. Often large clusters of well formed individuals are observed, not only among the cells but distributed throughout the mucous portions of the sputum. These are very suggestive of active proliferation. In some instances a small group of three or four bacilli presents the appearance of being, or of having been, included within a pus-cell. But Baumgarten's careful researches led him to assert that the bacilli were found partly enclosed in the fixed tissue cells (of the cornea), never in leucocytes.

Among the 87 consecutive cases in part 5 will be found six in which I have recorded T.B.?. I purpose reviewing them in detail. The rods seen did not present the ordinary characteristic appearances of T.B. All the elements in the diagnosis of the case are equivocal. But in so far as the cellular elements afford a means of diagnosis it would appear that an inflammatory denudation of the alveoli and bronchioles is slowly advancing, and this in conjunction with the symptoms, signs, and history, tends to confirm a suspicion of Φ.

The specks seen might have been either inorganic granules, which often retain the fuchsin stain, or the last remains of a previous tuberculosis, of which the history and physical signs appear to afford corroboration. The possibility, indeed the frequency, of healed pulmonary tuberculosis is a fact which is justly insisted on by the teachers in the pathological department at the Western Infirmary. I have already (p. xiii) cited a notable example witnessed in the living subject (5291)

Doubtful cases. 5689

5692

5693

5759

Relation of age to ♀.

* 5723.

This case again is altogether equivocal: the specks here too may be the last witness to a triumph of the tissues over the invader.

The elements of bronchitis predominate; possibly these indicate the early deposition (and destruction) of tubercles

The appearances presented are not quite characteristic of T.B. But the cellular elements again indicate an extension of catarrhal process. The signs are not limited to special areas.

An old man, in whom it may be assumed that an emphysematous condition has supervened upon a former tubercular process, and has perhaps been the means of overthrowing it. It is a clinical fact of which the cases of our out patients afford abundant verification that emphysema militates against tubercle. In one or two other cases of old men with emphysema I have failed to discover the presence of T.B. which had been previously recognised by another observer.

With regard to the relation of age to of pulmonalis I give statistics from the whole series of 200 cases. Among the 93 patients presenting T.B. one* was 65 yrs old, one 52, three fifty, and all the rest were younger, the most frequent ages being from 18 to 33. There were in all 21 patients of 50 yrs of age and upwards. 18 were more than 52 years of age, and only one of these afforded present evidence of the bacillus.

Part 4. Suggestive.

The subject of treatment is beyond the scope of the present work. But with regard to prophylaxis I should like to add one suggestion to the means already under our control.

The examination of Sputum is awe-inspiring. Nothing in the history of the disease is so impressive as the sight of an almost invisible film of sputum teeming with millions of the pestilential germs.

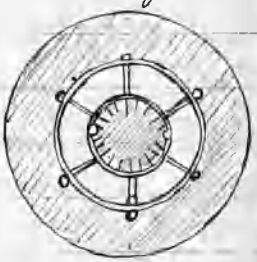
We are compelled to recognise the necessity of such isolation as will militate against hereditary transmission of the disease, and prevent direct infection. It is evident that in ordinary dwelling-houses these objects cannot be attained, least of all in the dwellings occupied by the working classes in Scotch cities, where all the members of the family live, eat, & sleep, in the same apartment with the consumptive patient.

Moreover the social habits of the British nation, together with prejudiced sentiment would unfortunately forbid the Enactment of such thorough isolation, even if it could be carried into effect. It is doubtful therefore whether the matter will ever become one of national legislation, and whether, as in the case of Small pox and other infectious diseases, the judicious ruling of the wise will succeed in overwhelming the prejudice of the ignorant for the good of both.

Meanwhile, much might be done by the institution of an asylum for consumptives, which would confer proper hygienic attention on the patient, and would ensure a certain degree of isolation. On the patient's part there is naturally great reluctance to leave home & friends when the fatal issue is known to be approaching.

And reciprocally the same sentiment induces relatives to cling to the consumptive patient until they themselves are weary at the sight of suffering which can be but slightly palliated, worn out with watching night and day, and distressed by the capricious temper of their intractable patient. It would seem desirable on this account to establish an asylum in which the family might reside near to the patient.

Such a design might be effected by the construction of a ring of buildings consisting for the most part of well appointed dwelling houses adapted to the requirements of the families. Within the centre of the enclosure would be a circular ward with several doors and windows.



Ground-Plan

Three storeys might be built, allowing wards for males, females and children, each being connected with the corresponding flat of the outer ring of houses by means of balconies and bridges. If the dwellings were rented, the hospital treatment could be given without payment.

By this means the patient would be always isolated by night and systematic destruction of the sputum could be carried out. The family would be relieved from the care and expense of nursing and treatment, which in many instances when the breadwinner is broken down constitutes the most distressing social element in the case. In order for other members of the family to go out and gain a livelihood, the patient must be abandoned and neglected during a great part of the day.

One of my patients who died a few days ago was constantly in this plight. On several occasions she was alone in the house and un-

able to rise to open the door, so that I had to return again at night to visit her. Growing daily weaker and more emaciated; suffering agony from intestinal ulceration; unable to take ordinary food, even if she could have risen to prepare it; she lay alone day after day, reluctant to leave her husband and her home, although she might have gained admission to a general hospital.

This measure, while it confers benefit on the individual patient, must nevertheless be regarded as one fraught with the utmost danger* to the suffering community at large, so long as phthisical cases are admitted into the general wards by the side of patients suffering from innocent affections of the lungs or diseases of other organs.

Patients under treatment in the consumption asylum might, if they were well enough, go to work sometimes, or they might spend part of the day with their family; and relatives might visit daily in the wards or meet the patient on the balconies. In the ward a certain degree of privacy might be secured by the erection of partitions between the beds which would yet allow every patient to be seen quite well by the nurses and physicians from the centre of the room.

The public furthermore would derive a twofold benefit. Not only would the source of infection be removed and held in check, but families with ascertained tubercular history would be denoted. Of course, it need hardly be stated that the bacillary test would be made in every case a criterion for admission. In order to fulfil its purposes such an institution would need to be placed in the neighbourhood of the industrial community, with ready access by means of public conveyance. That this would constitute

no source of danger to the public is evidenced sufficiently by the good health of those who live in streets adjacent to fever hospitals in all the large towns of the kingdom.

In conclusion then, I would commend some such scheme to the consideration of those who are capable of establishing organised effort with a view to mitigate the ravages of this pestilence.

*A resident physician in the Royal Infirmary recently pointed out a case to me, and said "I believe that patient has contracted phthisis since admission to the ward"

Part 5. Detailed.

i. Consecutive cases 52

ii selected cases 67

PATIENT.

The numbers in red refer to pages of text

number

sex
m. male
f. female

condition
m. married
s. single
w. widowed.

Age in years.

1. History.
p. personal
f. family

uncertain, irrelevant
doubtful. dubious.
good, suspicious
suggestive, bad.

2. Leading symptoms at time of examination

3 Duration of illness
Since earliest symptoms, not necessarily duration of present condition

4. Physical signs of chest + state of other systems

sl. slight. slightly
gen. generally
ch. changes.
Rh. Rhonchi
ap. apex. apical

BrBr. Bronchial Breathing accompd. any added sound
Brs. Breath Sounds
x. expiration
f. feeble h. harsh
p. prolonged

5 Progress

1. History. 'Suspicious' implies a history of disease or death probably due to tubercular processes although not ascertained to be so. E.g. death three months after taking ache. 'Suggestive' implies the mention of some disease known to be tubercular, e.g. hip joint disease.

Between 'uncertain' & 'doubtful' (or 'dubious') I observe an arbitrary distinction. The latter terms suggest that what little is known contains a suspicious element. History is 'bad' when a mother, or two other relatives have died from ♀ or Kindred conditions. The history of course does not include the history of the present illness.

2. Symptoms The typical symptoms always include two of the four cardinal respiratory symptoms (cgh spit, pain, dyspnoea) and two others well marked. E.g. cgh. pain, loss of flesh, suppression of menses.

The symptoms are classified as slight, marked or severe according as they conform most nearly to the average of the symptoms or conditions indicated in the corresponding column opposite. Any notable difference is mentioned.

The table is not intended to represent the progress of symptoms in cases of ♀, but to afford a standard of severity with regard to the symptoms of all respiratory diseases.

[see also p 70]

	Slight	Marked	Severe
app^ce	Appearance pale Glands enlarged	Thin Pallid or flushed Cnl	Emaciated Blueness of lower eyelids clubbed fingers. Cnl.
Cgh.	Cough in morning and occasionally	frequent. Causes vomiting in morning	constant prevents sleep
Spit	not much; yellow in morning	much sometimes bld.	very much often bld
hpt.	Haemoptysis slight occasional		copious hpt.
Pain	sl. occas^l	often with cough	frequent severe
Dyspnoea	on exertion	Constant	Severe
Voice	sometimes hoarse	husky	lost
Appt.	Appetite fair	Capricious	failing
Bowels	constipated perhaps occas^l diarrhoea	sometimes diarrh.	frequent diarrh.
Digestion	fair	impaired	greatly disordered
Menstruation	scant. pale	irregular	absent
Headache	occas^l	sometimes	frequent
Sleep	occas^ly disturbed	often restless	sleeps little
L.T.	Loss of Flesh appreciable	considerable and progressive	great and rapid
N.S.	Night-Sweats often on walking	profuse	excessive
		increased growth of hair of body	
Pulse	rapid soft	rapid irregular	very weak + rapid

Examination of the larynx shows it to be

inflamed when the condition resembles a simple laryngitis	implicated when the condition would rightly be pronounced Tubercular	involved when destructive processes are in evidence

R.I.E. f.m. 30. l. not ascertained

18 2. Cough & pain 3 many months.

4. Rh. post., Crep.n ant., Rt & left

5. Sept.r 8. Dulr., Br.Br., Br.S.h. left upper. ho crep.

5592. f.m. 31. l. p.r.f. gord. 2. Typ. sl. 3. 2 yrs.

4 dulr., rh., x.p., both ap. ant & post.

5. Aug 10. Occas.l crep.n rth. in various parts, at intervals. Cgh less. Wgt. constant.

5595. f.s. 19. l. p. susp. f. suggs. 2. Debility; dyspn.

22 3. Several months 4 sl. ap. dulr. V.S. murmur in "pulmonic" area. Enlarged glands, neck & axilla.

5. Sept. 5. Great improvement in glands while in V.H.

5598. m.m. 59. p. cgh long durn.n f. doubtful. 2 dyspn. 3 ap.

4 pn. nowhere clear. Br.S. f. gen. Extensive Aortic Aneurysm.

Sputum June 2. Brownish viscid mucus with food. few mic bac

T.B. —

5600 f.s. 35 l. p.r.f. susp. 2. Typ. marked. 3. 5 mos.

18 4. Rt. ap. soft. Left ap. excav.

5. June 8. i.s.q.

May 30. 1. Much fluid bluish mucus, with caseous yellow nodules
2. Mostly pus ? E. T. 3. Oil globules. Various crypt.
4 Var. large bacteria T.B. —

June 16. 1. Similar. 2. pus. squa. granular débris. E.T not seen but nodules green
4 Very abundant small dipl. many mic. var. T.B. —

Sept 15. 1. Similar 2. gran. débris few cells. E. T. not seen
4. many mic var, small dipl. caps. & non caps T.B. —

June 2. 1. muco pur. streaky 2. Some ep, some squa.
3. crystals. 4 very numerous mic, sta, str, dipl, bact

June 7. 1. mucopur viscid. 2 some squa, few col. T.B —
4. Spores of fungus. T.B. —

June 6. 1. Little. "prune-juice" 2. mostly squa. also bld. T.B. —
16. 1. Very little. "prune juice", and a little grey mucus
2. much cellular débris, mostly squa. some alv. gran
4. many mic var. T.B. —
18 1. Various fluid with "brick-dust" deposit; alkaline reaction one or two pur. stringy masses. 2. many squa. few alv. bld corps. (Separate) 4. mic. var. T.B. —
30. 1. 2. 3. 4 Similar T.B —
Sept 5. 1. much fl. mucus with denser white masses T.B —
June 2. 1. Much fluid mucus; large yellow pur. nod.
2. E. T. (retic.) 3. large crystalline masses
4 few mic var. 5. T.B. small & slender +

55 95

5606. f. S. 18. 1 p. Rheumatic fever at 5 yrs of age, Rheumatism every winter. 2. pain at heart; dyspn. on exertion 3. several years. 4 pale. p. 72. T. 98°. x. p. & blowing

5611 see below

5614 f. M. 52. 2 Pain in chest. Troublesome cgh & occasl
22 dyspn. 3 3 yrs. 1. p & f. good 4. x. p. occasl. rh. (rt. infraclav). 5. June 30 greatly relieved

5617. f. m. 36. 1. p. good f. bad (mothers side)
18
21 2. typ. marked 3. 3 weeks. 4 Extensive Soft. Rt & Left
22

5619 M. S. 73. 1. p & f. susp. 2. Typ. sl. 3. 4 mos.
4. rh. gen.

5620. f. M. 28. 1. p. good. f. susp. 2. Typ. severe. 3. 9 mos
42 4. Consol. both bases; rt soft. 5. June 27. Cavity
43 (rt base). soft (left gen.). Consol. both ap. Rt soft.
Sept. 1. improved greatly during residence in V. H

5611. M. S. 27. 1. p & f susp. 2. Typ severe 3. 4 mos.
42 4. Left. soft. gen. Consol & sl. crep. left upper lob. involv. 5. Sept. 1. improved while in V. H.

5623 f. M. 25 1. p & f. sugg. 2. Cgh & hoarseness 3. 4 mos.
4. hpt once. T. 99.6 Br. S. h. gen.

June 6. 1. Grey viscid gelatinous mucus 2. many squa. some alv.; part bronchio-tar cast 4 mic var. T.B. —

June 9. 1. Mucopur. hom. frothy. One part streaked with bld. 4- mic. var. T.B. —

June 9. 1. much greenish pus in dense nod. One sl. bld-st. 2. a few col. T.B. +

June 11. 1. Mucopus hom. yellow-gray. 2. much streaky mucus. 4. mic. var. —

Jun 11. 1. muco-pur. discr. (mucus fluid) 2. alv. gran & fatty 4 many bacteria T.B. —

June 27. A.O. T.B ++

June 16. 1. muco-pur discr. 2. degenerated cellular masses 4. dense mass of slender mycel. mic. var T.B. +

June 12 grey mucus. Trace of pus. 2. much débris a few col. a few alv. gran. E.T. not seen. 4 Fungus spores. many var. bacilli T.B. —

5625. M. S. 43. 1. asthmatic breathing nearly every month during eleven years. Has been in an asylum. f. irrel. 2. asthma. 3. 11 yrs. 4. pn. hyp. res. gen. with a.p. + rh. 5. Sept. 16. 1. s. 9.

5627. M. M. 30. 1. p. of. susp. 2. Typ marked 3. 6 mos.
22
42 4. Rt apex. soft. 5. Aug 7. 1. s. 9. T. usually abt 100°
44

5635. f. S. 19. 1. faintings and anaemia four years ago.
47 2. Typ. sl. 3. 12 mos. 4. Br S. h. gen. at. Rt base dulln + crepn 5. Aug 17. feels better: rh. + crepn at different dates in various situations

5638. f. S. 18. 1. p. epileptic f. sugg. 2. Typ sl. + paleness
27 3. more than a year 4. left ap. consol. incip. soft.
42 5. referred to dentist. Aug 14. 1. s. 9.

5639. f. S. 48. 1. f. uncertain 2. weakness, pain in back, hoarseness, cgh. 3. 5 years 4. Paralysis of left vocal cord. Pulsating tumour, left infraclav.

5640. f. M. 37 1. p + f. irrel 2. Cgh. Dysp. 3. one month 4. very stout. ht 5 ft. 3 in. wgt. 12 st. 6 lb. Rh. gen. 5. July 6. 1. s. 9.

June 16. 1. greyish mucus. 2. Some alv gran. Curschm. sp. (two seen) T.B. —

June 16. 1. Mostly thick yellow pus. with diffused streaks of bld a little frothy. 2. Abs. one group. oil glob. 4 fungal myced. Bac cocci. 5. Three found singly near together after long search. +

June 16. 1. muco pus diser. - Mostly clear viscid mucus 2. one col. cil. a few alv gran pig. 4 not many mic. —

June 30. 1. muco pus hom, gelat. 2. much debris; scv. alv. gran. pig. 4 fungal spores 5 One or two small rods ?

Aug 20. viscid gelat. greyish mucus. 2 many ep. gran. many col. cil. 2 Curschm. sp. 4 a few sta &c. —

June 16. 1. muco pus frothy. 2. ? E.T. 4 very abundant mic. bac. 5. Two couples seen after long search +

June 16. 1. muco pus. thick. partly brown. 3 food debt. 4. mic bac. —

June 16. 1. viscid bluish mucus with a few yellow streaks. 2. Some alv gran. 4. Some dipl. + mic bac. —

5642. M.S.12. 1. pos. sl. susp. 2. Cgh. N.S. 3 2 mos
4. rh. gen. 5 July 6. 1.S.9.

5650. M.S.33. 1. p. susp. f. sugg. 2. Typ. sl. 3. 3 yrs
22 4. ulcers of palate. sl. ap. consol.

5651. M.S.27. 1. p. Susp. f good. 2. Typ. marked 3. 5. mos.
4. Sl. Consol. Rt. ap. incip. soft. left ap. 5. Signs on left
more pronounced.

5652. M.S.28. 1. p susp f. good. 2. Typ sl. 3. 2 yrs.
4. Incip. soft. left upper, and less Rt. 5 Sept.r 5
imp.d Signs less marked left; sl. more Rt.

5662. f.S.14 1. p. sl. Susp. f sugg 2. typ severe 3. 3 mos.
42 4. dry cavity Rt. ap. incip soft. left gen.
5. Conditions adv.d (Sept. 30) prog. severe emaciation

5663. f.M.27.1. p. susp. f. sugg. 2. Typ marked. 3. 6 mos.
4. Consol. rt. gen. Excav.n left upper.

5664 f.M.30. 1. p. susp. f dub. 2. Typ. sl. Suppression
44. of menses. 3. 6 mos. 4. Consol. both ap. Crep.n Rt base
5. Aug 21. some impt. Sept.r 28. meno. retd. Crep.n Rt base

June 23. 1. a little viscid greyish mucus (stood overnight)
2. much organic débris 4 Very num. bact. + cocci. —

June 23. 1. Muco-pur. hom. One bld. st. 2. many squa-
bld corps (separate) 4 not many mic. 5 few small +

June 23. 1. muco-pur. hom. frothy 2. Ep gran. also a
degen. organic mass. 4 numerous sta.
5. in small irregular groups. ++

June 23. 1. muco-pur hom. frothy. white specks 2. Ep. gran.
? E. T. 5. T. B. very unevenly distributed; some
very small individ in groups +
Aug 12. A.O. ++

Aug 4 1. a little muco-pur. dull white, streaky
2. mostly pus. much débris. some alv gran. fatty
4 numerous mic var. 5 many short, some end & end
mostly in small groups. some appear within parcells +

June 30. 1. Thick yellow pus. 2. mostly pus. E. T. 5. very
abundant; great variety; many very short. +++

June 30. 1. fluid blenish mucus, with yellow streaky pus.
2. E. T. Bronchiolar cast. 4. one chain str. 5 Two seen +

Aug 8. 1. a little muco-pur sheet, scraps of food. 2. some
alv gran pig 4 many mic Var. 5 —

Sept 5 Muco-pur hom. 2 much débris. few alv gran pig fatty —

5668 f. S. 17. 1. p r f. good. 2. Typ. sl. 3. 8 yrs.
21 4. sl. duln. Rt & left ap. duln. left base 5 July 13 1.5.9.
47

5673. f. S. 20. 1 p. cgh. 3 yrs. f. bad. 2. Typ marked
3. worse ten wks. 4 incip. soft. Rt & left gen. lar. sl. inv.

5676. f. M. 67. 1. p. cancer of left breast removed last year.
23 f. sugg. 2. Typ marked. 3. many years. 4 Emphysema
27 & atheroma. 5. Aug 3. 1. 5. 9. Sept 1. 1. 5. 9.

5678 f. M. 38. 1. p r f. sugg. 2. Typ severe (T° 99°.4) 3. 1 yr.
19 4 Rt & left above. sl. duln. Br. S. f. below. hyp. Br. S. h.
5. Aug 26. feels better; has gained 8 lb. Exp. at various
parts during 2 mo. Sept 16. about the same.

5679 see below.

5680. M. S. 44 1. p. good. f. bad. 2. Typ severe. 3 1 yr.
18
22 4. lar. inv. Consol. Rt & left gen. incip. soft. here & there
42
43 5. July 31. cyanotic: has lost 14 lb. wgt in 4 weeks. Soft. more gen.

5679 M. S. 22. 1. p. susp. f. good 2. Typ marked. 3. 5 mos.
4 sl. consol. left ap. incip. soft. Rt ap.

July 7. 1 a little fluid mucus with yellow green nodules of pus.
2. a few alv. gran. 4. very num. small dipl. + tetrac. Encaps
many various cocci 5. some small pink specks. ?

July 7. Second Exam.n —

Jan. 30. 1. mucopur coherent. 2. many alv. gran + mic. E.J.
4. one group sta. 5. mod short + thick; many specks; many groups
+++

July 2. 1. mostly thick yellow pus. a little fluid mucus: one or two
col. cil. ? E.J. —

Sept.r 1. 1. Mucopur discr. Some bright red streaks. 2 Some débris
? E.J. 3. yellow masses + a few Cocci; a few small dipl
(Some Encaps) —

July 2. 1. a little mucopur, greyish, viscid. 2. much débris
* some alv. fatty. E.J. in four places 5. abundant many
small. Some beaded many large groups. +++

July 30. 1. same. 2. same. 4 Some med. dipl. 5 same +++

July 7. Much mucus with some mod. of pus. pink tinge in one part
2. Sev. alv gran. Some E.J. much gran. débris + Cocci var. +

July 2. 1 Mucopur. hom. gelat. streaked with ? milk
2. many Squa. Some alv. gran. 4 many groups of sta
+ cocci var. —

5686 M.S.20. l.p. susp f. sugg. 2. Typ sl 3. two weeks
4. Consol. left upper. dulm. Brs. f. Rl gen.
5. July 17. no worse.

5687. f. M. 32. l. p. good. f. susp. 2. Typ severe. 3 8 mos
42 4. consol. left ap. Excavn. Rl ap. 5. Returned home.

5689. f. S. 20. l pot. sugg. 2. Pain in chest. 3. 4 yrs.
48 4. Consol. left. ap. post. Brs. harsh. left base.
Pharyngitis. Teeth bad. 5. Sept. 28. is gradually losing
wgt. occas. crep. of fine here and there at different dates

5690 M. S. 16. l. p. sugg. f. uncertain. 2. Typ sl. cgh.
3. every Summer 4. chest rounded. Mesenteric regions
hyp. reo. R. p. oh. gen.

5691. M. M. 34. l. p. sl. susp. f. good. 2. Typ sl. 3. 3 mos.
27
42 4. consol both ap. Rt soft.
43

5692 M. S. 19 l. p. frequent "asthma". f. sugg 2. Typ sl.
48 3. 5 days. 4. sl. dulm. both ap. Brs. f. gen.
5. Aug 19. Rhonchi gen.

July 1. 1. Thin watery fluid with white muddy sediment
2. mostly squa. 4. Teeming with Sta. & bact. —

July 9. mucopur hom. yellowy recon. 2. One or two Col. Several alv. gran. pig. some débris. E. T. thick strands with alv. arrangement. 4 mic. var. 5 many scattered specks; many clusters; some singly, apparently within pus cells. +++

July 7. Bluish fluid mucus. Some parts denser, white & yellow. 2. Many squa. many alv. 3. food or Starch grains 4. groups of Sta. 5. a few small specks. ?

July 7. Bluish fluid mucus, with yellow streaky purulent portions 2. some alv. gran. a few col. cil. 4. Various cocci with squa. cells. —
Second examination. 5. Some specks. Two pairs of small bacilli found after long search. +

July 9. Mucopur, greyish gelat 2. a few alv. glan a few col. cil. ? E. T. 3. oil glob. crypt. 4. fungal spores; & Mic. dipl. & tetrac. 5. Many in large clusters +++

July 9. Mucopur dirty frothy 2. Curschm. Sp. Some alv. gran. 4. Many small inconspicuous dipl. —
Second examination 5. one or two specks. ?

5693. f. m. 30. p. sugg. f good. 2. Typ marked.
48 3. 3 mos. 4. duln & crepn left upper. Sl dulm.
Rt. ap. 5. Sept 2. wgt incr. Crepn varies.

5696. m. m. 35. p & f. susp. 2. Typ severe. 3. 6 wks.
20 4. R. p & h. gen. Rh. here & there. 5. Referred to Dr.

5699. m. m. 41. p. susp. had lost 20 lb wgt. in 6 yrs. f. sugg.
18 2. Typ. sl. 3. 6½ yrs. 4. BrS. h. gen. ap. cous.
22. soft. Rt. upper. 5. Aug 10. advancing. lar. inv.

5702. f. m. 44. p. good. f. bad. 2. Typ. sl. 3. 3 mos.
4. soft. Rt upper and (less) left ap. 5. Sept 7. sl. impr.

5703 m. s. 20. p. good. f. susp. 2. Typ sl. 3. 3 weeks
21
27 4. Early soft. Rt upper & less left upper. tuba. & BrS. f. at bases.
42

July 9. Mucopus hom., & scraps of food. 2. Many alv. glan 4. Sarcinae. many sta. some dipl. tetrac. —

July 16. Mostly pale fluid mucus with denser white and yellow portions. 2. Sev. squa. few alv. muc. 4 mem. dipl. & short rows. one or two appear within pus cells. 5. some scraps appearances. ?

July 28. Pale straw-col^d fluid with white opaq nodules 2. Not many pus cells. Mem. sp. gran. pig. 3. many small oil glob. 5. one scrap. app^ce ?

Aug 6. a little greyish mucopus. hom. fluid, sl. foetid 2. many epi. gran. pig. Sev. col. 4 many mic. var. —

July 16. Thin pale yellow pultaceous fluid, highly foetid. 2. much organic debris. pus cells few. few alv. 4. dense masses of micros. abundant bact. & sm. dipl. —

July 9. Much sanious fluid with yellow & red nodules. 2. bld corps. many squa. Sev. epi. muc. one or two col. many fibrous shreds 3 Some oil. 4 large bact. & many sta. with squa. 5. various forms. +++

July 11. Mucopus discr. 2 Sev. alv. gran pig. much E.T. 4 a few sta. dipl. tetrac. 5 many braided, many slender, some in cells +++

July 14 a little drab fluid with muddy sed^t; sickly faint faecal odour 2. mostly squa. some bld. debris ? E.T. & fungi & bacteria +

5707. m.w.50. p. susp. f good. 2. Typ. sl. 3 6 weeks.
21 4. Crs. h. & x. p. gen. duln. & crepn left mamm. & inf. axill
27
43 5. Died suddenly from hpt. At P.M. no bld was found in alveoli or small bronchi; & no bleeding point discovered

5710. f. m. 33. p & f. susp. 2. Typ. sl. 3. 7 mos. 4. Soft?
21 Rt upper (& less) left upper. old pleurisy at Rt base
42
5 no fluid on puncture (Aug 28)

5713. f. m. 33. p. susp. f bad 2 Typ. marked. 3. six mos
4. sl. ap. ch. rt & left.

5721. m. m. 46. p. under treatment 2 yrs; at first had cavity
21 at rt. ap. & soft? at left. ap. 2. Typ marked 3. worse
43 two months. 4. Soft? Rt gen. & less left. 5 adm. V.H.

5723. m. m. 65. p. sugg. f bad. 2. Typ marked. 3. 6 mos.
42 4 duln. left upper. crepn left inf-axill. duln. Rt ap. & Rt lay
x. p & f. apices.

5729. f. s. 26. p. susp. f. bad. 2. hoarseness 3. five yrs.
21 4. left vocal cord paralysed. Ap. duln. left. & x. p. & jerky
22 5. Aug 3. I.V.R. Rt infraclav. Aug 7. I.S.Q.

July 14. Mucopur. discr. greenish. foetid. 2. E. T. 4. few cocci var.
5. mostly short, some slender. Small groups as though in cells
+++

July 14. Thick viscid greenish pus. frothy. 4. num. str.
dipl. tetrac. 5 often slender. Some specks. many small
groups ++

July 16. Mostly pale blue fluid mucus with denser white streaks
+ masses 2. many alv. gran. pig. much debris. E. T.
4. a few small dipl. + tetrac. ++

Oct. 1894. A.O. —

July 21. Greenish fluid pus: offensive. 2. E. T. 4 sev. mic. var.
✱ 5. not always conspicuous. Some specks. Some slender
[most singly +

Aug 29. much. fl. mucopur. discr. 2. Some small ep. mic.
4. some dipl. + tetrac. Encaps. —

July 21. milky white fl. with small pale yellow mass 2. much
débris (squam) a few alv. a few col. 3. some oil. 4 bact
str. str + oval coccus. 5. a few here + there, most singly +

July 28. mucopur discr. 2 chiefly squa. Some ep gran. + mic.
4 many mic var. [preparation destroyed] O

Aug 6. a little drab col.ᵈ fl. with odour like putty; one or two
viscid pellets of greyish mucus. faintly streaked with bld.
✱ 2. many col. many ep. mic. Many bld. corp (in masses). very
num. squa. 4. abund. mic var. —

5736 M.S. 42. p. of sugg. 2. Typ severe. 3. two yrs.
18
42 4. Cavity Rt ap. Crep.ⁿ Rt gen and left ap.

5737 M.M. 36. p. susp. f uncertain 2. Typ marked
19 3. off & on 7 yrs. 4. duln. & crep.ⁿ Rt upper & less left
5. Aug 21. 1. signs same. Tᵉ often high. has lost 8 lb in 1 mon.

5738. f.S. 18. p. Same complaint 4 yrs ago. f bad
19 2. Severe diarrhoea vomiting & L.7. Resp.ⁿ sympt
42 sl. 3. two Mos. 4. sl. ap. ch.

5739 f.S. 9. p. of susp. 2. Typ marked 3. two mos
4. duln & crep.ⁿ left gen. 5. Aug 5. Crep.ⁿ Rt upper
not hd. on left

5740. M.S. 32 p. sugg. f uncertain 4. duln. & crep.ⁿ Rt
post. gen and upper ant. less on left

5745 M.S. 37 p. good. f sugg. 2. Typ. severe (Tᵉ 98°) -
42 hoarseness 3. two mos. 4. duln. & crep. Rt ap. & left above
43 both bases dull. Cavity left infraclav.

5747. M.S. 23. p. susp. f good. 2. Typ. sl. Left 3. two mos.
22 4. Pos. impt. Bronch. Rt ap. Soft.ⁿ left gen. Cavity
left infraclav. 5. Aug 21. duln & fix left base. Left Rt
Crep.ⁿ as before. Gradually gaining wgt.

July 28. a little fl. mucus with thick. pur. mod. 2. E. T. 3. crystalline bodies 4. a few cocci var. 5 mostly isolated +

July 29. a little mucopur horn. nöcid. 2. many squa. few ep. muc. E. T. several very small shreds 4 some sta. 5. various; singly & in groups +++.

Aug 8. very little mucopur. horn. 2. Sev. ep. muc. E. T. sev. large meshes 4 very num. small dipl. &c. 5 groups of elongated individ. around. in some parts ++

mucopur discs. 2. chiefly pus. Sev. ep. & mic. not
July 30 conspicuous. 5. mostly isolated; some end to end; long slender curved, nodular forms +

July 30. much mucopur discs frothy 2 almost wholly pus present E. T. 4 a few sta 5. num. groups of a few bacilli; some appear to be within abv. ep. cells. ++

Aug 14. Thick yellow green pus. fl. putrid 2. some ep. gran. fat. E. T. one or two extensive meshes 5. a few here & there, singly & in pairs +

Aug 14. Mucopur discs. part flesh-col'd. 2. Few sp. gran E. T. two meshes 4 a few dipl. 5. small. some specks, many slender; in two and threes & one large cluster +

5748. f. W. 42. p. sugg. f. bad. 2. Typ marked. 3. 18 mos.
27 4. soft^g both upper. bases hyp-res. lim^d excava^n left upper

5749. m. m. 29. p. Treated for syphilis 9 mos. ago & for
21 [illegible] two mos. f. uncertain. 2. cgh, many years.
attacks symp^ms 7 mos. 4. duln. both lungs above
sl. crep^n left above, also left base.

5750. m. m. 42. p & f. good. 2 asthmatic attacks 8 yrs.
4. Rh. gen.

5751. m. m. 34. p. sugg. f. good. 2. Typ marked 3 two
mos. (off work 10 mos.) 4. duln. rt & left above. Crep^n left
5. Aug 21 Crep^n also rt above. Bases hyp. res. Sept 18. 1 5 9.

5753. f. m. 29. p. good. f. sugg. 2. Typ severe. 3. three mos.
35 4. Extensive Cavity Rt upper. Soft. left. Sept^r 9 died
42

5754 m. S 30. p & f. good. 2. Typ sl. 3 two yrs. 4 albumin[illegible]
18
21 soft^g Rt upper ant & post. left less. 5. Sept 28. advancing
22

5755 f. s. 27. p. Inflamma^n of lungs 5 years ago. Treated
for Bronchitis & asthma in hospl. f. bad. 2. Typ sl.
3. hoarseness 9 mos. leucorrhoea 4 mos. 4 Rh. gen
sl. laryngitis

Aug 1. Much mucopur discr. 2. E.T.? one shred. 5. in one part. mostly singly, or in two & threes. +

Aug 1. little. drab colr mucopur. hom. 2. chiefly pus many bld corps. 5 most. singly. small. some specks. +

Aug 4. Mucopur. discr. frothy. scraps of food. 2. débris
* Curschm. sp.

Aug 4. not much. mucopur hom. pale yellow green. 2. alm. wholly pus. E.T. 4 few cocci var. 5. most among pus cells: a few everywhere. ++

Aug 4. mucopur-hom. faintly greenish. 2. many squa. E.T in small meshes. 3. large yellow stellate crystal. 4 many cocci
* var (mostly with squa.). 5 various forms. +++

Aug 6. much fl. muc. with green nod. One has sl. bld st.
2. alm. wholly pus. frequent E.T. many col. cil.
4. a few sta. 5. mostly small groups. ++

Aug. 6. a little thin bluish glairy mucus; scraps of food
2. many alv. gran. one or two col.
4. many mic var. —

5756 M.S. 24. p. good. f. uncertain 2. Typ. sl. but
42 N.S. excessive. 3. two wks. 4. ap. duln. rh. vsl. crepⁿ
left gen; rt less. 5. Aug 21. hoarseness. Laryngitis
signs adv.? wgt. same. Septr 18. as before.

5757. M.S. 18. p. good. f. bad in collateral branches.
2. attacks of choking. 3. since childhood. 4. sl. laryngitis
duln. Rt above with Br S. f. + rh. crep at base. Same (sl.) left

5758. M.M. 35. p. susp. f. good. 2. Typ marked. 3. 2½ yrs
4. Cavity Rt. ap. soft.? Rt gen. and (less) left upper
als. duln. Rt base. Left base hyp res. 5. Aug 31. wt same
Signs same. feels worse.

5759. M.M. 66. p. good. f. doubtful 2. Dyspn. 3. five yrs
48 worse 9 mos. 4. much albuminuria. liver enlarged.
great pallor. Tr 96°2. oedema of feet. pulse occas.? misses
a beat. 1st sound of heart redup. Chest hyp-res antly
Rh. gen. duln & crep.ⁿ at bases.

5761. M.M. 55. p. pleurisy 6 yrs ago f. susp. 2. Dyspn
22 3. 18 mos. 4. Consol with rhon. rt. post. gen. occasl
23 crepⁿ Rt ant; similarly but less on left. Rt base, duln
with Br S. f. 5. Aug 14 no rhonchi. Sept 16. I.S.Q.

5762 M.S. 33. p. of. susp. 2. Typ sl. with dyspeptic sympt.
3. two weeks 4. Rt & left upper, Duln. with Br S. f. & jerky

Aug 6. mucopus horn. 2 Many ep. muc. few col. cil. 4 abund muc var. many small. dipl. 5. a few singly: some leads
+

Aug 11. fluid mucus with denser portions 2. very few cells. 3 much oil 4 Several mic var. [film indistinct] —
5. Aug 19. keeping well: no bronchi.

Aug 8. Thick yellow pus, with a little fl. mucus 2. many ep. gran. partly fatty. E. T. several shreds & small inches. 4. some mic var. 5. Great variety. some singly many large grnfs.
+ + +

Aug 6. Mucopus horn. Many small entangled bubbles. 2. many squa. some ep. gran. pig. much streaky mucus 3. very num. cocci var. 5. one or two indistinct specks ?

Aug 8. much fl. muc. with pus. rod. 2. much gran. debris 4. Many mic var. —

Aug 18. much fl. muc. sl. tinge of bld in one part 2. Sev. squa many ep. gran. pig. much debris. Sev. dipl & staphs. —

Aug 8. a little thick fl. mucus with white specks. Scraps of fibrin 3 many squa. some ep muc. (contiguous). Some degen masses 4. some sta —

5763 f. m. 58. p. Sugg. f. good. 2. Typ marked. 3 Sev. wks
4. Duln. w. crepⁿ left ap; less rt ap. also Rt base.
5. Sl. crepⁿ left supraspin. Sept 30. gaining wgt. Crepⁿ ...
Aug 26.
5765. f. m. 47. p. nasal polypi. f. husband. d. from ?
5 2. dyspn. & severe cgh. 3 8 yrs. 4. very pale. Rt. gen
hyp. res. ant. gen. 5. Aug 14. 1. S. 9.
5769. m. S. 14. p. of. Susp. measles 4 yrs ago. pleurisy (left)
5 3 yrs ago. Scarlat. 2 yrs ago. 2 {Cgh 4 yrs after measles and N.S. excessive
4. post nasal adenoid vegⁿˢ Sl. ap. duln. (most rt) with
... p. Aug 17. 1. S. 9.
5772. m. m. 35. p. treated for ? 3 months ago. f. Susp.
21 2. Typ marked, but no. N.S. 3. off work 5 mos. worse 1 m.
22 4. lar. inv. Excavaⁿ Rt apex. Crepⁿ Rt gen. less on left
duln both bases. Rt duln. abs.
5776. f. S. 20. p. of. Susp. 2. Approximately typical
3. two wks. 4. occasˡ ch.

5

5773. see p. 66.
5777. M. S. 19. p. of good. 2. Typ. Severe (Tᵘ 102°4) 6 mos.
18 4. lar. impl. ap. left. Elsewhere hyp. res. 5. after
42
43 One month; cavity Rt ap. Crepⁿ Rt gen & occasˡ left gen.

5780 f. m. 29. p. f. good. 2. pain in back. leucorrhoea
approximately typ. 3. five mo. 4 Sl. ap. ch. more
on Rt. occasˡ crepⁿ Rt.

Aug 8 very little viscid mucopus. hom. 2. Some squa. some sp. gran. some débris. 4 some bact. —

Aug a good deal of clear viscid mucus with yellow streaks. 2. Some squa. —

Aug 18. a little turbid greyish fluid with scraps of food. 2. much débris. Sev. squa. & sp. Many mic. var. —

Aug 14. Thick yellow green coherent pus. 2. E. J. extensive meshes. 4. many mic var. 5. Some beaded many apparently within pus cells. many large groups +++

Aug 18. Thick grey mucus with mucopus masses, brown and yellow green. 2. Many round ep. cells. fatty. 3. Oil glob 4. mycel. & spores. Many mic var. —

Aug 18. much clear mucus fl with pus mod. 2. Sev. ep mic. Sev. squa. E. J. Many small shreds. Some larger leuko. 4. mic. (with squa). 5 most singly, small, a few in threes or fours +

Aug 18. a little clear fluid mucus with specks of dust. ? 2. Many squa. much débris 4. Many mic var. —

5781. f. m. 23. p. susp. f. sugg. 2. Typ. sl. 3. Three weeks
4. duln. & rh. gen. more Rt.

5782. f. m. 50. p. susp. same sympt. (below) two years ago.
at that time crep.^n both bases. f. good. 2 dyspn. &
weakness. 3. three years. 4 occas.^l rh. gen. crep.^n both bases.

5787. f. s. 22. p. pleurisy four yrs ago. f. not known.
2. Cgh & dyspn. 3 six years. 4. rh. gen. 5. Sept. 30 imp.^d

5790. m. s. 28. p. chancre & gonorrhoea, 4 yrs ago. Immoderate
use of alcohol & tobacco. f. uncertain. 2. Typ. sl.
3. more than a year. 4. Soft ? Rt ap. sl. duln left ap.
Br. f. at bases. Ht. (1st Sd. not clear. 5. Aug 26. i. s. q.

5791. m. s. 23. p. sugg. f. susp. Was disch from navy on
18 a/c of "pneumonia & φ" 14 mos. ago. 2. Typ sl. (T.^r 100°)
31 3. 14 mos. 4. Duln. Rt. & left upper. Duln & crep.^n left base
5. Sept. 30. In poorhouse hosp.^l with pleurisy.

5792. m. m. 25. p. susp. f. good 2. Typ. sl. (T.^r 100°.2) 3. two weeks
21 4. Excava.^n Rt. upper. Soft.^d Rt. gen except base.
22 sl. duln. left ap. 5. Sept 28. Sl. imp.

Aug 18. Much clear gelat. mucus with white streaks; frothy. much entangled air. Scraps of food. 2. pus not in excess. Many squa.; much débris; very many col. cil. few Curschm. sp. 4 few. mic. —

Aug 18. much mucopur. discr. frothy. sl. viscid. 2 few bld. cops. 4. many mic. var. —

Aug 25. a little clear viscid mucus. with greyish specks. 2 many squa. sev. ep. gran. sev. col. cil. Curschm. sp. 4 sev. mic. var (near squa.) —

Aug 25. a little clear fluid mucus with denser white specks. 2. very num. ep. gran. + gran. débris. Some col.r 4. many cocci var. —

Aug 25. a little mucopur. discr. pus in nod. 2. almost wholly pus. E. J. one leash 3 a few sta. —!

Aug 25. Mucopur. hom. viscid drab col.r sl. bld. st. 2. Many squa. much débris. a few Ep. mic. E. J. two large meshes ~~4 some bact + cocci. 5. mostly small, slender, inconspicuous many specks. some small clusters as if in puscells + +~~ 4. num. mic. var. +.

5793. f. S. 22. p. susp. f. bad 2. Typ marked. 3. one year
4. lar. sl. impt. Cavity Rt ap. Dulln. left ap. 5 adm. V.H.

5794. f. W. 44. p. good. f. husband d. of φ. 2 Typ marked
21 N.S. excess. 3. 18 mos. 4. Cavity Rt upper. soft left
42 upper. 5 Sept 16. l.S. 9.

5798. m. S. 23. p. susp. f. sugg. 2 Typ marked. 3. 18 mos.
21. 4. Lim^d Excav^n Rt upper. Soft^g left ap. 5. Sept 7.
signs of cavity greater. has gained 6 lb wt. Sept 16. signs
advancing. not so well.

5799. m. S. 18. p. susp. f. good. 2. Typ marked. 3. 12 mos
21. 4 soft^g both ap. most Rt. 5. Aug 31. sl. imp^t

5773. f. S. 15. p & f. susp. 2 Typ. sl disproportionate dyspn.
3 wks. 4. Consol. Rt above and (sl) left ap.

5804. f. m. 46. p. dyspn. & cgh return every Autumn & spring. f. bad.
under treat^t last winter. Notes then made of duln. Br S f
& rh. here & there gen. 2. dyspn. & cgh. 3. 2 wks
4. Rh. gen. duln. Rt & left upper.

5807. m. m. 41. ~~p & f~~ good 2. Typ marked. 3 Nine mos
4. sl. ap. duln. Crep^n at bases 5. Sept 4. has lost 4 lb left
Crep^n also left interscap.

Aug 25. a little mucopur. hom. thin yellow : 2 alm. wholly pus. few ep. muc: sev. ep. gran: E. T in two or three places 4. some bact + cocci. 5. mostly slender small inconspic. many specks, some small clusters as if in puscells. ++

Aug 25. olive green viscid mucopur hom: 2 mostly pus a few red corps. E. T. in four places. 4 some large dipl. + other cocci +

Aug 25. much mucopur discr. much froth. sl. greenish yellow 2 alm. wholly pus. E. T. one large mesh. 4 some cocci var 5. many small. singly + in small groups. as if in pus cells +

Aug 25. green-yellow. mucopur discr. 2. sev. large ep gran some ep muc. E. T. one large mesh. 5. num. in mucous portion; not many among cells: long: beaded: many large groups. +++

Aug 16. a little fl. bluish mucus, with white streaks and ford. 2. many ep. gran. 4. many mic var. —

Dec.r 1895. A.D. —

Aug 27. mucopur hom, cream col'd. a little fluid 2 a few small ep. gran. pig. —

Sept. 1. much mucopur hom. also a little fl. mucus. 2 some squa sev. ep. gran. pig. 4 a few cocci. some bact. —

Sept 1. much yellow drab, thick, mucopur, with a little fluid mucus. 2. mostly pus; sev. bld corps. singly. a few col.r 4 a few sta. 5. large + thick, a few singly + a few twos + threes +

3935. M. M. 57. 1. Has been under treat.t two years
24 otherwise p. of f. good. 2. Cough & Dyspn. some-
31 times spasmodic. 3. Seven years
4. Hyp- reo. Br. S. f. rh. gen.
5. Wgt. has varied between 11 ost 12 st.

4620. m. m. 30. 1. p. attended a year ago. No marked
19 sympt. except T.e 101°; sl. ap. dulm. with Br. S. f.
occas.l crep.n & rhonchus have been noted here and
there during the last year; has had occas.l hpt.
also occas.l diarrhoea. f. good.
2. Morning cgh. 3. two years
4 I. S. 9.

4792. f. s. 17. p.* Susp. f. Sugg. 2. Typ marked; great
18 Emaciation & pallor, 3 one year. 4. Cavity
Rt & left (left more adv.) much albuminuria
* Has been under treatment one year during which
the signs & symptoms have steadily progressed until
death in Sept.r

4794. m +63. 2. Typ marked. 3. Six yrs. 1. prof. Susp.
19 4. Rl. ap. ch. 5. During last two years crep.n & rh.
have been occas.ly present here & there.
Sept. 30. wgt has varied slightly. No accomp.t

Sept. 28. 1. Much clear glairy mucus, with denser white flakes: much froth. 2. Many catarrhal. Many col. cil. some mixed in a convoluted sp.
* Some Charcot's crystals and some "transitional forms" some double clubs. —

Sept 9. 1. a little greyish gelat. mucous.
2. Many ep. gran.-pig. and ep. muc. several also larger, ill defined and granular. Sev. squa.
3. Some hemi-elliptical crystals.
5. T.B. in small groups, most among cells. +

June 1895. A.O. +
May 19. 1. abundant clear fluid with dense nodules
2. Examination of fresh spec. was not made
4. Many cocci. bac.
5. T.B. +++

May 19. 1. mostly pus. yellow. tenacious 2. Some ep muc 4 many sta—
second observation —
July 2. mostly pus, semifluid, nummular — } Fresh spec. not stained
July 14. {mucopus, [illegible], faint [illegible]. a little froth. foetid} 2. Much gran. debris 5. specks. ?
Aug 11. {Much greenish pus: a little fl. mucus some froth. sl. foetid} 4. a few cocci ?

5396. M.M. 40. p. a brassfinisher. tubercular testis
37 the other has been removed. f bad.
44 2. Cough + dyspn. 3. six years.

4. Duln. BrBr. rh. crep.ⁿ both ap. ant & post

5. Aug 24. during four months phys. signs have shown slight variation; and wt has been constant. Lately crep.ⁿ has been coarser (Rt) and pat. has not been so well since going into another house

Sept 28. Rh. & crep. scarcely appreciable here & there

5491 f. S. 17. prf. good. 2. Typ marked 3. Three weeks
43 4. soft! rt gen. less left. 5. May Cavity formnⁿ Rt interscap. June imp? July signs of cavity less marked. July 22 gained 14 lb. wgt in 3 mos.

Aug 26 continues well no crep.ⁿ

Sept 30 still gaining wgt: recent consonating crep.ⁿ (clicking râle) at supʳ ang. of rt. Scap.

Mar. 1. AO. —

Apr. 4. 1. viscid mucopus, grey whitish. a little froth
※ 4. abund. dipl. Encaps. very large 5. only one seen +

Apr. 30. much greenish col'd coherent pus, with
※ cheesy cold nod. 3 a few oil glob. 4 many
large dipl. two pairs in each caps. 5. T.B. only one seen +

June 2. glutinous pus, stained bright red in patches
※ Flat glass can be turned upside down 2. many
※ squa. one group col. 4 largest dipl. 5. T.B.
numerous mostly slender ++

July 30. Much mucopus hom viscid frothy: a large
imprisoned air bubble; one or two sl. streaks of
※ bld. 2 Mostly pus, some alv gran pig, some
shreds of ?E.T. 4. Dipl. as before as
multiple capsules. 5. T.B. mostly slender singly +

Sept. 29. Thick viscid pus. parts bld-std. 2. mostly
pus, many col. cil., some alv gran pig. 4 many
※ large dipl. whose caps. is rather more evident with
fuchsine stain than other counterstained. 5. T.B. —

Apl. 16. pur. one red streak. T.B. mostly short +

June 3. pur. streaky. 2. many alv. some squa.
4 num. mic. var. 5. T.B. —

June 16 Mostly pus. one blood streak; 2. very masses of
bld corp. 4. Some stained dipl 5. T.B. —

July 11. Mucopus hom. 4 a few mic. var.
5. several specks and ? one bacillus ?

5510 M. S. 24 l. p. susp. f. sugg 2. Typ Marked.
44 3. Three mos. 4. ap. consol. 5. Aug 10. Crep." left upper.
Gen condition improved

5543. M. S. 19. l. p. good. f. irrel. 2. Typ. severe, cough.
20 3. one year. 4. sl. consol. + ap. Cavity left manum
5. adm. V. H. June 30. Bronchiectatic cavity, emptied at will.

5819. f. W. 50. p. large hpf. two yrs ago. [redacted]. Husband (a mason)
19. d. age 44, presumably from ph. Son (age 18) d. of "gall-
oping consumption". Has lately been living with a d.
whose husband (also a mason) died in Royal Inf.y from
"Bright's disease". 2. Typ sl. 3. six weeks.
4. no phys. signs. Recorded diagnosis "gastric dyspepsia"
5831 f. + 37. p. susp. f. sugg. 2. pain in left side; frequent
33 cgh. N.S. very great 3. one week 4. Soft! Rt + left above
(most Rt.) 5. Sept 23. Tubular br. with crep." (left base) where
also signs of old pleurisy.

5845 M. W. 32 1 pf good 2. Typ Marked 3. six mos.
34 4 Consol. Rt + left. ap. ant. + upper post. Soft! left ant
and post

Apr 23. mucopur; brownish 2. 3. Exam^n not made
4. abundant sta. & bact. 5. T.B. slender, wavy +
Second examina^n: +

May 8. Thin fl. yellow ~~green~~ pus 2. E.J. not seen
4 few mic 5. T.B. —
second examination —
May 19. Thin fl. pus (sent by post) 2. 3. not examined
4. some bacteria —
second examination. Similar; very few mic. —
June 12. Thin fl. yellow ~~green~~ pus. 2. some alv. ep.
4. some sta. a few str. —

Sept. 3.
a little gelat. mucopur. hom. 2 some sp. gran. pig.
some col. cil. 4. a few dipl. encaps. tetrac and
other cocci +

Sept. 24. mucopur hom. very tenacious 2. few pus cells
* alm. all cat. some col. cil. E.J. several small leashes
* sev. Curschm. sp. 3. var. cryst. 4 slender mycel.
5. individuals mostly small, and in small groups ++

Sept. 19 much fl. muc. with dark yellow-green nod. 2 E.J.!
sev. small shreds; few col. cil. & sev. 'transitional'
4. many var. cocci & bact. Encaps. dipl. med. & small
caps. of latter more evident with carbo-fuchsine stain
than when counterstained. 5. Many small & some thin. ++

PATIENT.

The terms employed in denoting the regions of the lungs are apex, apical. above the clavicle & above the scapula

upper. down to abt second intercostal space in front (ant) and third behind (post)

above to third interesp. ant. and inferior angle of Scap. post

Interscap, between the scapulae. Scap. scapular

below all inferior to above, ant & post.

bases. lower than scapulae

Axill side down to level of nipple

Inf. axill to margin of costal arch.

The terms employed to denote the physical signs vary somewhat from those employed in the Glasgow School; they are in accordance with the nomenclature in Dr Wyllie's Notes

Consol includes the presence of the following signs:- dulness on percussion (p. dulm.) Bronchial Breathing (B.Br.) and increase of vocal resonance (I.V.R.). Crepitation & when associated with signs of consolidation is held to indicate a process of softening (soft.)

Excavation, cavernous, cavity, need not be defined nor also hyper-resonance (hyp. res) tympanitic (tymp) whispered pectoriloquy (wh. p.)

Slight apical changes include a sl. degree of dulm, not appreciable below the clavicle, with an alteration in the characters of the respiratory sound to harsh, prolonged, heavy feeble; and in some cases I.V.R.

When not specified, understand both sides, Right

SPUTUM.

Little more need be added here than an index of certain other abbreviations employed.

wt. wgt.	weight	abn.	almost
V.H.	Victoria Hospital	degen.	degenerated
i.s.q.	in statu quo.	bld.	blood
hpt.	haemoptysis	Corps.	Corpuscles
abt.	about	retic.	reticular
sev.	several	mycel.	mycelium, mycelial.
incip.	incipient	subst.	substance
N.S.	Night-sweats	vac.	vacuolated
L.F.	Loss of flesh: losing flesh	med.	of medium size
imp.g imp.d	improving / improved	gelat.	gelatinous
adv.g adv.d	advancing / advanced		
incr.g decr.g	increasing decreasing		
frix.	friction sound		
app.ce	appearance		
hd.	heard.		

With regard to the Structural Features it is to be observed that no mention is made of the most common cellular elements, pus cells, catarrhal cells & squamous cells, unless one of these is unusually prominent or rare.

Likewise no mention is made of a few micrococci unless these attracted attention from some peculiarity.

In other respects, every observation is recorded.

The term 'bacteria' is applied to rodlike forms. The term 'mic. var.' is used to include bacteria staphylococci, some diplococci and a few streptococci all present in one specimen

SPUTUM. 70.

Scale of Quantity

little
some
a good deal
much
very much

Scale of number

one or two
few (or a few)
some
several sev.
many
numerous num.
abundant. abund.

1. Physical char.

pur. purulent
hom. homogeneous
discr. discrete
fl. fluid
nod. nodules.
st. stained

2. Structural Features

squa. squamous
ep. epithel-ium / -ial
alv. alveolar
gran. granular
pig. pigmented
nuc. nucleated
col. columnar
cil. ciliated
E.T. Elastic Tissue
Cursch. Curschmann
Sp. Spiral
~~[illegible]~~ ~~[illegible]~~.

3. Inorganic Elements

cryst. crystals
glob. globules.

4. Other organisms

mic. microbes
~~var.~~ various
microc. micrococci
dipl. diplococci
Sta. staphylococci
Str. streptococci
Caps. Capsulated
Encaps. Encapsulated
noncaps. non capsulated

5. Tubercle Bacilli