PROFESSOR KOCH'S REMEDY FOR TUBERCULOSIS.

CLINICAL NOTES ON A CASE OF LUPUS TREATED IN BERLIN BY KOCH'S METHOD.

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AND

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THE following is the complete clinical record of the case briefly reported in the *BRITISH MEDICAL JOURNAL* of November 22nd, 1890. It may be considered a typical one both as regards the disease and its progress under the treatment. The case is not advanced as one of cure, but the result obtained far exceeds that produced by any other known method at our disposal both in point of efficacy and rapidity. At the same time it behoves us to urge upon the profession the necessity for extreme caution in the use of this potent remedy, especially as recent experience has demonstrated that the phenomena following its use are inconstant and frequently alarming.

E. N., aged 22, mechanical engineer.

Family History.—Main points of importance: Is seventh of a family of eight. Eldest sister is a complete invalid with caries of bones of foot since the age of 12. One brother has many disfiguring scars on the neck from suppurating glands, at the age of 10.

Personal History.—Main points: After scarlatina, at the age of 5 years, he had middle ear suppuration with discharge, and has been quite deaf on that side ever since. From age of 6 to 13 years, had suppurative disease of bone of both ankles, cicatrices being now present. At age of 12 had severe suppurating glands on right side of neck, which burst spontaneously, leaving a disfiguring scar.

Face: First spot of lupus on the right side of nose appeared in November, 1884, but was preceded by some affection of nasal mucous membrane. Despite repeated cauterisation, disease spread rapidly and destroyed a great portion of right ala of nose. Came under Mr. Morris's observation in February, 1885, who has repeatedly scraped and cauterised it since; the disease has thereby been arrested on the right side, but spread on left.

Palate: The palate was first involved in the summer of 1885, the gums in the beginning of 1889. Both have been frequently scraped and cauterised.

Glands: Masses of caseous glands have been removed from the neck on five occasions since 1885.

Present Condition on November 15th, 1890.—Height, 5 feet 6½ inches; weight, 10 stone. A remarkably intelligent, calm, and reliable patient; well nourished, muscular young man, with dark brown hair and brownish grey irides; teeth and nails good. Face much disfigured by the destruction of a large portion of the nose by lupus, and the operations referred to for it. The neck exhibits five disfiguring scars, the result of spontaneous rupture of abscesses and of operations for the removal of caseous glands. The largest of these is chiefly the result of spontaneous rupture; it is situated on the right side of the neck, parallel to the ramus of the jaw, about an inch below it, and extending behind the angle; it measures 2¾ inches in length. This cicatrix is markedly rugged and hypertrophic, and contains several recent lupus nodules. Another cicatrix, lying transversely across the middle line of the neck, the result of operative procedures in 1887-88, and measuring 1½ inch in length, although not hypertrophic, shows many recent lupus nodules. The remaining scars on the left side, which result from more recent operations in 1890, also probably contain lupus tissue, as they are covered with thick scab. In addition to the scars, there are three enlarged hard lymphatic glands in the anterior triangle of the neck, the largest being nearly the size of a pigeon's egg, and situated beneath the left ramus of the jaw. Several smaller glandular enlargements are present on the right side.

Nose: There is extensive destruction of the right side of

the nose, the right nostril being reduced by cicatricial contraction to an aperture ¼ of an inch in diameter, but the mischief there is apparently quiescent. On the adjacent portion of the nose are numerous comedones. Progressive destruction of tissue is taking place on the left side of the nose, characteristic lupus nodules being present as far outwards as 1½ inch from the middle line, and upwards to within ¾ of an inch of the inner canthus. The most outlying lesion is a typical lupus ulcer the size of a threepenny bit. The upper lip is free from disease, except close to the nostrils, the mucous membrane of which is involved. Over the cheeks, chin, and neck, are numerous comedones and acne pustules, some of which suggest the early manifestation of lupus, but the diagnosis cannot be made with certainty.

Gum: The upper gum, which had been frequently and freely scraped and cauterised, exhibits raised, vascular, spongy granulations, irregular in outline, with intervening bands of cicatricial tissue, and in parts is considerably retracted, exposing the dentine of the teeth, especially of the canines. The mucous membrane of the upper lip is now healthy in appearance, but a year ago complete destruction by cautery of a large lupus mass with central ulceration was performed.

Palate: The whole of the anterior half of the hard palate as far back as the first molar on both sides is uniformly covered with raised, shaggy, vascular, extremely hypertrophic granulations. The posterior half of the hard palate and the middle half of the soft palate are dotted over with irregular fungating nodules, with much intervening scar tissue. There is a large nodule on the base of the uvula, which is oedematous. Immediately above the left anterior pillar of the palate is a deep irregular ulcer, the size of a large pea. The tonsils are slightly injected but not obviously diseased. The pharynx is normal, and laryngoscopic examination merely reveals slight diffuse injection of the larynx, but no tubercle or arytenoid swelling. (Some hoarseness which is at times notable is doubtless due to the fact that he works in a very noisy shop in which it is necessary to shout habitually.) The tongue is clean and free from lupus. The digestive functions are normal. The chest is well formed, and there are no evidences of tubercular disease of the lungs or other internal organs.

He was admitted to the Royal Clinic in Berlin on November 15th under the care of Professor von Bergmann, to whom we take this opportunity of expressing our thanks for his extreme kindness, courtesy, and consideration, both to ourselves and to our patient.

On November 16th, at 8.45 A.M., he received his first inoculation of 0.01g. of the ordinary 1 per cent. solution, in presence of Professor Koch, Professor von Bergmann, and Professor Liebreich. At 3 P.M. he had a severe rigor, when his temperature began to rise. At 5 P.M. he was suffering from *malaise*, depression, headache, somnolence, oppression of breathing, tightness at the chest, and nausea. The tongue was dry, breath very offensive, pulse 136, respiration 28. No further note of pulse and respiration was made throughout the case.

Local Condition.—The nose was swollen, tense, shining, erysipelatous-looking, the epidermis over each lupus point raised from beneath by opaque yellow fluid. The glands in the neck and scars were swollen and very tender, various lupus points about them showing as above. The gums were turgid, and felt swollen, while the teeth felt loose. Granulations on the palate were enormously swollen and extremely vascular. The erythematous blush was accurately confined to the lupus parts, considerable throbbing pain being complained of there but nowhere else.

On November 17th, at 8 A.M., his state was as follows:—Feels well; has slept fairly, especially during the latter part of the night. Has slight headache and some general aching pains, but the aspect of fever has completely gone. Breath is still peculiarly offensive, respiration tranquil; tongue dry, furred in the centre, red at tip and edges.

Locally.—There is slight flush still over the nose, but the swollen, tender, shiny appearance has disappeared, along with all local pain and throbbing. The lupus looks as if it had been severely blistered, the recent points showing out like deeply seated pustules, recalling a herpes at its height. A few scabs are present here and there. The gums are less swollen and puffy than last night; the cicatricial tissue there

TABLE.

No. and Date of Injection.	Quantity of a 1 per cent. Solution.	Maximum Temperature.	How long after Injection.	Secondary Rise.	Length of Pyrexia.	REMARKS.
1. November 16th, 8.45 A.M.	0.01	40.15° C. 104.2° F.	10 hours	To 38.5° C. 38 hours after injection	39 hours	Reaction both local and general; severe rigor, 3 P.M. At acme of reaction, pulse 136, respirations 36. Headache, somnolence, dyspnoea, sweating, thirst, breath offensive. Local reaction in lupus regions, scars and glands, and round comedones on nose.
2. November 18th, 4.30 P.M.	0.01	37.8° C. 100° F.	6½ hours	Trifling	16 hours	Reaction slight and only general (headache). Solution had been kept for three days, but other patients injected reacted strongly.
3. November 19th, 3 P.M.	0.01	38.8° C. 101.8° F.	5 to 7 hours	None till after apyrexia ?	18 hours	Reaction, both local and general, severe, but less so than after first injection. Severe rigor at 8 P.M., lasting forty-five minutes. Vomiting. Reaction trifling.
4. November 21st, 3.30 P.M.	0.01	37.3° C. 99.2° F.	4 hours	?	3 hours	
5. November 23rd, 11.45 A.M.	0.015	38.6° C. 101.5° F.	7 to 9 hours	None	14 hours	Reaction moderately severe locally.
6. November 25th, 12.30 noon	0.02	38.6° C. 101.6° F.	10½ hours	None	15½ hours	Reaction locally markedly less than before.
7. November 26th, 9 A.M.	0.02	38.6° C. 101.4° F.	14 hours	None	15 hours	Local reaction nil.
8. November 27th, 9.30 A.M.	0.025	37.7° C. 99.8° F.	5½ hours	None	17 hours	Local reaction nil.
9. November 28th, 11 A.M.	0.03	37.9° C. 100.2° F.	12 hours	None	16 hours	Local reaction nil. Went out.
10. November 29th, 10.15 A.M.	0.04	37.3° C. 99.2° F.	7 hours	Slight, probably accidental	5 hours	Local reaction nil.
11. November 30th, 11 A.M.	0.05	38° C. 100.4° F.	6 hours	None	9 hours	Local reaction nil. Went out twice.
12. December 1st, 12.30 noon	0.06	37.6° C. 99.6° F.	2½ hours	None	7 hours, ? accidental	Local reaction nil
13. December 2nd, 3.45 P.M.	0.08	36.6° C.	1½ hours	None	—	—
14. December 3rd, 7 P.M.	0.1	37.6° C.	6 hours	None	—	—

is not now distinguishable. The changes in the condition of the palate are the most striking. The general swelling has subsided, and the whole surface is glazed. The anterior half is mainly covered with thick brown scab. In the posterior portion the previously existing lupus nodules are now represented by yellow points beneath the mucous membrane. The glands have subsided and are painless. There are yellow adherent scabs over the lupus nodules about the cicatrices. The scars about the ankles are absolutely unaffected.

November 18th, 10 A.M. Feels quite well, looks bright, appetite returned. Blush over the nose completely subsided, leaving many of the comedones previously noted surrounded by minute beads of yellow purulent fluid. The previously lupus portions are covered with thick, brown, adherent scab, which completely obstructs the right nostril. The glands in the neck have entirely subsided. The hardness of the cicatrices persists, and the scabbing over the lupus patches is more marked than yesterday. The gums show superficial ulceration with cicatricial tissue now visible for the first time since inoculation, but there is no scabbing; at one or two points they are bleeding. There is much brown, hard, adherent scab over the anterior half of the palate. Over the posterior part the mucous membrane has yielded, resulting in the formation of minute shallow ulcerations extending some distance over the uvula, the base of which is covered with thick yellow fluid. The condition of the mouth causes considerable pain, so that only soft pulpy or liquid food can be taken. At 4.30 P.M. he had his second inoculation, 0.01 g. being again used. At 11 P.M., when the temperature attained its maximum of 100° F., he felt considerably out of sorts and had severe headache, but none of the other symptoms experienced after the first injection. The solution used was made three days previously, and there is considerable doubt as to its reliability, although other patients inoculated with it reacted normally.

November 19th, 9 A.M. Does not feel so well as yesterday, looks dull, has some tinnitus, and says he feels 'groggy.' Tongue moist, still coated. The signs of local inflammatory reaction are decidedly less marked than yesterday, no effect having resulted from yesterday's inoculation. Swelling of the nose has almost entirely subsided, and very little redness persists. Scab is beginning to separate at a few points. The little pustules surrounding the comedones on the nose have

dried up to form minute scabs. The lupus tissue on the gum shows out markedly between the smooth cicatricial tissue, the general swelling having subsided. The scab has separated from the anterior half of the palate, leaving comparatively deep ulcers covered with thick, yellow, gummy secretion. The ulcerations over the posterior part of the palate, including the uvula, are cleaning; they are shallower than those over the anterior part. The factor of breath has completely disappeared. At 3 P.M. he received his third inoculation of the same amount of the solution as previously. At 8.45 P.M. he had a rigor which lasted for forty-five minutes, and was worse than after his first inoculation. At 10.15 P.M. he presented a marked febrile appearance, with suffused eyes and apathetic dull look. He complained of severe frontal headache, nausea, cough, and oppression at the chest without expectoration. Locally he complained of throbbing pain and a feeling "as if the teeth were all jammed together and too many for his head." His tongue was dry and brown. At 10.30 he vomited severely, with relief to his headache. The note as to his local reaction runs thus: Some swelling and blush of the nose, but not comparable to that after first inoculation. The abundant scabs prevent the lupus tissue from being observed. The gums are much swollen and tender, bleeding at a few points. The palate is little altered, but rather redder than before. Breath is extremely fetid. Glands on both sides of the neck are considerably swollen and tender.

November 20th. Fall of temperature and return of feeling of good health. Swelling of nose subsided, but a faint blush still remains there. Scabbing is more abundant than ever over the nose and adjacent parts. The teeth are covered with scabs. The gums are not so swollen as last night, the lupus patches in them showing as livid granular areas upon both sides of the frænum, and between the second incisors and canines on both sides. The palate is more densely covered than ever with thick scab in the anterior half, and, in the posterior half, with pultaceous, yellow, sloughy-looking matter, which is firmly adherent to the deeper parts. The glands in the neck are still enlarged, but not tender.

November 21st, 9 A.M. Feels well, but is decidedly losing flesh. He does not take food with relish. Scab is beginning to separate from nose and neck, the subjacent tissue showing no lupus. On the gums and palate, however, lupus is still discernible, but is more limited than formerly. The palate is

healing rapidly. At 3.30 p.m. he was inoculated for the fourth time, the amount used being again 0.01 gramme. Very trifling reaction, both local or general, ensued.

On November 22nd he felt well, his appetite had returned. A good deal of scab had separated, but more was forming.

November 23rd, at 11.30 a.m., was inoculated with 0.015 gramme. He had slight headache and dyspnoea, but the reaction, although brisk, was of short duration. His nose swelled, but the palate and gums did not react. On this date we were compelled to return to England. The progress of the case may be gathered from the accompanying tabular statement of the results of each inoculation. It may be briefly summarised as exhibiting diminution of both general and local reaction to doses progressively increased up to 0.1 gramme, and administered at close intervals until complete immunity was attained. No local reaction whatever resulted from the seventh and subsequent inoculations, the total number given being fourteen within the space of eighteen days. The patient returned to London on December 6th.

The following note of his condition was made on December 8th:—

Neck: The scars on the neck are softer and flatter, and especially the large one parallel to the ramus of the lower jaw on the right side. No lupus nodules are now perceptible in the transverse cicatrix. Thin adherent scale now takes the place of scab in the scars on the left side of the neck, but there is no lupus tissue visible when it is removed. The effect of treatment upon the glands is very manifest, as they cannot now be felt, with the exception of the largest, which is reduced to the size of a pea.

Nose: As the result of inflammation the contraction of the scar bounding the right nostril has resulted in almost total obliteration of the nostril, and from the same cause a large number of comedones have been removed, leaving patulous, sebaceous ducts. Absolute removal of lupus nodules and arrest of the disease have taken place upon the left side of the nose, the scar tissue left being smooth, shiny, and still somewhat pink. When this pinkness is removed by pressure there is no sign of amber-coloured 'apple jelly' tissue. The ulcer on the left cheek has healed with a slightly raised but firm scar, which is entirely free lupus. There has been no reaction round the acne lesions scattered about the face, and there is now no appreciable change in them.

Gum: Although there is still a slight amount of lupus present in small scattered islets, the mass of spongy granulations has disappeared, leaving smooth, healthy-looking gum.

Palate: A very similar result to that in the gum has occurred on the palate. The ulcer had healed, all of the smaller and most of the larger hypertrophic granulations have disappeared, leaving in places pits which are in process of repair. It is at the back of the incisor teeth that most of the remaining disease exists, but even there daily improvement is noted.

January 3rd, 1891. Since the last report the granulations on the palate and gum have been considerably more raised, and show signs of further activity. There is no return of lupus on the nose.

GLASGOW ROYAL INFIRMARY.

REPORT OF CASES UNDER KOCH'S TREATMENT.

[Second report by JOHN LINDSAY STEVEN, M.D., and CHARLES WORKMAN, M.D., Assistant-Physicians to the Hospital.]

In this report additional details are given of the cases recorded last week.

CASE II. *Phthisis*.—This patient, since December 22nd, 1890, has had three injections—namely, December 24th, 0.011 gramme; December 30th, 0.005 gramme; and January 2nd, 0.015 gramme. After the first two of these injections only a trifling reaction was observed, but a very marked reaction followed the third, the temperature rising to 104.4°, and slowly subsiding during the next two days. More blood observed in sputum on evening of 24th, but on 30th it is noted that no bacilli could be found. General state very good.

CASE III. *Phthisis*.—Since December 22nd J. McD. has received three injections—namely, December 26th, 0.01 gramme; December 29th, 0.012 gramme; and on January 2nd, 0.015

gramme. After each injection a decided temperature reaction was observed, but, on the whole, these have been less severe than those previously noted; 0.015 gramme only produced a temperature of 101.8°, with pulse 104, and respiration 32. During reaction complaint of dyspnoea has been prominent. Physical signs much as before; general state good.

CASE IV. *Lupus*.—I. S., since December 22nd, has received four injections—namely, on December 24th, 0.005 gramme; on the 26th, 0.007 gramme; on the 29th, 0.009 gramme; and on January 3rd, 0.01 gramme. The first three of these injections produced practically no temperature reaction, the highest point being 100.4° after the first; after the last of 1 centigramme the temperature rose in twelve hours to 102.4°, to fall in six hours to 99.2°, a trifling reaction indeed compared with those recorded last week as the result of much smaller doses. After each injection distinct, but much slighter, local reaction has been observed. Considerable improvement of the diseased parts, especially within the mouth, falls to be noted.

DISCUSSION AT THE CLINICAL SOCIETY OF MANCHESTER.

At a meeting held December 23rd, 1890, Dr. JUDSON S. BURY opened a discussion on the treatment of tuberculosis by Koch's method, and gave a detailed account of the method from personal observation during a recent visit to Berlin. Dr. Bury strongly advised the use of very small quantities of lymph in commencing treatment.—Dr. GUMPERT remarked upon the extraordinary power of selection of tuberculous material displayed by the lymph, and pointed out the immense benefit which would be obtained by the early use of the remedy in doubtful cases before the disease had progressed too far for treatment to eradicate it. From observation made in Berlin, Dr. Gumpert urged the importance of using small injections to commence with, increasing gradually until the exact quantity required to produce the desired local change had been determined. A dose of 1 milligramme or even less was sufficient at first. With half a milligramme, distinct reaction had been obtained. Dr. Gumpert afterwards showed a case of Mr. Southam's in which he had injected 3 milligrammes each time on December 8th, 12th, and 18th. The patient, a lad aged 16, had over thirty patches of lupus on the face, neck, back, and legs. He had had a tuberculous affection of the left knee in early childhood, which had produced total stiffness of the joint thirteen years ago. The reaction after this comparatively small dose had been very severe; headache, pain in the chest, and very severe pain in the strumous knee; rigor about nine hours after the first injection, but not after the others; high temperature, 104.4°, 104.2°, and 104.6° F. respectively; repeated vomiting fourteen, fifteen, sixteen, and seventeen hours after the first injection, but not after the others. The stiff knee became slightly movable on the evening of December 9th, and could be bent to an angle of about 120° on the following day. It became painful and stiff again some hours after the second and third injections, and more movable after the disappearance of the reaction, and could now be bent without the slightest pain to a right angle. The lupoid patches were all markedly improved.—Dr. HARRIS having spoken, Mr. COLIN CAMPBELL (Saddleworth) regretted that his observations of the results of Koch's treatment did not enable him to agree with the very favourable opinions expressed by Dr. Bury and Dr. Gumpert. They spoke of "cures" as if they were indubitable facts. He had grave doubts about these cures, and a consideration of the theory advanced to explain the working of the new remedy did not diminish these doubts. He had seen a great number of cases in Berlin, and carefully noted a few in each class. The cases of glandular enlargement were certainly not benefited. "Scrofulous joints" appeared to be improved, but as much improvement often took place from rest alone. As regards lupus, he saw only one case in which a cure was claimed, and he thought Dr. Sutcliffe could give them later news about that one case. The other cures he noticed were also observed sixteen days later by Dr. Sutcliffe, who still reported "no improvement." Where, then, were the "cures?" He had several patients anxious to try the treatment, but on the evidence before him, and his own observations, he was unable conscientiously to recommend it, otherwise than as an

experiment.—Dr. SUTCLIFFE (Stalybridge), from personal observation of cases, thought that the time had not yet arrived for formulating any definite rules as to the best method of using the lymph, or as to the results of its action. Probably the best way to treat phthisis would be by small doses injected at intervals of a fortnight spread over a long period of time, and conjoined with all hygienic, tonic, and climatic treatment available. Dr. Sutcliffe showed an asbestos syringe largely used in Berlin in preference to the one used by Dr. Koch.—Dr. BRIERLEY deprecated following a “method,” and using a preparation the composition of which was not known to the profession, and was of opinion that English practitioners would be chary about putting this sensational treatment of tuberculosis into practice. Since the method was purely experimental at present, Dr. Brierley thought the treatment should only be carried out in hospitals where the patients could be constantly under the immediate care of skilled workers.—Dr. SIMPSON, though disliking the secrecy, at present perhaps unavoidable, of Koch's preparation, considered that they would not be justified in passing it by. Its use required great care and caution, and its curative value was not as yet firmly established. In many advanced cases, or where pulmonary tubercle was extensively distributed, it was contraindicated, and it could only be used with the utmost possible caution in any threatening of meningeal tubercle. Then, too, there was some evidence that it might set up activity in some cases where tubercle might have remained. This raised the question, what became of the bacilli? They did not share, it seemed, in the death of the tuberculous tissue. Were they in some cases, by the absorption of this, simply set free with their active properties unimpaired?—The PRESIDENT and others also addressed the meeting.

NOTES FROM BERLIN CLINICS.

By T. STACEY WILSON, M.B., C.M., M.R.C.P.,

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Variations in the Character of the Reaction.—Persistent Pyrexia treated by Larger Doses.—The Local Effects produced in the Lungs.

IN connection with the apparent uncertainty as to the amount of reaction that occurs in certain tuberculous cases, it is very important to recognise the fact that well-marked and even extreme internal reaction may occur where there is very little temperature reaction. This fact was strikingly brought out recently by Professor Leyden, who pointed out that a case of his which showed *post mortem* extraordinarily severe changes as a result of the new treatment had shown almost no signs of reaction, and the temperature had not risen to 101° F. until a dose of 5 centigrammes was given. This patient—a woman with advanced phthisis and amyloid disease—received in twelve days seven injections, and a total of 1 decigramme of the lymph. We see cases of a less severe nature when the tolerance is to all appearance real; and it is not unusual to meet with cases of chronic tuberculous phthisis, even with extensive cavities, where the dose can be raised as rapidly as in the above case, and with good result.

In contrast with these we sometimes see cases where the reaction is abnormally great, and the patient develops an intermittent pyrexia, as in advanced phthisis. Here we may find ourselves in a dilemma through not knowing whether the fever is due to a reaction produced by too large a dose of the remedy, or to the dose being too small to properly protect the system from the morbid substances produced by the disease or set free by the treatment. Sometimes the former seems to be the case, and the temperature subsides if the injections be omitted for a few days; but in other cases the latter seems to be the true explanation, and the temperature continues high at night until an injection sufficient to cause a very considerable reaction is given.

This question as to the amount of the dose is also of extreme importance when dealing with the hectic temperature of advanced phthisis. Are we in these cases to continue with small doses without increasing them until the temperature comes down? or are we boldly to push on to larger doses and high temperature reactions even to the limit which the

patient's strength will allow? From the cases I have had the opportunity of watching, and from what I have been able to hear, I think that the last named is the best for the patient; but upon this as upon very many other points we can only be guided by the results of patiently gathered experience.

Two cases in Professor Leyden's wards illustrated this last-named mode of treatment. In one intermittent pyrexia continued until a good reaction was obtained, and in the other pyrexia increased, if anything, with small doses, and became hectic in type; the patient, moreover, developed considerable pneumonia, with some fresh excavation of one lung. The dose was here increased from 0.0015g. on December 8th, to 0.002g. on December 10th, and 0.005g. on December 12th, and on December 15th 0.008g. was given, and this in spite of the rise during reaction reaching 104°F., while the temperature never fell below 101° or 102°, and on days when no injection was given reached 103° or so at night. After the injection of 5 milligrammes, the morning temperature fell to 100°F., the lowest for five days, and after the injection of 8 milligrammes to 99°F. The most marked change was, however, in the pulse, which fell from 115 or 120 to 85 on December 15th, and 55 on December 18th, with an evening temperature of only 101°F.—the lowest for fifteen days. Next day the pulse was 75, and the temperature was rather higher again. Two days after the injection of 8 milligrammes, the patient was still feeling very low and ill, and dissatisfied with the treatment, but on December 19th was looking and feeling better.

With regard to these advanced cases, the feeling seems to be that the lowered vital powers which usually accompany a hectic temperature renders them more or less unsuitable for treatment. This is especially so with regard to the digestion, for if the patients have not good powers of assimilation, the increased tissue metamorphosis brought about by the remedy will seriously undermine their strength. Further, it is necessary to remember that the remedy itself seems to have some special action on the stomach, for abdominal pains are apt to be caused when there is no reason to suspect abdominal tuberculosis. Too much attention cannot be paid to the diet of patients undergoing the treatment, but especially to that of advanced cases where there is a possibility of gastric or intestinal tuberculosis, for under these circumstances it may happen that both stomach and intestine may be the seat of very extensive ulceration, in consequence, probably, of the sloughing of tuberculous tissue which the remedy has produced. Such a condition has been recently demonstrated in the *post-mortem* examination on one of Professor Leyden's cases which has already been referred to.

As to the nature of the local reaction that takes place in the lungs, there is much still to be learnt, for we have to draw our conclusions almost entirely from evidence of a clinical and not pathological character. In addition to the congestive changes which give rise to the copious watery expectoration so usually seen during the reaction, we can frequently observe the development of actual consolidation, which may be of considerable extent, from the action of the remedy. This may be, however, unaccompanied by any special rise in the temperature, and such was the case in several of the instances that came under my notice at Berlin. I did not hear any expression of opinion as to the prognostic significance of this inflammation, but in most of the cases referred to the physical signs of consolidation cleared up in a week or so, on continuance of the injections. It seems likely that it is of a similar nature to the inflammatory reaction seen in tubercular tissue elsewhere, and is the process by which the morbid tissue is destroyed. It is possible, however, that it may sometimes partake of the character of a true pneumonia.

There is, I think, no reason to doubt that degenerative processes take place in the lungs, and that the tubercular tissue disappears here as elsewhere by a process of exfoliation or absorption. The following points are in favour of this:—

1. The disappearance of consolidation and restoration of resonance and vesicular breathing which is observed in favourable cases.

2. That signs of fresh cavity formation are sometimes to be observed clinically. In one out of two fatal cases where I had an opportunity of seeing the lungs *post mortem* there were evidences of fresh cavity formation, although the changes were not sufficiently unusual in character to be put down with certainty as due to the remedy and not to the usual morbid