T H E S I S.

ADMINISTRATION OF TUBERCULIN.

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ADMINISTRATION OF TUBERCULIN.

Gentlemen,

In submitting to you a thesis on the Administration of Tuberculin, I desire to thank, in particular, Drs. James Mackenzie and Kelynack for placing at my disposal out-patients from their cliniques at Mount Vernon Hospital for Diseases of the Chest, also Dr. Carey Rees, my colleague at Margaret Street Hospital for Prevention of Consumption, for his courtesy in permitting me to attend on his day as well as my own, so that the patients there might be seen twice a week.

OUT-PATIENT.

In the out-patient departments of the various Consumption Hospitals we find the cases grouped somewhat as follows:-

(1) Very early definitely diagnosed or suspected cases which readily find admittance as In-Patients and as readily pass on to Sanatoria.

(2) More advanced cases where in the opinion of the Medical Officer the patient is not likely to regain a position amongst the ranks of the wage-earners and who, in consequence, is treated as an out-patient until he is recommended to the Poor Law Infirmary or to a home for the Dying.

(3) Patients with symptoms referable to the chest but without evidence of tuberculosis.

The result of this is that when a patient with a tubercular lesion is fortunate enough to come whilst in the first category, he is put on a waiting list for admission and is treated symptomatically meanwhile. If he has means enough to secure his not having to return to work immediately on his being discharged, he stands a better chance of preferential treatment. If he can, in addition, contribute something towards his maintenance at Sanatorium he is fortunate indeed.

In this way, from the first, admittedly a large percentage of cases are considered incurable, whilst only a small percentage are treated with the expectation of bringing about a cure.

Even so, when we turn to the Statistics of those Sanatoria where the most rigorous selection is made, we find it is by no means the invariable rule that all cases do well. It is certainly astonishing how very many return to the out-patient department within a few weeks of their discharge.

Below is a table showing the results of 6½ years' experience at Fairlight Sanatorium, Hastings, (Dr. Nigel F. Stallard, M.D.)

The cases have been classified according to prognosis at time of admission.

Class I. Quite early cases.

Class II. Moderately advanced, but with a good chance that arrest of the disease will follow sufficient treatment.

No.	Initials.	Sex.	Age.	First Dose.			Last Dose.		
				Date	Weight	Dose	Date	Weight	Dose
23.	D.A.	f.	26	21/6/11	8·0	P.T.O. ·001	9/3/12	8·0	P.T. ·03
24.	A.H.	f.	25	20/9/11	7·5	P.T.O. ·001	9/3/12	7·9	O.T. 1 cc. (no sputum).
25.	M.R.	f.	36	4/11/11	8·1	P.T.O. ·0005	9/3/12	8·0	P.T.O. ·5
26.	B.W.	f.	30	20/9/11	9·9	P.T.O. ·001	9/3/12	9·9	P.T. ·2
27.	B.G.	f.	34						
28.	E.S.	f.	31	24/6/11	7·13½	P.T.O. ·001	9/3/12	8·3½	P.T. ·6
29.	E.C. (contact see No.1)	f.	15	30/9/11	7·8	P.T.O. ·001	9/3/12	7·11	O.T. ·35
30.	F.S.	m.	12	2/9/11	4·9½	P.T.O. ·001	9/3/12	4.12½	B.E. 1 mgr.
31.	B.G.	f.	35	14/6/11	7·9	P.T.O. ·001	9/3/12	7·9	P.T. ·15
32.	J.A.	f.	28	27/2/12	10·2	1/50,000 B.E.	9/3/12	9.13½	1/25,000
33.	L.S.	f.	17	26/9/11	6·6	T.R. 1/50,000	9/3/12	6·12	B.E. 1/80
34.	F.P.	f.	25	24/10/11	8·12	1/25,000 B.E.	5/3/12	8·8	1/400
35.	G.O.	f.	30	19/12/11	9·4	1/50 B.E.	5/3/12	8·13½	1/80
36.	T.	f.	34	12/12/11	6·11	1/120,000 B.E.	5/3/12	6·6½	1/1600
37.	W.M.	m.	62	25/7/11	11·6	1/70 T R.	5/3/12	10·10	1 1/5 B.E.
38.	C.D.	f.	16	14/11/11	8·3½	1/50,000 B.E.	5/3/12	8·2	1/1600 B.E.
39.	A.M.	f.	15	10/10/11	8·11	1/50,000 T.R.	5/3/12	9·1	1/625 B.E.
40.	G.A.	m.		5/12/11	8·12	1/50,000 B.E.	5/3/12	9·0	1/1250
41.	A.G.	m.	49	28/11/11	11·2	1/10 B.E.	5/3/12	10·8	1/100 B.E.
42.	J.L.	f.	22	7/11/11	8·0	1/50,000 B.E.	5/3/12	7·13	1/250 B.E.
43.	E.T.	f.	26	24/10/11	8·7	1/1250 T.R.	5/3/12	7·9	1/16 B.E.
44.	B.R.	m.	31	11/7/11	9·7	1/100,000 T.R.	5/3/12	9·13	3/5 B.E.
45.	F.I.M.	m.	25	13/6/11	9·6	1/100,000 T.R.	5/3/12	9·4	1/60 B.E.
46.	G.I.M.	m.	38	16/1/12	9·4	1/10 mg.B.E.	5/3/12	9·1	1/3 B.E.
47.	T.J.	m.	34	11/7/11	10·8	1/20 T.R.	5/3/12	10·5	14/10 B.E. (1 2/5 mg.)
48.	J.P.	m.	33	13/6/11	10·10	1/100,000 T.R.	19/3/12	11·4½	1/3 mg.B.E.
49.	R.K.	m.	27						

Class III. More advanced but not hopeless cases.

Class IV. Cases where at best only temporary benefit may be expected.

The following tables give the results, as far as obtainable since the formation of the Sanatorium:-

TABLE I.

CONDITION ON DISCHARGE FROM FAIRLIGHT.

	No.of cases.	Arrested	Much improved.	Improved.	In statu quo.
Class I..	25	10	6	8	1
Class II.	27	7	7	10	3
Class III.	66	-	12	43	11
Class IV.	10	-	-	2	8
	128	17	25	63	23

Note:- Only those discharged in the earlier part of the year are included.

TABLE II.

	Well and Working.	Well, not working.	Fairly well (some at work)	Ill	Dead	No news.
Class I.	17	-	3	2	-	3
Class II.	13	3	1	2	1	7
Class III.	13	1	9	9	8	25
Class IV.	-	-	-	2	4	3
	43	4	13	15	13	40

It will be seen, leaving out of account those who we have been unable to trace, that nearly fifty of our old patients regard themselves as quite well.

It must be the experience of everyone that sanatoria do not settle the problem of consumption. Although most valuable educational work is done at them, as well as the benefit of a temporary or permanent kind the patients derive, still there remains the great mass of patients who cannot obtain admission or who have for some reason been discharged before a lasting cure has been wrought.

A line of treatment therefore that will raise the patients' immunity seems most reasonable to try, particularly if it can be adopted without interference with the patients' mode of life.

GENERAL METHOD.

The first practical difficulty is the system that obtains of hospital letters whereby a patient procures a letter through a subscriber which entitles him to usually six weeks' treatment, and if the course is to be prolonged the letter must be renewed when it runs out. This is an excellent way of obtaining patients and funds pari passu, but it often happens that the continuity of treatment is broken just when the course is in full swing. At Margaret St. Hospital for Prevention of Consumption the plan has been adopted of not requiring the letters of patients who have tuberculosis definitely diagnosed to be renewed. At Mount Vernon the Committee have kindly met us in the same way with regard to the Tuberculin Patients.

The next difficulty is that of frequency of attendance. To obtain the best and certainly the quickest results with Tuberculin, it is necessary to see patients at such frequent intervals as twice a week or even alternate days. It is usual for the staff and clinical assistants to attend one day each week. As this is probably as much time as can be spared for hospital out-patient work in one hospital, it would manifestly be an advantage to continue this method. One group of cases has been treated in this way and while the time taken to immunise the patients is double as long as when seen twice a week, the method is particularly applicable to patients having larger doses, as, for example, those who have had a tuberculin course as In-Patients or at Sanatoria and who are recommended thence for continuance of treatment, who react less or more each time an increased dose is given.

Two-thirds of the patients are seen twice a week, mostly cases which have started from the smallest doses as out-patients, and they undoubtedly progress more satisfactorily than if seen only once a week.

In a very few instances cases have been seen every alternate day for a limited time to get through a critical period in the administration of the Tuberculin.

TEMPERATURE.

To be effective, or even safe, Tuberculin Treatment must, to a large extent, be guided by the variations in the patient's temperature after each dose.

At first it seemed unlikely that the patients could take their own temperatures with sufficient reliability, however, it has been found that unless with the very obtuse or the very young it is quite possible to get sufficiently accurate records. In the first place the local district nurse is asked to go a few times to explain the clinical thermometer and its uses. It is found most convenient to get the patient to jot down on a slip of paper the records of temperature, and the actual charts are usually both entered up and kept at the Hospital.

When a patient understands from practical experience what is meant by a reaction and at the same time feels confidence in the benefit he is receiving, it is wonderful how intelligently he co-operates. One ventures to think that many times the temperatures are more accurately recorded than where in hospital an inexperienced probationer, without enthusiasm for her work, has the matter in hand.

Where patients are living at home or at work one does not wish to interfere more than possible with their mode of life and at the same time it is manifest that a morning and evening temperature very often do not give the extreme limits of variation. When working with Dr. Wm. Russell in Edinburgh Royal Infirmary, the difference between a maximum and minimum chart compiled from a four-hourly record was very striking as compared with the ordinary morning and evening chart. Practically it is found, as was pointed out by Lawrason Brown in Kleb's "Tuberculosis", that the highest temperature is often in the afternoon. The rule adopted, therefore, is to have the tempera-

ture taken, under the tongue, at 8 o'clock in the morning, at 4 o'clock in the afternoon and at 8 o'clock in the evening. Also that if the patient is having what he soon recognises as a reaction, the temperature should be taken then also.

It is very interesting to watch the temperature chart of a patient over a prolonged period. There seems an instability about the temperature of tubercular patients. This is often observed in women during the week preceding menstruation. Dr. W.H. Wynn, M.R.C.P. (in Queen's Medical Magazine, July, 1911) published charts bringing out the point and it has often been confirmed. Besides the general interest of the observation, it is a matter of some importance in understanding the progress of the case.

The range of temperature is of importance also. Each patient seems to have a type which remains more or less constant. The exact value, to be put on the range when the maximum is not above 99, has not so far as can be ascertained been definitely worked out. If it were conceded that the normal line varies with the individual then the swing per se would assume great importance.

One case, A.N. No.15, usually had a temperature 99·5 to 100·5 on Sunday evening and as his injection was given on Wednesday and Saturday it seemed natural to connect the two things. However, as the temperature never occurred on the Thursday, further enquiry was made and it was found that he sang in a church choir, which apparently was responsible for an auto inoculation as in fact will any severe unwonted exercise. (Marcus Paterson Transaction Med.Soc.London Vol.XXXI).

Not infrequently constipation, influenza, bronchial and nasal catarrhs cause the temperature to rise and be irregular for a longer and shorter time. It is a matter of the greatest moment to the treatment to recognise this as otherwise the progress of treatment might be unnecessarily interfered with.

OTHER DRUGS.

In this country and especially when the cases are out-patients, it is impossible to carry out a range of experiments without having regard to the patient's immediate symptoms. At the same time one knows that the relief of symptoms is palliative rather than curative. It has therefore been the general policy not to give drugs other than tuberculin, unless some symptom were specially complained of, then to treat this in addition for perhaps a few days or weeks. This adds so much to the patient's comfort and does not seem contra-indicated at all in the administration of tuberculin. The great majority of the cases have no other treatment than the tuberculin. Amongst the exceptional cases are a group of associated tubercular larynx with pulmonary tuberculosis. This condition is of such a desperate kind and so little amenable to radical treatment that it seemed only right to combine, or rather to add, tuberculin to the routine palliative treatment prescribed by the laryngologist. 6 cases of this kind are amongst those treated and all are showing marked recession of the laryngeal condition.

CHOICE OF CASE.

It is of supreme importance in any treatment to choose the cases most suitable for it.

On the one hand the patient must have a definitely tuberculous lesion, on the other the treatment must not aggravate the lesion.

With regard to age, the youngest case (A.D.No. 67) was 4 years old and the oldest 62 (M.V.No.37). There is no ascertainable age limit that became evident either way. It seemed, however, that small children may be more sensitive and ready to react. For example, G.G. (No.20), age 7, was perhaps the most sensitive case treated. But, of several other children, younger, none offered any special difficulty. The great bulk of cases were in the fourth decade, but this was more a matter of accident than otherwise. If the question of age is considered it must be partly from the inconvenience of giving small children repeated injections. What plays a greater part is the temperament of the patient. A certain nervous temperament, the erethic type, (F.W.No.12) seems to react readily and not to maintain the physical condition.

It, of course, was a *sine qua non* that there were not serious renal cardiac or other complications. Two cases were the subjects of more or less definite depression, but this steadily improved as the doses increased; one developed mental symptoms during treatment.

In order to arrive at a definite diagnosis the first place must be accorded to definite physical

signs in the chest. However, to treat incipient phthisis obviously the disease must have advanced some way before physical signs are definite. While the physical condition is debatable, the presence of tubercle bacilli in the sputum was considered diagnostic, this was present in 2/3 of all the cases treated.

With regard to the other third the history was an element of importance, thus loss of appetite, loss of weight, shortness of breath, cough expectoration, haemoptysis, rapid pulse, without obvious cause, previous chest condition, particularly pleurisy, with fatigue on exertion, were all highly suggestive of the condition. If there were also dullness over any area of the lung, with perhaps restricted expansion and distant breath sounds, it was almost conclusive.

In 15 cases a subcutaneous test with old tuberculin, as will be afterwards described, was given and if a focal reaction was present, no doubt was felt as to the site and nature of the lesion, while if a general, as well as a local, reaction occurred, although it was not possible to localise more accurately the lesion as being in the chest, such a definite response to a tuberculin injection seemed to justify the diagnosis. There were only 4 cases (E.C.No.29, L.S.No.33, S.B. No.97, F.E. No.17) in which the grounds, apart from the Tuberculin Test, were rather uncertain, but in all these cases very remarkable improvement took place in the general health with tuberculin treatment.

It is here important to say that perhaps 20 of the cases were X-rayed by the Radiographer at Mount

Vernon Hospital. The exact interpretation of the plates in every case seemed open to discussion and, although very beautiful pictures are taken with rapid exposure whilst the patient holds his breath at the end of a full inspiration, and while information may be gained about the condition at the root of the lung, it is not usually possible to form a more trustworthy estimate of the state of the lung as a whole than can be formed by clinical examination in the height of the history of the case.

It has been a great disappointment to the Radiographers that in Powell & Hartley (1911) more stress was not laid on the value of their work. For example, several cases were submitted where there had been haemoptysis without any cardiac or renal condition and the strong presumption was that the cause was pulmonary, but no aid in localising the site of haemorrhage was obtained.

PHYSICAL SIGNS.

It is difficult to define what case is too far advanced for tuberculin. Cases running temperatures above 100°F. were thought unsuitable. In these what is termed conveniently a mixed infection is considered to be present and there is nothing to be gained by antagonising one infection alone, particularly as the temperature chart ceases to be a guide to the treatment.

The term, mixed infection, though hitherto not much used in this country, describes a condition worked out by Koch (R. Koch. Die Ætiologie der Tuberculose. M.a.d.K. Gesund, Seit 33, Deutsche Medizinische Wochenschrift), Cornet's Tuberculosis (American Edition 1904), Osler recognises the condition, Griffiths (Studies in Pulmonary Tuberculosis, 1911) says the persistent mixed infections are the cause (1) hectic fever of chronic tuberculosis and (ii) amyloid disease.

Mixed infections are not amenable to treatment by tuberculin: rather their presence contra-indicates its use (Ibid p.57). They are dealt with by means of rest, fresh air, dieting, general measures, etc.

The question of physical signs as an indication for tuberculin is of paramount importance to mention. The toxaemia and tissue destruction of tubercle bacilli may be out of proportion to the physical signs. Thus it is common experience that a child with miliary tuberculosis may be examined by the most skilful clinician and reveal but little on physical examination and a few days afterwards display on the post mortem table disease in every lobe of the lungs.

It is therefore impossible to say that tubercular disease of the lungs is absent if no physical signs are present. Also when the disease is of a chronic type very great lung destruction may have taken place giving rise to extensive physical signs without so much interference with nutrition as in a much less marked case. In these researches the mere presence of extensive physical signs has not deterred one from

giving tuberculin while one recognises the improbability of effecting permanent arrest.

In the appendix will be found notes of two cases where one lung has collapsed and drawn the heart right over to that side (C.D. No. 38 and K.M.No.73) and several in which cavity formation has taken place (par ex. M.22) one in which cavity formation and phthisis laryngea co-exist.

Of the 99 cases treated physical signs were considered definite in 91.

Of the 8 cases where physical signs were indefinite 6 were positive and subcutaneous test, one was found to have sputum containing Tubercle bacilli.

TUBERCLE BACILLUS.

The presence of tubercle bacilli in the sputum is regarded as practically a certain diagnostic. Out of 63 cases examined it was found in 40.

In every case the examination was made by the ordinary Ziehl Neelsen Method. Opportunity did not offer to use the new Antiformin Method of Uhlenhuth which gives usually a higher percentage of positives than the older method.

REVIEW OF THE CONTINENTAL POSITION AS REGARDS SUBCUTANEOUS TUBERCULIN TEST.

TECHNIQUE:

For this purpose Koch's Old Tuberculin is used. It is diluted with .5% Phenol in Normal Saline.

The initial dose now usually given is .0002 c.c. (This is, however, only 1/5 the dose that has been commonly employed for adults in these cases). This is injected conveniently into the upper arm. If no reaction takes place in three days .001 is injected to be again increased .005 and a final dose of .01 c.c. given. In the event of a reaction in any stage, if severe, the result is considered positive. If not severe the dose is repeated when usually a more definite reaction occurs.

REACTION:

This is -

(a) local at site of injection.
(b) focal at seat of disease.
(c) general.

The local reaction consists in swelling at site of injection (usually the upper arm) pain and redness. The extent varies with each case but is always very marked, extending from elbow to insertion of deltoid muscle. There may also be a needle track reaction which is of doubtful value.

In all cases the patient has kept his temperature for a week previously. Taking it thrice daily (8 a.m., 4 p.m., 8 p.m.) The general reaction is

usually well marked, the temperature rising the day after the injection to perhaps 102 for a few hours. If, however, the temperature rises (.5oC.) 9/10°F. above the highest of the previous week, it is considered to satisfy the condition.

With the rise of temperature there is often a severe dry cough, increased pulse rate, vague pain in limbs, feeling of malaise and headache. These usually last but a short time, perhaps 12 hours, and gradually pass off, but are often of sufficient severity to keep the patient in bed, at most 24 or 36 hours. The patient for several days feels better than before he had his test dose and almost invariably puts on a pound or two in weight.

The particular in which the subcutaneous test differs from all the other tests is the presence during the reaction of focal signs and symptoms. This is, of course, of the utmost value in localising a doubtful lesion when it can be observed.

The value of the subcutaneous Tuberculin test was emphasised by R. Koch (Deutsche medizinische Wochenschrift 1890, No.7) "to obtain a reliable result it (tuberculin) must be given subcutaneously".

In spite of the many newer methods this is still admittedly the most reliable.

So many observations have been made that the value positive and negative is pretty well defined.

In Veterinary Practice 2-3% of cattle reacting to tuberculin and slaughtered were found to be without a tubercular focus. Consequently, having regard

to this small margin of error, tuberculin can be looked upon as an almost infallible means of determining the presence of tuberculosis in cattle (Schütz).

Of 324 patients who, between Oct. 1904 and October, 1909, received subcutaneous injections of tuberculin at Tübingen Med. Hosp., in which the apices were thought to be involved -

197 or 60·8 gave focal reactions at apices with general reaction.

24 or 7.4% focal reaction only.
76 or 23·5 general reaction only.
27 or 8.3% neither focal nor general reaction.

The focal reaction is demonstrable with percussion particularly 2-3 days after injection and lasts 4-5 days - v. Romberg and Otten both expressly state, so also do Roepke and Bandelier, that no permanent harm to the lung can result from the focal reaction.

Of 18 people who showed no reaction focal or general to subcutaneous test and received no treatment, enquiries at the end of 2½ years showed that 17 were healthy, while one had developed fistula in ano and tuberculous larynx.

Out of 47 examined later who had given only a general reaction, 44 were healthy. These showed deterioration in lungs and general condition.

Subsequently, of 135 who had given focal reaction, 2 had died, 82 pronounced worse, 51 only permanently arrested and able to work.

From this it is evident that when a focal reaction can be made out after the subcutaneous test the diagnosis of a sufficiently active lesion to warrant treatment is certain; when the reaction is general only, the clinical history and physical examination must be taken into account in coming to a decision as to the nature of the lesion causing it.

It is here important to repeat that those of the widest experience in the use of the subcutaneous test are agreed that when used to establish a diagnosis it is practically always without permanent harmful effect.

Penzoldt, speaking at the Congress of Internal Medicine, 1910, said -

> "With the exercise of the greatest precaution ill effects have been so very very seldom observed in thousands of tests that they may be considered as negligible".

The principal precautions are to avoid its use in febrile cases or when recent haemoptysis has occurred where cardiac or renal disease is present, epilepsy, hysteria, severe neurasthenia, suspected intestinal and miliary tuberculosis (B. & R. p.85 Ed.)

It is generally admitted that the great delicacy of the cutaneous tests render them of very little practical utility; within one's own experience many instances have occurred of doctors and nurses responding in the most positive way to v. Pirquet's reaction when at the time or since no lesion of sufficient activity to cause signs or symptoms has been demonstrated.

The negative value, however, of v. Pirquet where an active lesion is present is of definite prognostic value as indicating so profound an interference with the metabolism that the ordinary reaction does not occur.

It is claimed that with the subcutaneous test there is a prognostic value in the dose required, the height of fever in reaction, and the cessation of the reaction,- a slight lesion reacting to a smaller dose,-but the evidence adduced in support of this contention seems, at present, to be rather slight.

The following figures seem to give a clearer idea of the value to set on the reaction taken alone. Out of 400 recruits in a Bosnian Regiment recruited from a district where tuberculosis was ripe, 61% gave reaction to doses of ·003 c.cm, whereas in a Hungarian Regiment, from a less Tubercular neighbourhood, the percentage was 38%. In each case the recruit showed no clinical manifestation of the disease. In the following years 7·6% of the Bosnian and 3.2% of the Hungarian men developed active signs.

In the cases here referred to the Test Dose was used in 28 cases, all of them doubtful or with physical signs and 26 gave a positive result. In four of these cases where there was not quite enough evidence otherwise and the balance in coming to a diagnosis was turned by the Test at subsequent examination, Tubercle bacilli were found present in the sputum.

In two focal reactions were present when patients were subsequently seen and the doubtful physical signs for the time rendered more definite.

CHOICE OF TUBERCULIN.

ACTION OF TUBERCULIN:

It is due to the epoch-making researches of R. Koch that tuberculin has been introduced into medicine. Since his original work twenty or more years ago many preparations have been introduced of varying merit. Some designed to produce active immunity whilst some produced passive immunity. The tuberculins used in these researches are of the former category, that is to say that they produce a change in the organism by the absorption of the bacteria and their products which leads to the appearance of specific protective bodies (antibodies) in the Serum (B. & R. p. 115).

The first in point of discovery is Koch's Old Tuberculin. This is prepared as follows:- pure cultures Tubercle bacilli 4 to 6 weeks old on 5% glycerine broth, are sterilised by heating in steam, filtered and concentrated to one-tenth its volume, thus obtaining in 50% glycerine medium the soluble bodies secreted by the Tubercle Bacilli.

This old Tuberculin contains, in addition to the soluble secretions, portions of the bodies of the bacteria extracted during the hours heating and steaming by the alkali and glycerine contained in the culture broth (reference p.170 B. & R.)

This tuberculin, when first introduced in the doses then used, produced such violent reactions that, particularly owing to the discredit thrown on it by Virchow, it fell into disrepute and was allowed to lapse in this country.

Of the newer preparations the most used a few years ago was Tuberculin T.R. (Koch's New Tuberculin).

Old tuberculin aimed at a bacterial antitoxic action - but conferred no immunity against the bacteria.

The condition is compared by Bandelier & Roepke to the Tetanus antitoxin which does not kill the bacteria. They may survive the toxic immunity and ultimately kill the patient. With cholera and typhoid it is different where living bacteria are soon destroyed in the body of the immunised animal. Koch wished to attain the double immunity in the early stages of the disease. The experiment on guinea pigs when the bacilli were in large numbers in the blood were hardly comparable to the condition in lung cavities which is a local infection.

As the absorption of active organisms gave rise to the formation of abscesses Koch hit upon the plan of grinding up well-dried cultures in an agate mortar without addition. The powdered mass was stirred up in normal saline and centrifugalised. This separated it into two layers. The upper layer T.O.contained glycerine soluble substances, the lower T.R. the substances left behind after glycerine extraction. In Koch's hands a very high degree of immunity could be produced without causing reactions by gradually increasing doses. The patient becoming quite immune to large doses of Old Tuberculin.

Stock solution of T.R. is 20% glycerine and 1cc.= 2 milligrams of solid residue (That is to say 1 cc..

of the fluid contains the immunising substance of 10 milligrams of dried bacteria) Ruppel.

T.R. Tuberculin has two very great drawbacks. The first is the cost which is 8 or 10 times that of some of the other preparations and secondly that it is so unstable that the solutions are unreliable after a fortnight. My using it for one group of cases was simply due to the fact that it was in use amongst the In-patients at Mount Vernon Hospital.

Bacillary Emulsion. Has both the elements of T.O. and T.R. The preparation has not been centrifugalised after suspension in normal saline, simply allowed to settle and 50% glycerine added. Its employment was the result of agglutination experiments by Koch, Arloing and Courmont in monkeys. The preparation was first recommended to be used in rapidly increasing doses which produced violent reactions. However, it was shown that no advantage was to be gained by the reactions and now (Jochmann) tells us that the best results in the hands of Koch and his assistants have been obtained otherwise.

Koch's agglutination experiments often break down in individual cases and it is not considered that there is an absolute relationship between agglutination and immunity.

Christian and Rosenblat have demonstrated the presence of agglutination and the curative effects of Bacillary Emulsion when studying the antibodies and immunity in guinea pigs. Theydemonstrated the formation of connective tissue as a reparation process.

The stock solution Bacillary Emulsion is of a strength that 1 cc. = 5 milligrams of solid bacterial residue.

The antipyretic power of Bacillary Emulsion which is pointed out repeatedly in the cases in appendix was emphasised by Krause. Bandelier and Roepke, p. 184, speak also to the disappearance of fever without reaction being caused by small increasing doses of B.E., they also cite the recently published careful experiments of John which were confirmed after a year by the re-examination of the cases. He did not invariably obtain permanent results, but always had great immediate benefit as regards general health and as regards fever, even in very advanced cases. His largest dose was a 1/5 of a milligram.

It is unnecessary here to discuss all the tuberlins, but as the investigations have been carried out with a view to independently reviewing the position of Camac Wilkinson, it is essential to mention the theory of Carl Spengler (Bandelier and Roepke p. 195 1911).

Spengler's View of Relation between Human and Bovine Bacilli.

"The toxins of bovine tuberculosis are less toxic to tubercular man, far less than the tuberculins of human tubercle bacilli. As immunizing and curative agents they are far superior. The curative process in tuberculosis under their influence occurs in shorter time, and, because of their less poisonous character, safely and rapidly. My experiments with bovine

toxins in man, and those first of Koch, and then of v. Behring relating to immunizing cattle with human tubercle bacilli, have established that there exists between the toxins of bovine and of human tubercle bacilli and their hosts a reciprocal antagonism of natural origin, in the sense of Jenner's discovery. The two originally identical infecting agents have become in their respective hosts vaccines in respect of each other, and as such are naturally no longer identical in pathological sense. In my conception of bovine and human tubercle bacilli it is a case of the evolution of distinct varieties. The most striking result of the vaccinal qualities of the bovine toxins is that to tubercular man they are far less poisonous than the human tuberculins, although the bovine bacilli show themselves more virulent to cattle. If the bacteria were identical the bovine toxins must also show greater toxicity in man".

How far this is demonstrable, it is not my purpose to argue, but the fact is that many observers find it easier to treat their cases by taking them through gradually increasing doses of the Bovine tuberculins (of Koch), Perlsucht Tuberculin Original and Perlsucht Tuberculin (the latter being 50 stronger than the former) then going through a course of Old Tuberculin. The greater number of these cases have been treated by this sequence and comparing them with the B.E. range I think the sequence is easier to administer without reactions. But when a case has reached a maximal dose - 1 c.c. (1 milligram) of Old Tuberculin, it not infrequently happens that on care-

ful auscultation evidence still remains of some degree of activity of the disease in the lungs. In these cases it seems reasonable to supplement the Old Tuberculin with Bacillary Emulsion until a dose of 5 milligrams is given without reaction.

Besides the Tuberculin mentioned, I have some slight experience of Béranecks Tuberculin, but at present am not concerned with it.

DOSE.

The method of administration was inaugurated by Camac Wilkinson at the Kennington Dispensary, but experience has shown that it can be simplified somewhat as follows:-

In the P.T.O., P.T., and O.T. sequence it is necessary to have besides pure P.T.O., two dilutions, a 1/10 and 1/100 solution, the diluent being .5% Phenol in Normal Saline. Where a large number of cases are being injected it is convenient to prepare perhaps 5 c.c. of each dilution, this can readily be done with a graduated sterilised pipette. The dilutions can either be kept in the small wide mouth indiarubber corked bottles the tuberculin is supplied in by Messrs. Meister Lucius and Brunig, or they can be put in sterilised watch glasses, being kept carefully covered between each case but what remains over being destroyed each day.

Of P.T. it is necessary to have one dilution, a tenth of the strength.

As regards syringe, the simplest and best is a 2 c.c. "Record" with a platinum iridium needle which has fewer disadvantages than any other one knows of. It can be boiled and then boiling sterile water run through between each patient.

The bacillary emulsion is supplied by the laboratories at Mount Vernon Hospital and University College Hospital in test tubes or bottles with india-rubber caps which can be perforated by needle for each dose. This prevents contamination and has the advantage that the emulsion which naturally tends to sediment has to be inverted each time. The solutions are ranged from -

Sol 1 c.c. = $\frac{1}{20,000}$ Milligram B.E.

D 1 c.c. = $\frac{1}{10,000}$ " "

C 1 c.c. = $\frac{1}{1,000}$

B 1 c.c. = $\frac{1}{100}$

A 1 c.c. = $\frac{1}{10}$

AA 1 c.c. = 1 milligram.

AAA 1 c.c. = 5 milligrams.

The doses usually increase by about 50% in either sequence so that the last dose but one is half the dose being administered, commencing then with -

$\frac{1}{100}$ P.T.O.

.001 c.c. P.T.O. 1st. dose.
.0015 c.c. P.T.O. 2nd. dose.
.002 c.c. P.T.O. 3rd. dose.
.003 c.c. P.T.O. 4th. dose.
.004 c.c. P.T.O. 5th. dose.
.006 c.c. P.T.O. 6th. dose.
.008 P.T.O. 7th. dose.

	.01 c.c.
	.015
	.02
$\frac{1}{10}$	.03
P.T.O.	.04
	.06
	.08
pure	.1
P.T.O.	.2
	.3
	.4
	.56
P.T.	being 50 as strong
	.02
	.03
	.04
	.06
	.08
P.T.	.15
	.2
	.3
	.4
	.6
	.8
	1 c.c.
O.T.	.2
	.3
	.4
	.6
	.8
O.T.	1 c.c.

(B.E. 1 milligram
1.5 "
2 "
3 "
5 "
)

Bacillary Emulsion or T.R. (Koch's New Tuberculin) commence with, say -

$\frac{1}{50,000}$ milligram.

$\frac{1}{30,000}$ milligram

$\frac{1}{20,000}$ milligram

$\frac{1}{15,000}$ milligram

$\frac{1}{10,000}$ and so on up to 5 milligrams.

The dosage is thus simple to state but not one single case has gone through without reaction. If the reaction is slight, say up to 99·5, the last dose is repeated. If severe no dose is given and at the end of a week the last dose is repeated. If then the reactions recur in spite of repeated doses, it is usually possible by halving the dose and giving these half-doses at intervals of two days to get the patient over the sensitive period. Once past a sensitive period the dosage generally goes on without departure from the table. It is strange that every patient has a sensitive period of longer or shorter duration.

Sometimes with the higher doses the interval has to be lengthened but it is more satisfactory not to lengthen it beyond once a week. Some of my cases have fortnightly or three-weekly doses but this cannot be recommended if avoidable.

In the appendix will be seen notes of H.G.No.19, who was for a month or more extremely sensitive. He went to Hospital and Sanatorium and on his return has stood tuberculin without any difficulty. Camac Wilkinson shows a case where the sensitive period lasted through two entire months, but the patient emerged all right at the end and then the dosage went forward in the usual progression.

CRITERIA.

A difficulty that meets the worker with tuberculin, who wishes to demonstrate his results, is that the criteria by which progress is marked are of such a nature that they do not lend themselves to graphic methods.

For example, the patient's weight does not advance and watching the weight would lead him to be very disappointed often.

It is obvious that the tuberculin method makes great demands on the patient in seeking to raise his immunity by the injection of bacillary substances. The case is otherwise with the Cod Liver Oil, Gentian and soda treatment which endeavours to stimulate the

digestion and provides easily assimilable fats. Here the weight naturally rises until the limit of digestion is reached.

Pleasing as it is at Sanatoria to watch the weight rising, it is remarkable the number of cases which come for further treatment to the Out-patient Departments soon after returning to their home surroundings when the normal weight is reached through the loss of this adventitious weight and the evidences of disease recur.

The uniform experience is that under tuberculin, strange as it may seem, there is a trifling increase of weight after a test dose, that during the treatment the typical patient loses perhaps 2 or 3 pounds during the first month or two and then gradually gains weight until at the end of the course he is perhaps 5 lbs. or so heavier than when he commenced. After the treatment ceases a further increase in weight is expected to take place.

From this experience it is evident that, unless a serious loss of weight occurs, the patient may be reassured with confidence.

Of the 99 cases cited only two show loss of weight up to one stone. The one is a school teacher (No.12 F.W.) who is continuing her work, is a highly nervous girl, is always in a highly anxious state lest the educational authorities should know the state of her lungs. She is an old-standing case with frequent haemoptysis who has defied other treatment. The other (F.D. No.52) is an actor whose pulmonary condition was considered hopeless several months before

he was recommended tuberculin treatment and who has had intercurrent trouble. There is one other instance of serious loss of weight (E.D.No.9) who was referred to me from Mount Vernon Hospital and his case too was considered a bad prognosis.

For the rest, although the weight has not increased much in any case, the average is maintained.

The remarkable thing is the often rapid or if not gradual loss of dyspnœa so that the patient can move about more and can sleep better and consequently feels emancipated from the limitations of his disease. B.G. No. 31 shows this in a remarkable degree.

Following on this is the power and desire to resume work which is possible in the great majority of cases, for example J.R. No.53, J.E.K.No. 58 or of children to return to school, for example the F.S. No.30.

So far as sputum is concerned it often is at first increased but gradually diminishes, becomes serous instead of purulent and the tubercle bacilli cease to be present if a sample can be procured at all.

The patient's skin also alters in a subtle way so that he looks well and blooming instead of poisoned and anxious.

When we come to physical signs it is quite another matter. These seem to me to change very slowly. Added sounds gradually get less in amount but usually very slowly, unless in the bronchial cases.

In fact, several of the cases who are on quite large doses of Old Tuberculin still have crepitations. The dullness also alters even more slowly and so does the character of the breath sounds as presumably repair is in the nature of a fibrosis.

The time occupied by a course of treatment under the most favourable circumstances is five months and this often with the delays due to reactions lengthens out into 7 or 8 months.

With regard to cures it is not the purpose of this paper to speak. That can be only done after years of watching the after course of cases.

S U M M A R Y.

In this paper it is desired to confirm the feasibility and safety of administering Tuberculin in the Out-patient Departments for our hospitals, to show that the administration is fraught with immense benefit so far as the symptoms of the disease are concerned with much less rapid alteration in the signs, and the advantage to the patient of being guided by a positive subcutaneous test in doubtful cases.

A P P E N D I X

TABLE I, DIAGNOSIS, & TABLE II, TREATMENT.

S U M M A R Y

- of -

99 CASES UNDER TREATMENT.

N O T E S

- of -

81 CASES.

DAVID M. BARCROFT, M.B., CH.B.,
(Edin.)

TABLE I.

DIAGNOSIS.

No.	Initials.	Sex.	Age.	Physical Signs.	Tubercle Bacillus.	Subcutaneous Test Dose.
1	H.C.	f.	10	+	+ (May 17)	+
2	D.S.	f.	9	Doubtful	-	+
3	L.D.	f.	26	Doubtful	-	+
4	L.L.	f.	26	+	-	+
5	N.W.	f.	13	+	+	none
6	G.B.	f.	30	+	+	none
7	C.J.	m.	38	+	+	none
8	M.P.	f.	20	+	not ex^{d}.	+
9	E.M.D.	m.	27	+	+	none
10	A.S.	f.	47	+	-	none
11	M.G.	f.	26	+	-	+
12	F.W.	f.	19	++	+	none
13	J.L.C.	m.	27	+	-	none
14	L.A.B.	m.	23	+	+	none
15	A.N.	m.	19	Doubtful	+ (30.IX.11)	+
16	M.S.	f.	24	+	-	+
17	F.E.	f.	20	-	-	+ (focal)
18	W.E.	m.	13	+	-	+
19	H.G.	m.	39	+	+ (subsequent)	+

No.	Initials.	Sex.	Age.	Physical Signs.	Tubercle Bacillus.	Subcutaneous Test Dose.
49	R.K.	m.	27	+	+	none
50	A.H.E.	m.	32	+	-	+
51	F.F.	f.	31	+	-	none
52	F.D.	m.	45	++	not exd.	none
53	J.R.	m.	40	+	+	none
54	E.T.M.	m.	25	-	-	none
55	B.S.	m.	26	+	+	none
56	W.H.S.	m.	35	+	+	none
57	P.N.	m.	33	+	+	none
58	J.E.K.	m.	45	+	not exd.	none
59	D.H.	f.	23	+	not exd.	+
60	A.H.	m.	32	+	+	none
61	B.B.	f.	31	+	-	none
62	R.G.C.	m.	31	++	not exd.	none
63	F.B.	m.	6½	+	-	+
64	C.H.	m.	19	+	-	+
65	G.K.	m.	24	+	+	none
66	A.H.	f.	30	+	-	
67	A.D.	m.	4½			
68	M.D.	f.	18	+	+	none
69	T.F.	m.	41	+	+	none
70	N.F.	f.	26	+	+	none
71	M.A.H.	f.	42	+	-	+
72	B.K.	f.	29	+	+	none
73	K.M.	f.	30	+	+	none
74	A.Z.	f.	30	+	+	none
75	E.W.S.	m.	35	+	+	none
76	A.S.	f.	30	+	+	none
77	K.W.	f.	41	+	not exd.	none

No.	Initials.	Sex.	Age.	Physical Signs.	Tubercle Bacillus.	Subcutaneous Test Dose.
78	A.W.	m.	49	+	+	none
79	G.H.	m.	46	+	+	none
80	L.B.	f.	22	+	-	none
81	C.A.	m.	37	+	+	none
82	A.W.	f.	23	+	+	none
83	M.P.	f.	24	+	-	none
84	A.H.	f.	43	+	-	none
85	W.N.	m.	17	+	not ex.d	none
86	H.S.	m.	31	+	not ex.d	none
87	F.S.	f.	24	doubtful	-	doubtful
88	L.B.	f.	26	+	not ex.d	+
89	W.M.	m.	19	+	+	none
90	B.H.	m.	15	+	not ex.d	none
91	W.S.	m.	9	+	-	none
92	A.G.P.	m.	37	+	+	none
93	A.B.	f.	40	+	+	none
94	A.W.	m.	18	+	-	+
95	E.A.	f.	25	+	-	none
96	J.D.	f.	29	+	+	+
97	S.B.	m.	10	doubtful	-	+ (pain abd.)
98	C.J.	m.	17	+	-	+
99	W.S.	m.	39	+	+	none

TABLE II.

TREATMENT.

No.	Initials.	Sex.	Age.	First Dose. Date	First Dose. Weight	First Dose. Dose	Last Dose. Date	Last Dose. Weight	Last Dose. Dose
1.	H.C.	f.	10	17/5/11	4·6	P.T.O. ·0005	24/1/12	4·10	O.T. 1 cc.
2.	D.S.	f.	9	14/1/11	3·10	P.T.O. ·0005	6/1/12	3·13	O.T. 1 cc.
3.	L.D.	f.	26	29/7/11	7·7½	P.T.O. ·001	17/2/12	8·2	O.T. 1 cc.
4.	L.L.	f.	26	28/6/11	7·3	P.T.O. ·001	9/12/11	7·5½	O.T. 1 cc.
5.	N.W.	f.	13	17/5/11	6·54	P.T.O. ·0004	31/1/12	6·8½	O.T. 1 cc.
6.	G.B.	f.	30	21/6/11	8·0	P.T.O. ·001	9/3/12	7·13	O.T.+1 cc.
7.	C.J.	m.	38	1/6/11	8·6	P.T.O. ·001	9/3/12	8·9	O.T. ·5
8.	M.P.	f.	20	1/7/11	7·2	P.T.O. ·001	9/3/12	7·3	O.T. ·35
9.	E.M.D.	m.	27	9/1/12	11·2	1/5 B.E.	12/3/12	10·5½	3/10 B.E.
10.	A.S.	f.	47	1/11/11	6·11	P.T.O. ·001	9/3/12	6·9	P.T. ·08
11.	M.G.	f.	26	30/9/11	6.12	P.T.O. ·001	9/3/12	7·1	P.T.O. ·5
12.	F.W.	f.	19	27/1/11	8·2	T.R. 1/100,000	9/3/12	7·1	P.T. ·5
13.	J.L.C.	m.	27	18/11/11	8·10	P.T.O. ·001	9/3/12	8·13½	P.T.O. ·6
14.	L.A.B.	m.	23	27/12/11	7·12½	B.E. 1/100,000	9/3/12	8·4½	B.E. 1/100
15.	A.N.	m.	19	12/7/11	7·6	P.T.O. ·001	9/3/12	7·8	O.T. 1 cc.
16.	M.S.	f.	24	31/1/12	9·12	P.T.O. ·001	9/3/12	9·11	P.T.O. ·004
17.	F.E.	f.	20	8/11/11	9·5	P.T.O. ·001	9/3/12	9·5	P.T.O. ·6
18.	W.E.	m.	13	17/6/11	6·12	P.T.O. ·0005	9/3/12	7·4	O.T. ·4
19.	H.G.	m.	39	27/5/11	10·2½	P.T.O. ·001	9/3/12	10·6	P.T. ·025 (Sanatorium)
20.	G.G.	f.	7	27/12/11	3·12	P.T.O. ·001	9/3/12	3·13	B.E. 1/200,000
21.	F.B.	m.	37	18/10/11	9·3	P.T.O. ·001	9/3/12	9·6	P.T.O. ·03 (very heavy work)
22.	C.M.	m.	45	23/9/11	8·0	P.T.O. ·001	9/3/12	8·0	P.T. ·03 (working. Attendance irreg.)

No.	Initials.	Sex.	Age.	First Dose.			Last Dose.		
				Date	Weight	Dose	Date	Weight	Dose
23.	D.A.	f.	26	21/6/11	8·0	P.T.O. ·001	9/3/12	8·0	P.T. ·03
24.	A.H.	f.	25	20/9/11	7·5	P.T.O. ·001	9/3/12	7·9	O.T. 1 cc. (no sputum).
25.	M.R.	f.	36	4/11/11	8·1	P.T.O. ·0005	9/3/12	8·0	P.T.O. ·5
26.	B.W.	f.	30	20/9/11	9·9	P.T.O. ·001	9/3/12	9·9	P.T. ·2
27.	B.G.	f.	34						
28.	E.S.	f.	31	24/6/11	7·13½	P.T.O. ·001	9/3/12	8·3½	P.T. ·6
29.	E.C. (contact see No.1)	f.	15	30/9/11	7·8	P.T.O. ·001	9/3/12	7·11	O.T. ·35
30.	F.S.	m.	12	2/9/11	4·9½	P.T.O. ·001	9/3/12	4.12½	B.E. 1 mgr.
31.	B.G.	f.	35	14/6/11	7·9	P.T.O. ·001	9/3/12	7·9	P.T. ·15
32.	J.A.	f.	28	27/2/12	10·2	1/50,000 B.E.	9/3/12	9.13½	1/25,000
33.	L.S.	f.	17	26/9/11	6·6	T.R. 1/50,000	9/3/12	6·12	B.E. 1/80
34.	F.P.	f.	25	24/10/11	8·12	1/25,000 B.E.	5/3/12	8·8	1/400
35.	G.O.	f.	30	19/12/11	9·4	1/50 B.E.	5/3/12	8·13½	1/80
36.	T.	f.	34	12/12/11	6·11	1/120,000 B.E.	5/3/12	6·6½	1/1600
37.	W.M.	m.	62	25/7/11	11·6	1/70 T R.	5/3/12	10·10	1 1/5 B.E.
38.	C.D.	f.	16	14/11/11	8·3½	1/50,000 B.E.	5/3/12	8·2	1/1600 B.E.
39.	A.M.	f.	15	10/10/11	8·11	1/50,000 T.R.	5/3/12	9·1	1/625 B.E.
40.	G.A.	m.		5/12/11	8·12	1/50,000 B.E.	5/3/12	9·0	1/1250
41.	A.G.	m.	49	28/11/11	11·2	1/10 B.E.	5/3/12	10·8	1/100 B.E.
42.	J.L.	f.	22	7/11/11	8·0	1/50,000 B.E.	5/3/12	7·13	1/250 B.E.
43.	E.T.	f.	26	24/10/11	8·7	1/1250 T.R.	5/3/12	7·9	1/16 B.E.
44.	B.R.	m.	31	11/7/11	9·7	1/100,000 T.R.	5/3/12	9·13	3/5 B.E.
45.	F.I.M.	m.	25	13/6/11	9·6	1/100,000 T.R.	5/3/12	9·4	1/60 B.E.
46.	G.I.M.	m.	38	16/1/12	9·4	1/10 mg.B.E.	5/3/12	9·1	1/3 B.E.
47.	T.J.	m.	34	11/7/11	10·8	1/20 T.R.	5/3/12	10·5	14/10 B.E. (12/5 mg.)
48.	J.P.	m.	33	13/6/11	10·10	1/100,000 T.R.	19/3/12	11·4½	1/3 mg.B.E.
49.	R.K.	m.	27						

No.	Initials	Sex	Age	First Dose.			Last Dose.		
				Date	Weight	Dose	Date	Weight	Dose
50.	A.H.E.	m.	32	2/2/12	9·5½	P.T.O. ·001	11/3/12	9·6	B.E. 4 m.D.
51.	F.F.	f.	31	15/12/11	8·11	P.T.O. ·001	11/3/12	8·9	P.T.O. ·15
52.	F.D.	m.	45	15/12/11	9·7	P.T.O. ·001	11/3/12	8·3	P.T.O. ·1 m.
53.	J.R.	m.	40	11/12/11	10·7	P.T.O. ·001	11/3/12	11·31	P.T. ·15
54.	E.T.M.	m.	25	27/11/11	8·11	P.T.O. ·001	11/3/12	8·10½	P.T. ·02
55.	B.S.	m.	26	29/1/12	9·8	P.T.O. ·001	11/3/12	9·2	P.T.O. ·02
56.	W.H.S.	m.	35	24/1/12	10·12½	B.E. 2 m.D.	11/3/12	10.9	B.E. 12 m.C.
57.	P.N.	m.	33	6/11/11	10·2	P.T.O. ·001	11/3/12	9·9	P.T.O. ·1
58.	J.E.K.	m.	45	11/12/11	10·12	P.T.O. ·001	11/3/12	10·2	P.T.O. ·15
59.	D.H.	f.	23	6/11/11	6·12	P.T.O. ·001	11/3/12	6·11	P.T.O. ·1
60.	A.H.	m.	32	31/7/11	10·4	B.E. ·2 cc.D.	11/3/12	10·4	B.E. "A.A."4m.
61.	B.B.	f.	31	8/1/12	8·6½	P.T.O. ·001	11/3/12	8·9	P.T.O. ·007
62.	R.G.C.	m.	31	6/2/12	9·1	P.T.O. ·001	11/3/12	9·1½	P.T.O. ·02
63.	F.B.	m.	6½	5/1/12	2·13	P.T.O. ·001	11/3/12	3·2	P.T.O. ·0125
64.	C.H.	m.	19	6/2/12	9·6	P.T.O. ·001	11/3/12	9·7	P.T. ·015
65.	G.K.	m.	24	27/11/11	10·9	P.T.O. ·001	11/3/12	10·3	P.T. ·01
66.	A.H.	f.	30	11/12/11	8·10	P.T.O. ·001	29/2/12	8·6	B.E.10 m.D.
67.	A.D.	m.	4½						
68.	M.D.	f.	18	15/8/11	6·3	Berauch	11/3/12	5·11½	
69.	T.F.	m.	41	6/10/11	11·6	B.E.^{1}/10 D.	8/3/12	10·11	B.E. 2 m.A.
70.	N.F.	f.	26	25/9/11	6·8	B.E.^{2}/10 C.	8/3/12	6·5	B.E. 9 m.A.
71.	M.A.H.	f.	42	11/12/11	8·0	P.T.O. ·001	11/3/12	7·5	P.T. 0·4
72.	B.K.	f.	29	2/2/12	7·11	P.T.O. ·001	11/3/12	7·6	P.T.O. ·008
73.	K.M.	f.	30	24/11/11	7·7	P.T.O. ·0005	11/3/12	7·5	P.T. ·3
74.	A.Z.	f.	30	20/10/11	6·12	P.T.O. ·001	8/3/12	6·11½	P.T. ·09
75.	E.W.S.	m.	35	23/10/11	8·5½	B.E. ^{2}/10 D.	29/2/12	8·8	B.E. 12 m.B.
76.	A.S.	f.	30	5/1/12	8·9	B.E. 18 m.D.	8/3/12	8·7	B.E.4 m.A.
77.	K.W.	f.	41	17/11/11	9·7	P.T.O. ·001	11/3/12	9·10	P.T. ·03
78.	A.W.	m.	49	16/10/11	9·14	P.T.O. ·001	11/3/12	10·3	P.T. ·08

No.	Initials.	Sex	Age	First Dose.			Last Dose.		
				Date	Weight	Dose	Date	Weight	Dose
79.	G.H.	m.	46	1/12/11	11·0	P.T.O. ·001	11/3/12	10·13	P.T. ·15
80.	L.B.	f.	22	4/12/11	8.2	B.E. 1 m.D.	8/3/12	8.2	B.E. 2 m.A.
81.	C.A.	m.	37	12/1/12	9.3	P.T.O. ·001	11/3/12	8.12	P.T.O. ·04
82.	A.W.	f.	23	6/2/12	7.6.	P.T.O. ·001	8/3/12	7.9	P.T.O. ·004
83.	M.P.	f.	24	12/2/12	11.6	P.T.O. ·001	26/2/12	11.4	P.T.O. ·002
84.	A.H.	f.	43	5/1/12	7.6½	P.T.O. ·001	26/2/12	7.4	P.T.O. ·004
85.	W.N.	m.	17	23/2/12	8.5	P.T.O. ·001	8/3/12	8.4½	P.T.O. ·005
86.	H.S.	m.	31	26/1/12	10.3	B.E. 1 m.D.	29/2/12	10.1½	B.E. 10 m.D.
87.	F.S.	f.	24	4/3/12	8.0				
88.	L.B.	f.	26	26/1/12	9.2	P.T.O. ·001	11/3/12	9.4	P.T.O. ·007
89.	W.M.	m.	19	22/1/12	11.1	P.T.O. ·001	11/3/12	10.11	P.T.O. ·02
90.	B.H.	m.	15	19/1/12	8.2	P.T.O. ·001	8/3/12	7.11	P.T.O. ·03
91.	W.S.	m.	9	20/1/12	3.9½	P.T.O. ·001	5/3/12	3.12	P.T.O. :015
92.	A.G.P.	m.	37	20/2/12	10.4	1/50.000 B.E.	5/3/12	10.6	1/16.000 B.E.
93.	A.B.	f.	40	6/2/12	7.11	1/100	5/3/12	7.12½	1/25 B.E.
94.	A.W.	m.	18	27/2/12	8.6	1/40.000			
95.	E.A.	f.	25	30/1/12	9.4	1/250 B.E.	5/3/12	8.13	1/125 B.E.
96.	J.D.	f.	29	27/2/12	6.12	1/100.000 B.E.			
97.	S.B.	m.	10	27/1/12	4.5	P.T.O. .0005	9/3/12	4.5	P.T.O. ·003
98.	C.J.	m.	17	26/8/11	8.3	P.T.O. ·001	9/3/12	8.3½	P.T.O. ·07
99.	W.S.	m.	39	27/2/12	9.13	1/250 B.E.	5/3/12	9.12	1/200 B.E. (Transferred from Mt.Vernon.)

G R O U P I.

H.C. No.1.

Aged 10. First came under observation on April 5th. 1911. Her grandfather had died of phthisis. Complained of cough, loss of flesh, shortness of breath. She had a fair appetite, digestion good, but some of her teeth were decayed. There was an impaired percussion note, with bronchial breathing at the left apex. Her sputum, when first examined, did not contain tubercle bacilli, but on examination, subsequently, on May 17th., tubercle bacilli were present. On May 10th., she had a test dose of .0005 Old Tuberculin, and her temperature ran up to 100, but there was no local reaction. A dose of Old Tuberculin .00075 was given, on May 13th., temperature to 100, no local reaction, no alteration in the physical signs, however, the sputum being positive warranted the commencement of tuberculin treatment. On May 20th., after the second dose a few sticky râles were heard at the apex, which persisted for a few days. The general condition soon commenced to improve as the doses of tuberculin were increased in the usual way. On January 24th., 1 cc. of Old Tuberculin was given without marked reaction, the physical signs present as at the commencement of treatment, but no sputum had been available for examination for some months. The Patient's weight had increased from 4 st. 5 lbs. to 4 st. 10 lbs.

D.S. No. 2.

Aged 9. Seen first on 10th. May, 1911. She complained of cough, which had lasted for 3 weeks, with expectoration, without haemoptysis, with shortness of breath, sweating at night, poor appetite, bowels regular. Her brother was a patient in Mt. Vernon Hospital, with phthisis. When examined, dulness was, to a slight degree, present at the right apex. The patient was given a test dose, on May 31st., of .001 O.T. without reaction. On June 7th., .0015 was given. A definite reaction to 101·2 resulted. Treatment was commenced with P.T.O. .0005, and was continued. On September 4th., the patient returned to school, after an interval of 4 months. The final dose of Old Tuberculin, 1 cc. was given on January 6th., and on March 6th. the patient was last seen. She said that she had no cough, or expectoration, or night sweats, and digestion and appetite were good. Her weight had increased from 3 st. 9½ lbs. to 4 st. 1 lb.

L.D. No.3.

Aged 26. First seen May 20th., 1911. Complained of cough for 7 weeks, with shortness of breath, pain in the chest, sweating at night, loss of flesh. She had, however, appetite fair, tongue clean, digestion poor, bowels regular. On examination, dulness was found on the left side, with harsh inspiration and no accompaniments. The patient was given a test dose of Old Tuberculin, .001, on June 7th., without reaction. The dose was

doubled on June 10th., and a good deal of local reaction, a temperature of 99.8 and headache resulted. On June 24th., .003 was given, which produced a local reaction, crepitations being heard at the right apex, posteriorly, after coughing, and the pain in the left shoulder was more severe. On July 9th., treatment was commenced with P.T.O. .001, and was steadily maintained until the 3rd. February, when the final dose of 1 cc. of Old Tuberculin was given, without reaction. No definite physical signs were present, no pain in the chest, 8 lbs. increase in weight, trouble with flatulence and some shortness of breath.

L.L. No.4.

Aged 26. First seen on May 27th., 1911. Complained of pain in the left side and weakness for four or five weeks, shortness of breath, palpitations, sweating at night, appetite poor, pain after food, bowels constipated. Father and mother died of chest trouble. There was bronchial breathing, with a few crepitations at the right apex. A test dose of .001 cc. of Old Tuberculin was given on June 7th., no reaction, then .002 on June 10th., and this dose was repeated on the 14th. On the 15th. patient had pains all over, shivering, felt sick, headache, severe local reaction, the redness in upper arm extending from the middle down halfway to the elbow, but without temperature. On June 21st. Old Tuberculin, .003 was administered. A severe local reaction resulted, the temperature running up to 102. On June 28th., treatment with P.T.O..001 commenced and continued with occasional slight re-

actions, until the final dose of 1 cc. of Old Tuberculin was given on January 6th., 1912. No physical signs were then present. The patient said that she was feeling quite well, had no cough or pain, shortness of breath only when she was hurrying very much, but to a much less degree than previously. No palpitations or night sweats. Had gained 8 lbs. in weight. Appetite good, digestion better, bowels open. In this case, during September, or about halfway through the course, crepitations were present at the right apex, for a few weeks.

N.W. No. 5.

Aged 13. Seen first on May 3rd. 1911. History of having had several attacks of pleurisy with pain and cough four or five years, shortness of breath, pain in the left side, sweating at night, appetite good, bowels regular. This patient had dulness at both apices, more marked at the left side, bronchial breathing, crepitations at the right apex. On May 10th., she had a test dose of .001 Old Tuberculin, with a marked local reaction, but the presence of tubercle bacilli in her sputum previously obtained rendered it unnecessary to give a second dose. On May 13th., commenced treatment with .0004 P.T.O., and by June 24th., reported by her mother that she was much brighter and had less feeling of fatigue than before the treament had commenced. The treatment was proceeded with steadily, until January 31st., when 1 cc. of Old Tuberculin was given. The patient had no shortness of breath, pain, palpitations or night sweats. She had, however, developed a dry pleurisy

on the left side, which persisted for a few days. Her weight had increased from 6 st. 3 lbs. to 6 st. 10 lbs., during treatment.

G.B. No.6.

Aged 30. First seen May 10th., 1911. Complained of spitting of blood, cough during two or three years, expectoration, haemoptysis, about one teacupful, a month previously, and also five days previously, pain in the chest, palpitations, sweating at nights, loss of weight, appetite good, tongue clean, digestion good, bowels constipated. Her father had died of phthisis. Her present illness had commenced with pleurisy, 6 months before. There was dulness on the upper lobe on the left side, down to the third rib. There were present bronchial breath sounds, but no crepitations with corresponding conditions at back. Tubercle bacilli were present in her sputum. She commenced treatment on June 21st. with P.T.O. .001 cc. At first she had severe reactions, but as the doses increased, she became less sensitive, and on the 7th. February had 1 cc. Old Tuberculin, without reaction. Dulness was still present on the left side, breath sounds seemed slightly harsher. The expansion was good; there were no crepitations. Her sputum which had contained tubercle bacilli, when examined on September 20th., was found to be negative on December 30th. Her weight was 1 lb. less at the end of treatment than at the commencement.

C.J. No.7.

Aged 28. Seen first on the 30th. May, 1911. Complained of cough, shortness of breath for 3 months, with expectoration, pain between the shoulders, night sweats, loss of one stone in 3 months, appetite good, tongue clean, digestion normal, bowels regular. His father and a brother and sister are phthisical. On examination, dulness was found at both apices, with bronchial breathing at the right and crepitations. Tubercle bacilli present in his sputum. Commenced tuberculin treatment on June 14th. 1911. The patient's temperature, which at first frequently reached 99.2 in the evening, has gradually settled down. He had occasional reactions. Sputum was examined on September 14th., and December 2nd. and February 21st., and at no time were tubercle bacilli found again. His last dose was Old Tuberculin, .5 cc. after which he had a reaction of 100.2. He has attended irregularly, which accounts for the treatment being so slow.

M.P. No.8.

Aged 20. Complaint of cough of four weeks' duration, with expectoration, shortness of breath, pain, palpitations, sweating at nights, loss of weight, appetite poor, tongue clean, digestion good, bowels constipated. Brother suffers from phthisis. Temperature, when first seen, 100. Physical signs were indefinite. A test dose of Old Tuberculin, on June 14th., gave a slight reaction. On June 21st. .0015 was given, with a similar result. On June 24th.

.0025, with an extensive and severe reaction, temperature going to 102.2. Treatment was commenced on July 1st., with P.T. .001, and was steadily proceeded with. On examination, on September 27th., the same indefinite signs were found. Dulness at the right apex, with prolonged expiration. At no time was tubercle bacillus found in her sputum. She ceased to attend when she had had a dose of Old Tuberculin .5 cc., she had moved away from London. Her symptoms had all disappeared, and she was able to do her full work.

E.D. No.9.

Aged 27. First seen on 10th. May, 1911. Complaining of cough, with expectoration, and shortness of breath for 8 months. No haemoptysis, sweating day and night, furred tongue. Dulness on the left side down to the second interspace in front, on the right side to the first interspace, posteriorly, on the left side down to the fifth vertebra, and on the right side down to the angle of the scapula, bronchial breathing over the dull area, down to the angle of the scapula on the left side. Vocal resonance and vocal fremitus, both increased; moist crepitations, sputum contained tubercle bacilli. Patient was admitted to Hampstead, and came again to the out-patient department on the 9th. January, with a report that he had extensive disease, but had done well during his 3 months' stay at Hampstead, and had gained 15 lbs. He had been treated with tuberculin, and had arrived at an injection of 1/5 m. Bacillary Emulsion, without much reaction; the prognosis was, however, considered

bad. The patient, on examination, was found to have considerably more involvement of both lungs than was noted in May. His tuberculin treatment has been continued. On the evening of February 27th., a rise of temperature was noticed, which was not associated with his treatment, and he said he had been digging in his garden. His dose is 3 m. of bacillary emulsion, but his condition is such that it seems possible that he may be unable to continue to attend.

A.S. No.10.

Aged 46. Came to hospital in December, 1910, complained of cough, which had lasted for a week, and short breath, and complained of pain in her chest and loss of weight, and her appetite was poor. There was dulness at the left apex with crepitations. She was treated throughout the winter and discharged in April. She returned in October, 1911. She had dulness down to the fourth rib on the right side in front and down to the angle of the scapula behind, and dulness above and below the clavicle of the left side, with bronchial breathing. There was also pleuro pericardial friction and a presystolic thrill when lying down. Her weight at the commencement of the treatment was 6 st. 11 lbs., and on the 1st. November she was given an injection of P.T.O. .001. On November 22nd. she reported that her cough was better than it had been for years, and that she was sleeping better, and that she was having no night sweats. On December 9th. that pleuro-pericardial friction had disappeared; it was noticed again to be present on

13th. Jan., 1912. Her weight now is 6 st. 8½ lbs. She has been throughout sensitive, and it has been difficult to increase the dose of tuberculin for this reason.

M.G. No.11.

Aged 25. Came to the hospital in March, 1910, complaining of pain in chest, which had lasted six years, cough and expectoration with haemoptysis, about one tea-spoonful every two months for two years, also shortness of breath, variable appetite, rather constipated and repeated colds. At that time she was found to have flattening in front, on the right side with dulness down to the third rib, some crepitations on the left side, and posteriorly there were crepitations on the right side and the expansion was poor at both sides. No tubercle bacilli at that time found in sputum. Treatment was mainly directed to the relief of breathlessness and of constipation. On September 23rd., 1911, her weight was 6 st.12 lbs. She was found to have slight dulness on the right side down to the fifth rib, with prolonged expiration, and a few crepitations, with similar conditions posteriorly. As a result of the test dose of .001 Old Tuberculin there was extensive local reaction at the site of injection. This, together with the physical signs, was considered sufficient to warrant the commencement of the tuberculin treatment. On September 30th. she had her first treatment injection of .001 P.T.O. She has been rather sensitive to tuberculin; during the week previous to her test dose, her temperature did not go above the normal line. As the result

of the test dose, her temperature on the next day was 100, and the day after 99.4 to fall to normal on the third day. After each injection there has been a variable rise of temperature, sometimes not more than one degree, once as high as 101.8 and again 101; on another occasion 100.6. In spite of the slow progress that has been necessary in her case, on March 9th.,her dose had reached .5 cc. P.T.O. and her breathlessness was much better and cough less. Her weight on March 1st. was 7 st. 1 lb.

F.W. No.12.

Aged 26. First came under observation in 1905, with a complaint of haemoptysis, the amount not recorded. At that time her weight was 8 st. 6 lbs. During the intervening years she has been recommended to various sanatoria, she has frequently had slight haemoptyses. In June 1911, she had not been at the hospital for 1½ years. Her physical signs showed dulness down to the fifth rib on the left side, with crepitations and bronchial breathing. She was following her occupation of school-mistress, which she was particularly anxious not to relinquish. Her treatment was commenced with 100.000th. m. of T.R., which was steadily increased until the end of August, when she was receiving 1/1000 m. of T.R. Her weight at the commencement of treatment was 8 st. 2 lbs.; at the end of August it was 7 st. 12½ lbs. It then suited her better to attend on other days, and she was consequently grouped with cases having P.T.O. and the course commenced on September 9th. with .001 cc. Her chest gave very much the same physical signs as before. Tubercle bacilli have been repeatedly found

in her sputum. She has had three haemoptyses of about one to three tea-spoonfuls each. On March 9th. her weight is 7 st. 1 lb; she is feeling able to do her work, but rather troubled at the loss of weight. Her physical signs are still present in her lungs as above.

Note:- This case is exceptional in so far as there is a marked diminution of weight under tuberculin treatment, but there are not any more evidences of toxaemia than when the patient first began her tuberculin course.

J.L.C. No. 13.

Aged 27. He complained of cough during one year, without expectoration, but with night sweats. He had had treatment at Victoria Park Hospital previously. His physical condition showed dulness on the left side down to the third rib, and on the right side above and below the clavicle. At the back dulness extended to the angle of the scapula on the left side. On that side of front and behind there were occasional crepitations, with bronchial breathing and rhonchi over the left side. His weight was 8 st. 10 lbs. at the commencement of treatment. On the 18th. November, he had an initial dose of .001 P.T.O. Tubercle bacilli have not been found in his sputum, and he has had no reactions to tuberculin. His temperature is of the swinging type, averaging 97.6 in the morning, 99 in the afternoon, and 98.6 in the evening.

L.B. No. 14.

Aged 23. He came under observation on December 13th. 1911, complaining of shortness of breath for one year, and cough troubling at night, with expectoration and had night sweats, poor appetite, with flabby, coated tongue, bowels regular, aspect rather pale. His physical condition showed dulness on the left side, down to the third rib in front, and down to the fifth dorsal vertebra behind. There was over this area bronchial breathing, and all over the left side there were rhonchi and occasional crepitations. The tubercle bacillus was present in his sputum. His temperature before treatment was usually 97 in the morning, and in the afternoon and evening varied between 99 and 100. It was thought in these circumstances, that the temperature being so high in the evening contraindicated the use of P.T.O. so the patient was put on to bacillary emulsion (B.E.) After the first injection his temperature failed to reach the normal line, and throughout the first seven weeks of treatment remained on or below normal, but when the dose had reached 1/300 of a milligramme, there was considerable local reaction, and in the following fortnight the temperature swung up as it had done before the treatment commenced. It has now steadied down to normal again. The present dose is 1/100 m. of bacillary emulsion (B.E.) Weight at present 8 st. 4½ lbs.

Note:- This case is interesting as illustrating the fact that a minute dose of bacillary emulsion has a marked beneficial effect on cases where there is a certain amount of pyrexia present. It also demonstrates that in almost every case at some time or other there

is a sensitive period, during which it is difficult to increase the dose, but with patience and a little ingenuity this period can always be passed, then the doses can be increased in the ordinary way. It will be noticed that, in spite of the reactions during the last few weeks, the weight of the patient has been maintained, and is about 6 lbs. more than at the commencement of the treatment.

A.N. No. 15.

Aged 20. First came to the hospital on the 27th. May, 1911, complaining of cough and cold, which had lasted some months, with expectoration, and had coughed up a little blood, but not recently, short of breath, had pain on the left side and at the back, his appetite fairly good, bowels regular. The physical signs were not marked. A slight dulness was noted, above and below the clavicles, with cog-wheel breathing, and without any accompaniments. His sputum at this time was examined three times, and tubercle bacilli were not found. He was, however, given a test dose of .001 Old Tuberculin on the 12th. July, without result, followed on the 15th. July by .0025, which resulted in slight soreness and swelling at the site of injection, with a temperature of 99.4. This dose was repeated and his temperature went up to 101° and there was no definite focal reaction. The history, together with the rather indefinite signs and the positive result of the test dose, was considered sufficient to warrant his being put on tuberculin treatment, and on July 22nd. he had his first dose

of P.T.O. .001. On July 29th. he had a reaction after his third dose, and in the ensuing weeks was quite sensitive to tuberculin, so that progress was very slow. On September 9th, he reported a slight haemoptysis. On September 27th. tubercle bacilli were reported in his sputum. He had now got over the sensitive period, and his doses could be steadily increased. The only complaint he made was that of being rather sleepless. In November his temperature was noticed to swing up to about 100-101 on Sunday evenings. As he received his dose on Saturday, this seemed like a reaction, but as it never occurred on Thursday afternoon, after his dose on Wednesday, enquiry was made, and it was found that he took his temperature after church on Sunday evening, where he sang in the choir, and, presumably the exertion of singing in the choir liberated the toxins sufficiently to cause an auto inoculation, with resultant rise of temperature. Occasionally the same phenomenon was noticed on Friday night, after choir practice. On December 2nd., a small area of pleurisy was present at the angle of the scapula, on the right side. His sputum was again examined on December 20th. and on February 3rd. and 28th. and found no longer to contain tubercle bacilli. On March 9th. he had a final dose of 1 cc. of Old Tuberculin, without reaction. He is now quite free from breathlessness and sleeping better, and, altogether, apparently quite well.

M.S. No.16.

Aged 24. She complained of feeling always tired, and of easily catching cold, during the last

three or four months, short of breath on exertion. Her digestion was good, and her bowels regular. She had a sister with phthisis. Slight dulness down to the second rib, on the right side, and above and below the clavicle on the left side, with a few crepitations. She was put on treatment on the 31st. January, 1912, and has been very sensitive. On March 5th., she was examined with an X-ray screen, and the right apex was found to be much dimmer than the left. Her dose has only now reached .004 P.T.O.

F.E. No.17.

Aged 20. Came under observation, November 1st. 1911. Her complaint was cough, headache and vague pains in her limbs, which had lasted for three months. She had palpitations, variable appetite, rather furred tongue, and her bowels irregular, her menstruation irregular. She had previously had ineffectual treatment for headache at the National Hospital, Queen's Square, and she had a bad family history, as regards phthisis. Her sputum did not contain tubercle bacilli, and her headache did not disappear when her digestion was treated. She had a test dose on November 8th., without any marked reaction, but on November 11th., she had .003 of Old Tuberculin, with a reaction the next day, temperature up to 102.4 gradually coming down to normal two days later. She was seen on November 15th., and was found to have a few crepitations at both apices and a few small glands were palpable near the anterior and posterior triangle at either side. On November 18th., she

was put on a treatment dose of P.T.O. .001, and was rather sensitive at first, but since December 27th. her doses have been pretty steadily increased without reaction. Her headaches have much diminished in frequency and intensity.

Note:- In the presence of the family history, the failure of treatment at other hospitals, it seemed possible that the headaches might be due to a toxaemia from a tubercular focus; with this in view the test dose was given, without quite definite positive result, and although her headaches have not disappeared altogether, the marked improvement in her condition seems to justify the tuberculin treatment, in her case.

W.E. No.18.

Aged 14. His complaint is cough, which he has had as long as he remembers, slight amount of expectoration, occasional loss of voice, rather short of breath, appetite fairly good. The brother of the last case, with a bad family history. One brother with a spinal curvature, and another brother with phthisis. He had had whooping-cough, measles and pneumonia. On physical examination crepitations were found after coughing at both apices. His sputum was negative. He was given a test dose on 17th. June, 1911. He had swelling at the site of injection, but no rise of temperature. This was repeated on the 21st. June. The following day his temperature rose to 100.4, and there was an extensive local reaction. The temperature fell to normal two days later, and on

June 28th., he received his first treatment dose of .0005 cc. P.T.O. The treatment was broken by his absenting himself from the dispensary during August and half September, and was recommenced at the beginning. Throughout the course there have been occasionally a few crepitations at the right apex after coughing, and a slight amount of friction on the left side. The treatment has been steadily proceeded with, and the patient is now having a 4 cc. dose of Old Tuberculin. At no time has tubercle bacillus been found in his sputum, in fact, there has been very little sputum to examine. On the 7th. February,he said that he coughed up a few drops of very black blood. His weight has increased 6 lbs. during treatment, and he seems much stronger and better than when it was commenced.

H.G. No.19.

Aged 38. Came under observation first on the 17th. May, 1911. His complaint was cough at night of six weeks' duration, with expectoration, without haemoptysis, short of breath on exertion, sweating at night, slight loss of weight, appetite good, rather constipated, bright complexion, clear skin. His physical signs were that on the right side there was dulness down to the second rib, with bronchial breathing and crepitations, on the left side there was dulness above and below the clavical, with sibilant rhonchi. His sputum did not contain tubercle bacilli. He was given a test dose of .001 O.T. on the 27th. May, which was repeated on the 31st. May. There was slight local reaction, but it was not deemed suffi-

cient to call it positive. .002 O.T. was given on June 3rd. which was repeated on June 7th. and then again on June 14th. Although there was slight pain and infiltration at the site of injection, there was no marked change in the physical signs, and no marked rise in temperature. The patient, however, told us that tubercle bacilli had been found in his sputum, so that the case was deemed sufficiently definite to commence treatment. On June 14th. he had an initial dose of .001 P.T.O. and on June 17th., after his second dose, there was quite a definite reaction, the temperature on the following day reaching 102.6 and throughout July the patient's temperature took on the rather hectic type, swinging from normal in the morning to about 101 in the evening, towards the end of the month swinging up as high as 103.6, although he had had no dose of tuberculin since the 5th. of July. His teeth were in bad condition, there was no marked change in the physical signs in his lung. He was sent to Fairlight Sanatorium in the beginning of August, where he stayed for some ten weeks, and then was an in-patient of Mount Vernon Hospital, returning to the out-patient department on the 24th. October. He had a few injections of bacillary emulsion at Mount Vernon Hospital; on the 1st. November he was commenced on P.T.O. .001, and has been able to have steadily progressive doses, without undue reactions. His physical signs when he returned from the sanatorium were distinctly more active on the right side than they were when he came under observation first. His general condition has, however, been steadily improving, At Christmas-time he

was able to be a temporary letter-sorter, and is now able for light work. His present dose is P.T. .925.

G.G. No.20.

Aged 7. Daughter of the above, complains of cough, especially in winter, and slightly short of breath, poor appetite. She had had whooping-cough and measles, and her father was anxious for her to be examined. A few crepitations were discovered on the right side below the clavicle. She was on December 27th. given a test dose of Old Tuberculin of .0025, to which she reacted. On January 3rd. she was given a treatment dose of .001 P.T.O. Although she had five doses the reactions were always so violent that it was not possible to increase the dose. On February 10th. she was given a 1/250.000 milligram of bacillary emulsion, and has reacted, though less violently, to this. After 4 doses she is still having one two hundred thousandth.

Note:- This case is of interest, showing the sensitiveness that is often found in small children, and it is doubtful whether she will not become hypersensitive before the doses can be increased, in which case the treatment will have to be suspended for a time. Of the small number of children of this age one has had the opportunity of observing, some take tuberculin quite as well as adults, while some, particularly sensitive, are more so than any adults one has come across.

F.B. No. 21.

Aged 37. He came under observation in October 1911. His occupation is that of cellar-man in a brewery. His complaint was cough during nine months, with expectoration, without haemoptysis, short of breath on exertion; he suffers from palpitation occasionally, sweats at night, is losing flesh, his tongue is furred, has pain after food occasionally, his bowels regular, his voice clear. He had been a patient at Fairlight Sanatorium, in April, May and June, 1911. His physical condition showed dullness down to the third rib in front, with bronchial breathing and moist crepitations, with a corresponding dullness at the back; towards the apex of the left lung there was cavernous respiration, whispered pectoriloquy, suggesting a cavity. He was put on treatment on October 18th. Weight 9 st. 3 lbs. Said he had lost 5 lbs. since leaving Fairlight. Considering the heavy work that he does, it is reasonable for him to have reactions, and for it only to be possible to progress slowly with his dose. Tubercle bacilli were present in his sputum on February 10th. His weight now is 9 st. 5 lbs.

Note:- Considering the physical signs, it is rather remarkable that he should be able to work a 12 hours' day, moving beer barrels about all the time.

C.M. No. 22.

Aged 45. This patient has been under observation for three years, during which time his condition has

steadily got worse. At first there was complaint of tightness in the chest and cough, with expectoration first thing in the morning, purulent in character, haemoptysis of one teacupful the week previously, sweating at night, slight emaciation, appetite good. Physical signs showed dulness with crepitations at the right apex. Weight at this time was 9 st. 1 lb. On June 19th. last he was examined and found to have impaired percussion note over the right upper lobe, with bronchial breathing, and some friction at the apex of the lower lobe. In September, 1911, the physical condition was dulness down to the fifth rib, with bronchial breathing on the right side, at an area at the level of the third rib there was cavernous breathing, whispered pectoriloquy, at the back on the right side there was dulness down to the sixth dorsal vertebra, with coarse crepitations all over. Then on the left side there was dulness down to the fourth rib, with bronchial breathing and crepitations, at the back there was dulness down below the angle of the scapula, crepitations, coarse and fine all over the back, with an area at the spine of the scapula with whispered pectoriloquy. A diagnosis was made of the extensive involvement of both sides, with cavity formation. The patient was out of work. He was put on tuberculous treatment on September 23rd. and on October 4th. had resumed his work. In spite of this it had been possible to increase his doses pretty steadily until the middle of February, when his attendance became irregular. During the last few weeks he has not been at work.

Note:- This is one of the most advanced cases that has been treated, and one in which other treatment has conspicuously failed to arrest the progress of the disease, and although at the time of making up this report, he is passing through a sensitive stage, still it seems remarkable for his condition to have so far improved that he has been able to work regularly during the last two or two and a half months, and one cannot help thinking that the sensitive stage was rather brought on by his feeling so much better, that he gave up attending regularly. At the commencement of tuberculin treatment his weight was 8 st. 1 lb., his present weight is 8 st.

D.A. No. 23.

Aged 26. Complains of cough, which she has had for several winters, without expectoration, without haemoptysis, without marked shortness of breath, or pain. Her temperature was 100, when she came under observation. The pyhsical signs were, in front, cog-wheel breathing on both sides, and at the right apex down to the spine of the scapula there was dulness with crepitations on coughing and bronchial breathing. Her sputum was negative. On June 7th. she had a test dose of .001, without marked reaction. On June 14th. a test dose of .002 Old Tuberculin produced a very marked reaction, temperature rising to 102.4. She was put on treatment on the 21st. June 1911, and was found to be rather sensitive, so that progress was slow. On the 29th. June, she had reached a dose of .003 P.T.O. She then went away to the country for

two months, and when she came back on October 11th., no added sound could be heard, the breath sounds were of the cog-wheel character, on both sides, and the expiration was markedly prolonged at the right apex. She resumed treatment with P.T.O., commencing with .005. At first progress was slow, but she did not prove anything like so sensitive as before, and her treatment had steadily progressed. She feels very much better and stronger, and her cough has disappeared.

A.H. No. 24.

Aged 24. She complained of a cough with expectoration, had once seen a streak of blood, two months before. She was easily tired by exertion, complained of pain in the right side, lost a good deal of weight, appetite poor, tongue was furred, digestion said to be good, bowels regular. Her father was phthisical. Her physical signs showed dulness down to the fourth rib on the right side, with crepitations, and to the spine of the scapula at the back, bronchial breathing front and back, also friction at the lower margin of the dulness in front. Her sputum contained tubercle bacilli. She was put on treatment. Initial dose .001 P.T.O. on 20th. September. The pleurisy rapidly disappeared and the general condition improved. On November 27th. tubercle bacilli were still present in her sputum, but her cough disappeared, and it was not possible to get another specimen until January 20th. when tubercle bacilli were absent. Throughout the treatment she was conspicuously free from reactions, until the 10th.

February, when she had a reaction after a dose of 6 cc. Old Tuberculin. As the treatment has progressed, she has voluntarily said that she has been able to take more exertion, and is able to walk five miles, without fatigue, and feels very well, better than for years. She has had a full dose of 1 cc. Old Tuberculin and before discharging her she is to have a few doses of bacillary emulsion, to give her extra immunity, commencing with 1 milligram.

M.R. No. 25.

Aged 36. Her complaint is of spitting blood at times during two years. She has a cough, which she has had almost all her life, she has slight shortness of breath, she is losing weight, fair appetite, clean tongue, troubled occasionally with flatulence, aspect is rather pale. She has occasionally swelling of the feet and ankles at night to a slight degree. Her father and sister are both phthisical. She has dulness on the left side down to the third rib in front, and at the back a corresponding area, and also in the region of the angle of the scapula. She has bronchial breathing with a few crepitations over the dull area. When she came under observation, her temperature was running up to 99.8 at night, and it was not thought advisable to commence treatment for several weeks, until it had settled down. Her first dose of P.T.O. .0005 was given on November 4th. Her progress has been rather slow, owing to her having an unstable temperature. On one occasion her

temperature touched 104, the day after injection. There has been no marked change in the physical signs, at date her weight is the same as when she commenced treatment. Her dose at present is P.T.O. .5.

B.W. No. 26.

Aged 30. First came under observation in January 1910. She complained of pain between the shoulders behind, and cough, which had lasted two years, with expectoration, and one haemoptysis two years previously. She was losing weight. On inspection, there was flattening of the left side, with dulness down to the second rib on both sides, with distant breath sounds. On September 16th. 1911 her physical signs showed dulness down to the third rib, on either side in front, and down almost to the angle of the scapula at the back, with bronchial breathing on the right side, and crepitations over the upper part of both lungs, before and behind. In the interval the patient had been at Northwood Sanatorium for five months. Tubercle bacilli had not been recorded in her sputum. She was given a test dose, without reaction, on September 20th. .003 Old Tuberculin, and on September 23rd. .005, with reaction up to 100.2. After this her temperature settled down, but on the 27th. September it reached 101.4 without any demonstrable cause. On September 30th. she commenced treatment with .001 P.T.O. and although her temperature swings through a fairly wide range,

the upper limit is usually not more than 99, although the lower limit is often between 96 and 97. Her doses have been steadily increased, so that now she is having P.T. .2. She is feeling very much stronger, and more vigorous than when the treatment commenced, and her weight has remained about the same, perhaps increased one pound or so. She has not had any haemoptysis since treatment commenced, and the crepitations have disappeared. (March 23rd. 1912. A specimen of sputum has been obtained with difficulty, but it contains tubercle bacilli).

B.G. No. 27.

Aged 34. First came under observation in January 1911. She complained of cough, pain in the chest, which had lasted four months, with expectoration, without haemoptysis. She was short of breath, and had had pain at the back in the cervical region, palpitation occasionally, had lost flesh, poor appetite, clean tongue, pain occasionally half-an-hour after food. Her sister had died of consumption, she had had pleurisy 20 years previously. There was some dulness found on the right side down to the second rib. In March, tubercle bacilli were found in her sputum. She ceased to attend in April, being admitted to Northwood Sanatorium until the end of the July, and returned on August 5th. and continued to be treated medically until December. On December 6th. treatment with tuberculin .001 was commenced, and has steadily been continued, and is, at present, having a dose of P.T. .02cc. Her weight at the commencement of tuberculin treatment was 6 st. 12 lbs. and is now 6 st. 11 lbs. Her physical signs were more marked on the right side at the commencement of the tuberculin treatment, than they had been when she came under observation first, but the friction, which was then present over the right side of the upper middle lobes is now disappearing; the general condition improving.

S. No. 28.

She came under observation first in April, 1911, complaining of cold, which had lasted two or three weeks, with cough and expectoration and haemoptysis, amount not recorded, shortness of breath, pain on the left side, palpitation, sweating at night, poor appetite, flabby, coated tongue, pain after food, constipation, and pallid, anxious expression. On physical examination, dulness was found on the left side, from the clavicle to the fourth rib, with a few crepitations. She was treated medically for two months. Tubercle bacilli were not found in her sputum, and on June 17th., she had a test dose of Old Tuberculin .001 cc., after which there was a marked general reaction, temperature rising to 101.4, with an extensive local reaction. She was put on treatment, P.T.O. .001, on June 24th. At first, progress was distinctly slow, owing to her being sensitive, and to her digestive troubles. In September her physical signs showed very much the same condition as at first, with friction over the left side. In October she was again examined, and in addition to the above the vocal resonance was thought to be increased at the right apex. On November 1st., she had haemoptysis of about one teaspoonful of blood. On November 4th., the friction was still present over a restricted area on the left side, at the level of the sixth rib. On the 3rd. February 1912, she was complaining of a return of cough, and dulness seemed to extend on the right side down to the fourth rib, and there were some crepitations. On March 6th., she is feeling much better, she has now reached a dose of P.T. 6. Her weight at the commencement of the tuberculin treatment was 8 st., and is now 8 st. 3½ lbs.

Note:- This case, in spite of the patient being rather sensitive, has resulted in an increase of weight, and a great improvement in the general condition, with diminution in the physical signs, although, for a time, there was rather an exacerbation of the signs on the right side.

E.C. No. 29.

Aged 15. This was a contact case, whose sister was a patient with quite definitely tuberculous condition, and figures amongst these cases. Her complaint was shortness of breath on exertion, and palpitations, and loss of flesh; her appetite was very good, tongue clean, and digestion good. She had some constipation. She had had pneumonia, at the age of five. When first seen, her temperature was 99.4. On examination there was some slight flattening, on the right side was prolongation of expiration, at the right apex. This may quite well have been within physiological limits. On the 30th. September, she had a test dose of .001 Old Tuberculin, without marked reaction. On October 7th., she had .003, which produced a marked local reaction, temperature rising to 100, the swelling and redness of the arm remaining for some time. On October 21st., she was put on treatment with P.T.O. .001, and her doses have been very steadily increased, without reactions. Her present dose is .35 cc. Old Tuberculin. Her weight has increased from 7 st. 8 lbs. to 7 st. 11 lbs. Her general condition has very markedly improved. Her shortness of breath and palpitations have both disappeared, and she is able to do her day's work without fatigue.

F.S. No. 30.

Aged 12. Came first under observation in August, 1911. He had been a patient in Mount Vernon Hospital for four months, from July to October 1909, and had been at a Convalescent Home for two years and one month, during which time he had gained 13 lbs. in weight. In September he was examined and found to have dulness of the right side, down to the fifth rib in front, and to the angle of the scapula behind, with bronchial breathing both in front and behind over this area and at the level of the second rib, in front an area with whispered petriloquy and cavernous breathing, suggesting a cavity; on the left side there was dulness down to the third rib in front, and to the fourth dorsal vertebra behind, with prolongation of expiration. He was put on treatment with P.T.O. .001, on September 2nd., and the doses were steadily increased. On January 13th., he reported that he had gone back to school, after an absence of three years. On the 28th. February, he received his final dose of 1 cc. of Old Tuberculin. On examination, his physical signs were much as before, a few crepitations on deep inspiration were heard in the neighbourhood of the root of the left lung, at the back.

Note:- This boy showed in a very remarkable degree the improvement in the general condition under tuberculin treatment.

B.G. No. 31.

Aged 35. She first came under observation in June 1910, with a history that she had had a cough for three or four years, with expectoration, without

haemoptysis, with pain and shortness of breath and palpitation, that she was losing weight. Tubercle bacilli were found in her sputum, at that time, and the upper lobes of both sides were reported to be affected. October and December of that year she spent in a sanatorium at Bournemouth. Throughout the Spring of 1911, she continued to attend as an out-patient. On June 14th, 1911, she commenced treatment with P.T.O. .001 cc. At this time her physical signs were that she had a hyper-resonant note all over her chest, exception in the clavicle region, where there was dulness, hollowing under each clavicle. There were rhonchi and crepitations with great dyspnoea all over the condition, suggestion bronchial asthma. She was, at this time, on the slightest exertion very breathless, unable to go up and down stairs, and only able to walk on the level very, very slowly. After the second injection, the subjective symptoms improved very much. On July 1st, her sputum was examined and no tubercle bacilli could be found in it. On July 5th, she reported that she was able to sleep much better, and was not disturbed by her cough. In August, she went for a fortnight to the seaside, but resumed her treatment on her return. Her symptoms had returned. On examination of her chest, the bronchial spasm seemed to be much less marked on the left side than on the right. During September, she passed through a sensitive period, and throughout it has been difficult to increase the doses, owing to her sensitiveness and to the supervention of pleurisy. On the 30th September, however, her subjective symptoms were very much better. She said that she could sleep on her right side, for the first time for two

years, and is able to do her work, go up and down stairs, and walk on the level in a way that she has not done for a long time. Her present dose is P.T. .15. Since she commenced tuberculin, her weight has remained constant at 7 st. 9 lbs.

Note:- This case is one where the emancipation from breathlessness, the asthmatic condition, under tuberculin has been very striking, and although the tubercle bacilli are still present in the sputum, the patient's comfort has been so great, that the tuberculin treatment has proved of more value than symptomatic treatment, under which she made little or no progress, and constantly had the asthma.

GROUP II. J.A. No. 32.

Aged 28. First came under observation in July, 1906. She complained of pain and of cough and expectoration, with shortness of breath and palpitations. She had a poor appetite. She had dulness on both sides, down to the fourth rib, with bronchial breathing and crepitations, at the back dulness down to the angle of the scapula, with bronchial breathings and palpitations on the left side. With symptomatic treatment she improved somewhat, putting on about half a stone in weight. Tubercle bacilli were found in her sputum in December, 1908. In June, 1909, physical signs had progressed somewhat. On the 13th February, 1912, the patient turned up as symptoms had returned after the absence of one year, during which time she had felt quite well; she was given a test dose of .001 Old Tuberculin, and gave a marked reaction, and has commenced treatment.

L.S. No. 33.

Aged 16. She came under observation on the 22nd. August 1911, recommended from a General Hospital, and complained of pain in the chest and cough, with yellow expectoration. She had no haemoptysis, no marked shortness of breath, but palpitation and loss of flesh, poor appetite, furred tongue, a little pain on the left side, during one week. There was a bad family history. On examination there was a slightly impaired note on the left side, down to the third rib in front, and to the spine of the scapula at the back, with a few crepitations and some prolongation of expiration. The physical signs did not seem sufficient to make a definite diagnosis, but in the presence of the very poor condition the patient was in, it was thought desirable to give her a test dose of Old Tuberculin. As a result of .001 cc. of Old Tuberculin, there was no definite reaction, but 001 cc. Old Tuberculin was repeated, and the second time there was a very characteristic reaction, the temperature rising to 104.2. This produced a fairly definite focal reaction, crepitations at both apices, and friction at the angle of the scapula and the left side, posteriorly. The patient was put on a fifty thousandth of T.R. tuberculin, and has made excellent progress. On November 21st. she was changed from T.R. to B.E. In her case, she has had, from time to time, to have symptomatic treatment, temporarily, for indigestion and for pleurisy. Her general condition has improved enormously, and she is now back at work. At no time have tubercle bacilli been found in her sputum.

Asked why she had absented herself March 5th. she said she felt so well that she thought there was no occasion to continue attending.

F.P. No. 34.

Aged 25. She came under observation on August 19th. 1910, and she complained of a cough, with yellow expectoration, shortness of breath, sweating at night. Her appetite was good, and tongue was clean. Her bowels were regular, and she had had a cough for two years. She was found to have dulness on the left side, and some rhonchi all over the lung. She next presented herself in August, 1911, having been at Northwood Sanatorium for the six months previous. At this time there was dulness over the whole of the left side, front and back, with bronchial breathing and crepitations, and prolonged expiration at the right apex. In addition to the lung condition, she complained of hoarseness, and saw the laryngologist, who reported deviation of the septum of the nose, and made the diagnosis, interarytenoid pachydermia, query, tuberculous. The patient was admitted to Mount Vernon Hospital for a few days only, where the interarytenoid tuberculoma was cauterized, and the report, with regard to her pulmonary condition, was that there was chronic fibrotic condition of the left upper lobe, probable affection of the right apex, and a tendency to bronchitis. On August 17th. she was again at the dispensary, and tuberculin treatment commenced. The initial dose was 1/25,000 milligram bacillary emulsion. As a result of the combined

treatment, the interarytenoid condition has become much less, and the patient's general condition has improved. There were no accompaniments the last time her chest was examined. In August, 1911, her weight was 8 st. 12 lbs., and is now 8 st. 8 lbs.

G.O. No. 35.

Aged 29. Her complaint was cough for 8 months, with expectoration, no haemoptysis, great shortness of breath, pain on the right side, loss of weight, variable appetite, with flatulence, constipation and occasional loss of voice. Previous history of pleurisy at the age of 8. She had dulness on the left side, down to the second interspace, in front, and to the level of the spine of the scapula, behind. There were no added sounds at that time. The sputum was examined on August 12th., and found to contain tubercle bacilli. The patient was admitted to Mount Vernon Hospital, where she remained two months, and gained one stone in weight. The report from the Hospital was that, probably, both upper lobes are attacked, but the patient is of a sturdy type, with plenty of resistance. No tubercle bacilli were found in her sputum during five examinations, during her stay in hospital. She had a course of tuberculin, and had reached a dose of 1/50 m. of bacillary emulsion, which was repeated four times, and each time with some reaction. On August 18th. she returned to the Out-patient department, for a continuance of the tuberculin treatment. The fiftieth of bacillary emulsion gave her a marked reaction, so

the next dose given was 1/500 m. She has gone on without reactions, and is now having 1/80 m. Her general condition has improved greatly. She is able to do hard work, and has retained half a stone of the weight added in hospital.

T. No. 36.

Aged 34. First came under observation on May 30th. 1911. Complained of cough, of 2½ years' duration. Has been both an out-patient and in-patient at Victoria Park Hospital. At this time she had copious yellow expectoration, and had had slight haemoptysis 14 days previously. Troubled with breathlessness, also losing flesh and tongue furred. Dulness on the right side, down to the sixth rib, with crepitations, bronchial breathing at the right apex. Her sputum contained tubercle bacilli. In October, she was admitted to Mount Vernon Hospital, where she remained for two months, during which time she had 11 injections, but no report as to the doses. She returned to the out-patient department on December 19th. 1911, when she had an initial dose of 1/10,000 of bacillary emulsion. The doses have been steadily increased. On February 20th. she reported that she was able to walk for three hours, at a stretch, and has not breathed so freely for two years.

W.M. No. 37.

Aged 61. Came to the out-patient department in May 1911, complaining of cough, with whitish expec-

toration, no haemoptysis, losing flesh, tongue furred, bowels regular. He had been an in-patient at a Brighton Sanatorium, on three occasions, and came out last on February 16th. Both lungs were dull, down to the sixth rib, in front, and down to the base of the lung, posteriorly, with coarse crepitations all over, and bronchial breathing. The patient was admitted to Mount Vernon Hospital, where he remained for two months. There he had tuberculin T.R., the last dose being 1/15 m. His general condition was considerably improved, he had gained one stone in weight, and the crepitations were not so general over his lung. He commenced in the out-patient department with 1/70 m. of T.R., and the doses were steadily increased. He has always run a temperature swinging to 99 in evening, probability of a mixed infection. In his case it has not been considered of so much importance as in many cases on account of the obvious bronchial condition, however, it has been necessary to proceed slowly with the dosage, as reactions up to 102, readily occurred. In November, he complained of some pleuretic pain, on the left side, posteriorly. On January 23rd. he had a wetting, and, apparently, a chill. His dose now is 1¼ milligrams bacillary emulsion, and he is feeling fitter than for several years, although not able for heavy work. Throughout the treatment he has had symptomatic treatment as well.

K.D. No. 38.

Aged 19. First came under observation in July, 1909, complaining of cough, which had lasted for six

months, with white expectoration, shortness of breath, sweating at night, loss of weight. A good family history, but on examination she was considered to be emaciated, to have extensive dulness on the right side, and dulness, down to the fourth rib in front, on the left side, and over the whole of the left lung, posteriorly, with crepitations. In August, she became an in-patient in a sanatorium at Bath, and was reported in October to be better. At this time she had a slight cough and no expectoration. Examined on June 24th. 1910, she was found to have dulness over most of the left lung, front and back, with crepitations and to be anaemic. A similar condition was recorded in April, 1911. She continued under medical treatment, until the end of September, when tuberculin was commenced, with an initial dose of 1/50,000 m. On January 23rd., she complained of great shortness of breath and coughing, pain in the left side. On examination it was seen that her apex beat was in the anterior axillary line. On percussion the right side was hyper-resonant all over, and the left side was dull, both front and back. On X. ray examination it was found that only a very small area of the left lung "brightened" on inspiration, immediately below the apex. There was no cardiac shadow to the right of the vertebral column, the whole of the right lung was abnormally transparent, and the dulness of the heart and the left lung occupied the remainder of the left side above the diaphragm. She is now having a dose of 1/1000 m. of bacillary emulsion, which she takes without undue

reaction. In this case the left lung has, presumably, fibrosed and contracted, drawing the heart right over to the left side. The right lung is diseased, but has expanded to fill the deficiency of the contracted left. In spite of such extensive disease, the general condition is slightly improving, and the weight of 8 st. 2 lbs. is two pounds less than when tuberculin was commenced.

A.M. No. 39.

Aged 15. Came under observation on December 20th. 1910. She complained of pain in the chest, cough, expectoration, haemoptysis of half a cupful seven weeks before, and spitting of blood for three years, occasionally. Sweats at night, not losing flesh, appetite good, bowels regular, voice normal. Had been sent from St. Bartholomew's Hospital to Brompton, three weeks previously, and father had died of cunsumption. On the left side dulness, down to the second rib, in front, and to the spine of the scapula, posteriorly, with crepitations and prolonged expiration. At the right side there was prolonged expiration, but no added sound. The patient attended until December 1910, and returned in October 1911, having been at Hampstead and Northwood during seven of the intervening months, and at home for 2½ months. At Mount Vernon Hospital, Hampstead, she had tuberculin by the mouth, the dose not known. Her physical condition at this time showed dulness at the left apex, back and front, and dulness at the

right apex and crepitations in front, down to the third rib, with bronchial breathing, and at the left side, behind, over the apex of the left lower lobe, fine crepitations, with considerable expectoration, streaked with blood. She commenced with a dose of 1/50,000 of T.R. tuberculin. It was changed in January to bacillary emulsion, and she is now having 1/500 m., and is progressing satisfactorily. Her weight has increased 5 lbs., under tuberculin treatment.

G.A. No. 40.

Came under observation on the 12th. December 1911, complaining of a sore throat and a cough, which had lasted for 18 months, with shortness of breath, during the last six months, palpitations, loss of 1 st. 7 lbs. in ten months; frequently having diarrhoea. Rhonchi were heard all over his chest, and scattered crepitations. The patient saw the laryngologist, who diagnosed a tubercular larynx, with infiltration and protrusion of both cords, and infiltration of the surrounding tissues. Tubercle bacilli were found in his sputum. He remained under medical treatment, until December 1911, when tuberculin was commenced, an initial dose of 1/5000 m. being given, to which there was a slight reaction, and the dose was repeated on the 12th. without reaction, and has been steadily increased, until the patient is now having 1/1000 m. His general condition has improved considerably since the tuber-

culin commenced, and the last report on the larynx is that the tissues are much paler; his voice is certainly stronger. His weight has increased 2 lbs. since tuberculin treatment commenced.

A.G. No.41.

Aged 49. Came under observation first on July 25th. 1910, complaining of a cough with thick phlegm, which had lasted for seven months. Had been attending S. Thomas's Hospital for two months and had been at a Convalescent Home. Cough was found to be slight, but with thick, white phlegm, no recent haemoptysis, no marked shortness of breath, but palpitations and sweating at night, good appetite and digestion. Sister had died of phthisis. He was found to have dulness over the right apex, in front and behind, with crepitations over most of the right lung. He continued on medical treatment alone until May 1911. He then went for five months to Mount Vernon Hospital, where he was treated with tuberculin, and the tubercle bacilli disappeared from his sputum, and he reached a dose of 10 m. of T.R. Owing to the expense of this preparation he was put on bacillary emulsion, one milligramme, and left Mount Vernon to go to Northwood. Last dose 3 milligrammes of bacillary emulsion. At Northwood, the tuberculin treatment was discontinued, and the patient was discharged, being about 2 st. heavier than when he went to hospital. On November 28th. 1911 he was re-admitted to the Outpatient Department having dulness on the right side to the fifth rib in front, and down to the sixth dorsal vertebra

behind, with crepitations and rhonchi over that lung, bronchial breathing at the apex. As ten weeks had elapsed since his last dose, he was started with 1/10 m. of bacillary emulsion, and has attended regularly. It has not been possible to get his dose above ½ m. His weight has gone back ½ a stone. His general condition is not quite so good as when he left Northwood.

J.L. No.42.

Aged 22. Pains and cough for five months, and has previously had haemoptyses, and has been treated as an out-patient at Brompton Hospital. The condition at that time showed dulness over the left apex, with bronchial breathing and crepitations. Tubercle bacilli had been found in her sputum. She commenced with a dose of 1/50,000 of bacillary emulsion, and has had her doze steadily increased, and is now having 1/250 of bacillary emulsion. Her weight has remained constant. There are now no added sounds over the left apex, where the breath sounds are distant and the dulness remains.

E.T. No.43.

Aged 29. First came under observation in June 1909, complaining of cough for 3 months, with pain in the chest, yellow expectoration, no haemoptysis, shortness of breath, sweating at night, loss of flesh, bowels regular. Extensive dulness on the left side, in front and behind, with coarse crepitations. In the autumn of that year, she was an in-patient at Northwood Sanatorium and at Mount Vernon Hospital. Tubercle bacilli were present in her

sputum. She then was absent for a year, and returned in January, 1911, complaining of pleurisy in the left side, and the physical signs were found to have somewhat increased, with commencing trouble at the right apex. In August, she was admitted to Mount Vernon Hospital, where she remained for two months, and gained 7½ lbs. She had tuberculin, the last dose being 1/250 m. of bacillary emulsion. On her return to the Out-Patient Department on the 17th October, there were crepitations over the upper lobe on the left side, posteriorly and anteriorly. The tuberculin treatment was resumed. In January, she complained of slight haemoptysis, friction on the left side, with crepitations, scattered over the left lung, bronchial breathing at both apices. Her dose, on the 5th March was 3/5 m. of bacillary emulsion. The patient says that she feels much better than before the tuberculin treatment commenced; she has, however, lost 11 lbs. in weight, since leaving Hospital.

B.H.R. No. 44.

Aged 37. First seen in October, 1906, complained of colds and shortness of breath, which lasted for one year. He had suffered from bronchitis as a child. Cough, yellow expectoration, shortness of breath, loss of flesh, 6 lbs. in 12 months, fairly good appetite. When first seen, no definite physical signs were made out, and no tubercle bacilli were found in the sputum. After being treated for 2 months, the patient was lost sight of for 3 years, returning in September, 1909, when bronchial breathing was noticed at the left apex,

with crepitations scattered over the left side in front. Medical treatment was resumed until July, 1911, when the patient was put on to tuberculin. He commenced with 1/100,000 T.R., was changed to bacillary emulsion in January, 1912. After the first dose of 3/10 m., he had a severe general reaction. The dosage has been continued more slowly. The patient is now following his occupation, and has greatly improved. When last examined there was some dulness at the left side behind over the upper lobe, but only a few crepitations were heard, posteriorly. His weight has increased half a stone on tuberculin treatment, it is now 9 st. 3 lbs.

Note:- This case is apparently one of slowly progressing tuberculosis, where the patient's resistance was fairly high, and the additional resistance as a result of the tuberculin treatment has been sufficient for him to rise superior to the invasion of the tubercle bacilli.

F.J.M. No. 45.

Came under observation first on April 18th, 1911, with a complaint of cough, which had lasted for 10 months, greenish expectoration, streaked with blood, shortness of breath, sweating at night, with loss of flesh, poor appetite, furred tongue and constipated. He was found to have extensive dulness over the left lung, with a few crepitations and bronchial breathing at the apex. Tubercle bacilli were found in his sputum, and tuberculin treatment was commenced, whilst he was waiting for admission to Mount Vernon Hospital.

The initial dose of 1/100.000 m. T.R. was given on May 30th, and he had 1/1000 m. on August 5th, when he went to Mount Vernon. There he was treated by a system of absolute rest, and not with tuberculin for the first 12 weeks; he returned to the out-patient Department on January 9th, 1912, with the report that he had developed tubercular larynx in hospital. At this time there were no active signs in his chest, but there was infiltration of both cords in the inter-arytenoid region, and had then been put on tuberculin. Tuberculin, commencing with 1/250 m., was resumed at the O.P.O. and the patient, on the 5th March, had 1/60 m. After every dose the patient has a reaction up to 100, but the report from Mr.Hett is that the larynx is improving, and the area of infiltration appears much less than when he ceased the rest cure. The patient has more tone in his voice. His weight is now the same as it was when he came under observation in last summer, but is 4 lbs. less than when he left Hospital.

G.J.M. No. 46.

Aged 35. He first came under observation in June, 1911. Has a cough, which had lasted for six months, with expectoration, streaked with blood, sweating at night, loss of weight, fairly good digestion. Physical signs were reported then over both upper lobes. Medical treatment was continued until the end of September, when the patient was admitted to Mount Vernon Hospital, where he remained for 14 weeks. Whilst there he had bacillary emulsion, initial dose of 1/50.000 m., and final dose of 1/5 m.

During that time he gained ½ a stone. Tubercle bacilli were present in his sputum, and he was reported to have extensive chronic disease of both lungs. The tuberculin treatment has been continued since his discharge, but owing to the delay in his presenting himself, and to the slight reaction, his dose now has reached 1/3 m. His general condition is good, and he is at work. His weight is 3 lbs. less than when he left Hospital.

T.J. No. 47.

Aged 34. He first came under observation in October, 1910, having previously had pleurisy, pneumonia, and pain and cough, which lasted for 3½ years. Had a haemorrhage on August Bank Holiday, and had occasionally spat up a little blood since. No great loss of weight, a certain amount of shortness of breath, palpitation. However, on examination, there was a dulness over both upper lobes, with crepitations on the left side. He came under medical treatment. Tubercle Bacilli were found in his sputum, on December 2nd, when he had a haemorrhage. In Spring, he was an in-patient at Mount Vernon Hospital, and had T.R. tuberculin. There, having had a last dose of 2 milligrammes, on the 2nd June. In July, he returned to the dispensary. His physical signs were much as before, and he received an initial dose of 1/20 cc. of T.R. tuberculin. He attends irregularly, once a fortnight, or once a month, and is now having 1½ m. of bacillary emulsion. His weight has been maintained. However, he had coloured sputum at the end of October, and at

that time creaking crepitations were heard extensively particularly on the left side, and sibilant rhonchi were present. He is hard at work as a carpenter, and feels well.

J. P. No. 48.

Aged 33. Came under observation on the 3rd June, 1910. He complained of recurrent pain on the left side, which had lasted for 8 months. He was pale, cough, expectoration, no haemoptysis, sweating at night, no marked loss of flesh, bowels irregular. There was some clubbing of his fingers. On physical examination, the vocal fremitus and vocal resonance were found to be increased at both apices in front, with dulness down to the second rib and crepitations. Posteriorly, dulness was more marked on the right side, and crepitations extended down to the seventh dorsal vertebra. His temperature was 103.6°F., his pulse 116, and his weight 9 st. 5 lbs. On August 30th, tubercle bacilli were found in his sputum. He improved on medical treatment up to the end of November, and did not do well through the winter. On the 13th June, 1911, his weight was 10 st. 10 lbs. This time physical signs much less than previously, and he was put on tuberculin, commencing with a dose of 1/100.000 T.R. He is now having a dose of 1/3 m. bacillary emulsion, and is at work, and looks remarkably well. There are no added sounds at all in his chest. His weight is now 11 st. 4 lbs.

R.K. No. 49.

Aged 27. Came under observation first on June 16th., 1911. Family history of consumption; complained of shortness of breath, and sore throat, difficulty in swallowing, which had lasted for five months. He had cough, expectoration, and six months previously had coughed up a teacupful of blood. Losing weight, great shortness of breath, palpitation, appetite poor, bowels constipated. Dulness noted at this time over the left apex. He was recommended for admission to Mount Vernon Hospital, where he remained from August 16th. to November 5th., and had gained 2 lbs. He was seen by the laryngologist on November 13th, 1911, who diagnosed tubercular larynx, and noted hoarseness for five months, pain on swallowing and on first awakening. Pain in the left ear, which began a month ago. Nothing to be seen in the left ear. The larynx showed involvement of the right cord, with swelling of the interarytenoid region. His lung at this time showed extensive disease on the left side, both upper and lower lobes. He had commenced tuberculin treatment before leaving the Hospital, which has been continued. His throat is said to be improving, and the condition of his lung is such that it is not possible to make at all rapid progress with tuberculin.

A.H.E. No. 50.

Aged 32. First came under observation in April 1910. He had had a haemoptysis 12 years previously, and had been treated at Brompton Hospital. He com-

plained of cough for two months, with white expectoration, shortness of breath. His condition fair, his appetite good, bowels regular, his tongue clean. His weight at this time was 9 st. 3 lbs. His apex beat was displaced out of the nipple line. Cog-wheel breathing was found at the right on the left side, and there was a query about the right apex. He was again examined in December 1911, after a 12 months' absence from the out-patient department. The complaint now was cough, slight pain in the left side, yellowish expectoration, loss of weight of 9 lbs. General condition was fairly good. Some dulness was found at the right apex, with prolongation of expiration and increased vocal resonance, and scattered crepitations. He had rather a toxaemic appearance, and explained that he worked in the Tube Railway, and was underground for 12 hours every day. His teeth needed attention, and those that were decayed were removed by the dental surgeon. No tubercle bacilli were found in his sputum. On January 19th., he was given a test dose of .001 Old Tuberculin, to which he had a slight general reaction, and a definite local reaction, and also a focal reaction, bronchial breathing at the right apex, marked prolongation of expiration all over the left lung, front and back, with crepitations along the inner border of the scapula. Treatment was then commenced. Although his temperature had been normal during the week previous to his test dose, and although the test dose had only produced a moderate reaction, .001 P.T.O. produced a reaction up to 101. Temperature in the evening not reaching normal, until the fourth day. This dose, repeated, produced

a temperature up to 104.4, the temperature reaching normal on the fifth day after the injection. A fortnight was allowed to elapse and then the patient was put on bacillary emulsion, commencing with 1 minim of D. Solution. He is proving sensitive to this, but stands it much better than P.T.O.

Note. It is instructive to notice that a patient may, exceptionally, be very much more sensitive to a small dose of P.T.O., than to a larger dose of O.T., and that very often where P.T.O. cannot be tolerated, B.E. is found satisfactory.

F.F. No. 51.

Aged 32. She first came under observation in January, 1910. A diagnosis was made at that time of emphysema and chronic bronchitis. She complained of a winter cough for three years. In May,1910, her sputum was examined, and found to contain tubercle bacilli, and the patient had had a considerable hameoptysis. Medical treatment was continued with intermissions, until October of 1911, when her complaint was cough, shortness of breath for 18 months. Cough, particularly after exertion, with copious sputum and haemoptysis, as mentioned above. Rhonchi were heard over the lower part of the right lung, posteriorly. Broncho-pneumonia developed, for which the patient was treated in S. George's Hospital, and subsequently at a Convalescent Home. In December, 1911, the patient recommenced treatment with tuberculin, P.T.O. .001, as initial dose. The patient has had slight reactions, and is progressing satisfactorily. She has not, however, gained in weight,

but her sputum now is less, and no tubercle bacilli can be found therein.

F.D. No.52.

Aged 45. Came under observation in December, 1911. By profession an actor. The patient had been seen in August by a physician at Mount Vernon Hospital, and had been given a very bad prognosis. He had gained admission to Mount Vernon Hospital, but, owing to his artistic temperament, he could not tolerate being surrounded with diseased people, and had gone away. He had had careful nursing at home, and had gained some weight, and improved in condition. On examination dulness was found extending on the right side down to the fifth rib, with an area of hyper-resonance on the second rib in space, in front, and also above the root of the scapula behind, with cracked-pot sound, and whispering pectoriloquy. There were crepitations over the dull area, with bronchial and cavernous breathing. On the left side dulness extended to the fourth rib and the angle of the scapula behind, but was relatively less than on the right side. There were a few scattered crepitations on the left side. Weight at this time 9 st. 4 lbs. The patient was put on tuberculin, but his case has been complicated by dysphagia, whether of an organic or functional nature one cannot say, by gout, and by an extraordinary nervous apprehension of any change in his symptoms. He had gained 4 lbs. in weight, which he has since lost. It seems doubtful if it will be possible to persevere with the treatment, although the lung condition is in statu quo.

J.R. No.53.

Aged 40. A taxi-cab driver, first came under observation in February, 1911. Cough for six weeks, with muco-purulent, blood-stained expectoration, loss of weight, shortness of breath, looked anaemic, rapid pulse. Weight at this time 10 st. 13½ lbs. Dulness was found at both apices, and crepitations scattered over the lung. His sputum was found to contain tubercle bacilli. He continued to attend as an out-patient, improving slightly until June, when pleurisy developed on the left side. In July he reported himself as much better. At the end of August he went to Fairlight Sanatorium. His weight was 9 st. 12 lbs. While there he had a continuous temperature, and remained in bed. The report on his leaving Fairlight was that the signs were advancing, but that he had gained 6½ lbs. in weight, during his stay there. On examination on December 11th, dulness was found on the right side in front down to the fifth rib, and at the back down to the angle of the scapula, bronchial breathing over this area, with a patch of tubular breathing at the root of the lung. On the left side there was dulness to the third rib in front, and to the third dorsal vertebra behind, with crepitations. At this time he was very weak and only able with difficulty

to reach the Out-patient Department owing to weakness and extreme breathlessness. He commenced tuberculin with an initial dose of .001 P.T.O., his weight being 10 st. 7 lbs. On 23rd February his condition had so far improved that he was able to return to work, having been off for 6½ months, and said that he felt better than he had done for 12 months. He, however, continues to have tuberculin. On March 11th, he had a dose of P.T. .15. He is still at work and improving.

E.T.M. No.54.

Aged 25. First came under observation on November 20th, 1911. Three years ago he had been a patient at Brompton, and had spent 8 months at Frimley Sanatorium. Complained of cough, which had lasted a fortnight, with pain in the left shoulder, expectoration, no haemoptysis, loss of one stone in weight, since he had left Frimley. Condition fairly good. Extensive dulness was found on both sides, with prolonged expiration. The tubercle bacilli were found in his sputum. He was put on tuberculin, initial dose P.T.O. .001. The present dose is P.T. .02, and his weight has increased from 8 st. 9½ lbs. to 8 st. 11 lbs. Throughout, his evening temperature has been swinging between 99 and 100.5.

A.S. No.55.

Aged 26. First seen in August, 1911. Has a sister with phthisis. Haemoptysis three times during six years. Complained of loss of flesh, cough slight, purulent expectoration. Teeth were indifferent. Dulness was found at the right apex, with crepitations, and early tubercular conditions diagnosed. The patient went to Fairlight Sanatorium. When he presented himself again, in 1911, dulness was found down to the fourth rib, in front, and down to the second rib on the left side, and down to the sixth dorsal vertebra on both sides at the back, bronchial breathing at both apices with crepitations. Several teeth were removed. The patient was put on tuberculin

treatment. He has now reached a dose of P.T.O. .02. Has lost 10 lbs.. since leaving the sanatorium, where he had gained 19 lbs. in weight.

W. S. No. 56.

Aged 35. Complaint was that he had had "influenza", which had lasted through June, July and November. He had a cough for seven months, with pain and expectoration, in which tubercle bacilli had been found. He had had a haemoptysis and shortness of breath. General condition was fairly good. Dulness was found on the left side down to the fourth rib, in front, and at the back to the level of the fifth dorsal vertebra, crepitations and rhonchi and bronchial breathing. During the week previous to commencing tuberculin treatment, his temperature was found to swing up to from 99 to 99.8. It was, therefore, thought best to put him on bacillary emulsion, commencing with 2 minims of Solution D. He is now having a dose of 8 minims of Solution C., with very marked improvement in the range of temperature; since the last dose it has not gone above 99.2. The improvement appears coincident with a haemoptysis, after digging in his garden.

P.N. No.57.

Aged 33. He was first seen in August, 1911, and at that time gave a history of having had "influenza" in November, 1910, and of being convalescent from recent pneumonia and pleurisy. His complaint was particularly of pain in the chest, on the left side. His general condition was such that one at first hesitated but ultimately decided to recommend him for sanatorium treatment. His physical signs showed extensive dulness on the right side in front, and behind, with crepitations, and evidence of a cavity at the right apex, together with dulness and crepitations over the left apex. His temperature was 101.2, when seen; his weight was 8 st. 12 lbs. He reported himself after his return from Fairlight in November, where it was said that he had much improved, and that he did not any longer need treatment. His weight, on discharge, was 10 st. 4 lbs. and he was said to have gained 18 lbs. while in the sanatorium. On examination, however, the dulness was found to be as extensive as before his going to the sanatorium, and crepitations were found right down to the base of the right side, also at the left apex. He was put on tuberculin, P.T.O. .001. He has returned to light work. He is distinctly sensitive to increase of dose, and goes to bed after his injection for the rest of that day. Has occasionally slight haemoptysis. His weight is now 9 st. 9 lbs. so that he is maintaining a portion of the weight gained in sanatorium. His general condition is steadily improving.

J.K. No.58.

Aged 45. First came under observation in July, 1911. History of having a cough in the morning, slight amount of expectoration, slight amount of emaciation, shortness of breath on exertion. Diagnosis of phthisis was made but the physical signs were not recorded. The patient was passed to Fairlight. On December 7th, 1911, he returned from Fairlight, where he had been the intervening 7 months. He was reported to be much improved, and his weight was 11 st. 3 lbs. on discharge. On examination, dulness was found, down to the fourth rib in front, and down to the angle of the scapula, behind, with harsh expiration and added sounds all over the chest, suggesting bronchial involvement. He was put on tuberculin, and has now reached a dose of P.T.O. .15. His weight is 10 st. 2 lbs. There are fewer added sounds in his chest. His general condition is maintained.

D.H. No.59.

Aged 23. Shop assistant. She came in October, 1911, complaining of winter cough, loss of one stone in six months, a pain in the chest felt on taking a deep breath. A large amount of expectoration, with haemoptysis, 10 months previously. On examination, on the right side the breathing was rather of the cog-wheel character, a few crepitations and

prolongation of expiration, and no dulness was made out. Given a test dose of Old Tuberculin, .001, the reaction was slight, temperature reaching 99, so the dose was repeated, and again the reaction was slight, so a dose of .003 Old Tuberculin was given a week later, which caused a temperature up to 100, and with quite definite local reaction in the arm, headache and an increase of pain in the chest. This was considered sufficiently positive to warrant treatment with tuberculin, and an initial dose of .001 P.T.O. was given on the 5th November. Although the patient has been constantly at work of a rather exacting character, in a confined atmosphere, her doses have steadily increased, and she is now having P.T. .1, and has gained 2 lbs. in weight. She feels very much better, and is no longer unduly fatigued in the evening, and looks very much better. Her cough has quite disappeared for more than 2 months, and we have not been able to get a specimen of her sputum to examine.

A.H. No.60.

Aged 32. First came under observation in September, 1910. He had a history of pleurisy two months before, cough for several years, pain in the shoulder blades, expectoration, no haemoptysis, loss of weight, shortness of breath, general

condition fairly good. Breath sounds were found to be weak and harsh at the left apex, with definite dulness and a few crepitations. At this time tubercle bacilli were present. The patient's weight was 10 st. 5 lbs. Examined in February, 1911, a report was made:- probability of fibro-caseous left apex, with some bronchitis and old pleurisy at the right base. On July 31st, 1911, his weight was 10 st. 4 lbs., and he commenced treatment with bacillary emulsion, 2 minims of Solution D. He is now having a dose of bacillary emulsion, Solution A.A., 4 minims. His weight is 10 st. 8 lbs. He reports himself as feeling Al. He is a gateman on the railway, and is able to be on duty for very long hours. The condition of his lung is apparently quiescent.

B.B. No.61.

Aged 31. She complained of cough, with pain on the right side, expectoration occasionally streaked with blood, shortness of breath on exertion, general condition fair. She had been at an Out-patient Department in July last, and was said to have consumption. Physical examination showed extensive dulness on the left side down to the fourth rib, in front, and to the angle of the scapula, be-hind. Dulness less marked on the left side, bron-chial breathing and crepitations on both sides. Sputum has been examined twice and no tubercle bacilli found, although the pathologist noted that "the character of the sputum strongly suggests

tubercle". She has been treated with P.T.O., commencing with a dose of .001, and has so far proved extremely sensitive, although her weight has increased 3 lbs. since treatment was commenced two months ago. Her dose now is P.T.O. .006.

R.G.C. No.62.

Aged 31. History of having attended at the Victoria Park Hospital for 12 weeks, two years previously. Present attack, cough, lasting for one week, with expectoration, sweating at night, loss of weight, shortness of breath on exertion, general condition good. On the right side there is dulness down to the third rib, with bronchial breathing, and on the left side dulness down to the third rib, with prolongation of expiration, crepitations, both before and behind, at the apices. Double apical tuberculosis was diagnosed. The patient has commenced treatment with tuberculin. His dose has been steadily increased, commencing with P.T.O. .002. He reports himself as much better, although his weight has remained stationary. The added sounds in his lung have diminished.

F.B. No.63.

Aged 6¼. First came under observation in November, 1911. Has a bad family history, been subject to bronchitis, and has no appetite, very bad cough in the morning, no expectoration, however. Was said to have malaena twice during the hot weather in summer. Is losing weight. General condition feeble, subject to diarrhoea. Crepitations were heard, widely distributed over right side and a few on the left. Glands in the neck. In this case there seemed sufficient to warrant a diagnosis of pretty generalised tuberculosis of a not acute character. His weight was 2 st. 12 lbs. The patient was put on cod liver

oil and malt and has also been treated with tuberculin, commencing with a dose of P.T.O. .001. The doses have been slowly increased. Bowels have become more regular. Added sounds are not heard in the chest. Last dose was P.T.O. .0125. Glands in the neck are reduced in size.

C.H. No. 64.

Aged 19. First came under observation on December 12th., 1911. His complaint was a cough for one week, with a feeling of discomfort in the chest. General condition was good. His bowels were constipated. Seemed some dulness on the left side down to the third rib, in front, and to the spine of the scapula at the back. Weight was 9 st. 5 lbs., and his temperature 99.4. There did not seem, here, sufficient to make a definite diagnosis. His sputum was examined, and no tubercle bacilli were found. He had a test dose of .001 Old Tuberculin, on January 22nd., his temperature for the previous weeks not having exceeded 98.6. This produced no reaction, so O.T. .003 was given on the 26th., temperature rising to 99.2, and a third dose of .005, on Jan. 29th., which resulted in a severe local reaction, although the recorded temperature did not correspond. But the reaction was of sufficient severity to keep him from work for two days. This was considered positive, although no focal reaction was demonstrated. The patient has been put on tuberculin treatment, and his doses are steadily increasing, without undue reaction. He has gained 4 lbs. in weight.

G.K. No. 65.

Aged 24. He was first seen on May 1st., 1911, when he was passed as suitable for admission to

Fairlight Sanatorium. His weight at that time was 10 st. 2½ lbs. He resumed attendance at the Out-patient Department on November 20th., 1911, after his discharge from Fairlight. Gave a history of having, three years previously, had a nephrectomy performed for stone. The report from Fairlight was that the case was arrested, and that he had gained 12 lbs., during his stay there. However, on examination, extensive dulness was found on the right side, with crepitations, in front and behind, dulness at the left apex, also friction along the inner border of the left scapula. On examination of his sputum, tubercle bacilli were found. The patient was put on treatment with P.T.O. .001. His last dose was P.T. .01. His weight is 7 lbs. less than when he left the Sanatorium, but the case has been recently complicated by an attack of herpes zoster, over the distribution of the fifth posterior root of the dorsal nerve on the left side.

A.A. No.66.

Aged 30. Married. She first came under observation in February 1911. She complained of having had a confinement four months previously, and a cough ever since. A very high-strung, nervous woman. She had expectoration, occasionally, had haemoptysis and sweating at night, loss of flesh, and general condition was poor. Appetite was poor, bowels rather freely opened. At that time there was friction heard at the base of the left lung, and a few crepitations at the apex. Diagnosis of pleurisy. No tubercle

bacilli were found, although her sputum was examined twice. In May, she went to Cranham Sanatorium. Her report from there was involvement of both apices with an old pleurisy at the left base. On examination on her return, however, the friction was still present, expiration was prolonged on the left side, about the level of the second interspace in front, but the apical signs were not definite. She reported having had 7 haemoptyses at the Sanatorium sufficient to soak a handkerchief each time. Through August, complained of pain in the right lung. She presented herself in the middle of September, when she reported severe haemoptysis, said that she had lost a quart of blood in five days. There were crepitations in the second space, and over the third rib, a circumscribed area in front, and friction at the left base behind. Her sputum was again examined, and no tubercle bacilli found. In November still complained of severe pain shooting down the arm, and there was tenderness in the second space, and over the third rib. Haemoptysis had not returned. There seemed to be some friction, now, about the level of the fourth rib, in front, and a pleuro-praecordial murmur. Friction was still present, on December 11th, and the patient was put on tuberculin, initial dose, P.T.O. .001. She was extremely sensitive, having a temperature after each dose, running up to 102.4. Under these circumstances, it seemed impossible to increase the dose, and the danger had to be considered of producing anaphylaxis, by continuing the small doses, so the patient was changed to bacillary emulsion, and

has had less reaction from this, than from P.T.O., but it is necessary to proceed very slowly with the increase of dosage. The last dose was 10 minims of D. Solution.

Note: This patient is a neurotic individiual, constantly complaining of severe pain, for which there is not much basis, and is very anxious and worried about herself, particularly if there is any haemoptysis. She has not, however, had any haemoptysis during the tuberculin treatment, so far.

A.D. No. 67.

Aged 4½. First seen on December 8th.,complaint was tubercular glands in the neck. In this case tuberculin treatment was commenced, but it was not possible to gain the patient's confidence, and he resisted injections very much, and ceased to attend after the third dose.

M.D. No.68.

Aged 17. First seen in July, 1911. Good family history. Pleurisy 3½ years ago. Has been at Bournemouth for one year,and at another sanatorium

10 months. Very short of breath, general condition poor, appetite poor, bowels regular, tongue clean. In this case very extensive involvement of the left lung, with a cavity, level of the third interspace, and commencement of involvement of the apex of the right lung. This patient was very feeble and cachectic. She was put on Béraneck's tuberculin, in July, and is now having 3 minims of D. 2 Solution. She has progressed slowly, and is, apparently, decidedly better than she was, and the condition in the lung suggests fibrosis. The crepitations are much fewer than they were. In February, her sputum was again examined, and besides the tubercle bacilli, pneumococcus was found to be predominant. The pathologist did not advise a vaccine, unless the patient could be watched in bed, which, of course, was impossible. The patient had a haemoptysis up to half a cupful, on March 8th. Her temperature has been rather better, since then, than immediately before.

Note:- This is the only case that has been treated with Béraneck's tuberculin in this series. Considering the very extensive nature of the disease, the result is gratifying, so far as it goes.

T.F. No.69.

Aged 41. He has been a patient since April 1907, when Phthisis was diagnosed and tubercle bacilli were found in the sputum in considerable numbers. His weight was, at that time, 12 st. In February 1908, he had haemoptysis for five days. In May 1908 he complained of loss of voice. Another haemoptysis in June, and another in March 1909, about a tablespoonful, another haemoptysis in May, about the same amount. The patient then went to Fairlight Sanatorium, and stayed for a fortnight, and went again later in the year, when he stayed 15 weeks in 1909. He remained at Hastings, until July 1910, returned to the Out-patient Department in November. Dulness was recorded all over left side, before and behind and at the right apex, with very weak breath sounds, and crepitations all over. In September 1911 he was again examined and the physical signs were much as before, excepting that, in addition, bronchial breathing was heard on the right side, however no tubercle bacilli were found in his sputum. He has been put on bacillary emulsion, and has had very few reactions, dose now being 2 minims of A. Solution and temperature normal. The last examination of sputum, in February, showed tubercle bacilli to be present. His weight is now 10 st. 13 lbs., half a stone less than when the tuberculin commenced. His general condition, however, is quite as good.

N.F. No.70.

Aged 26. First came under observation on the 25th. September 1911. Had spent four months at Ventnor, and had returned in June. Present attack had lasted one year. Cough, expectoration, occasionally coughed blood, great loss of weight, about a stone, since she had left the Sanatorium at Ventnor. Condition was poor, appetite was good. On physical examination there was dulness on either side, down to the fourth rib in front, and rather more on the right side, behind, than the left. Crepitations, bronchial breathing. Tubercle bacilli were found in her sputum. She was commenced with 2 minims of C.Solution of bacillary emulsion, and has gone straight ahead, and now got up to 9 minims of A. Solution. Her weight is three pounds less than when she commenced the tuberculin. Her temperature is still somewhat unstable, although she does not have reactions.

M.H. No.71.

Aged 42. Been under observation since January 1911. Her present attack had lasted for 12 months, cough, at times pain round the left side, no haemoptysis, sweating at night, loss of flesh, short of breath, especially after food, general condition poor, appetite poor. Dulness on the right side, behind, an area of amphoric breathing at the right of base, and the breath sounds over the front, both sides, said to be harsh, occasional crepitations. A diagnosis of phthisis was made and the patient recommended to

sanatorium. She continued to attend irregularly, but did not do at the sanatorium, and in June, 1911, was complaining of shortness of breath and indigestion. Her sputum has repeatedly been examined and no tubercle bacilli found. In November 1911 the fundus of the stomach was found to be 2 inches below the umbilicus. She complained of pain in the back, great pain immediately after food, vomiting sometimes, along with cough and breathlessness. The digestion was treated medically and improved greatly. She was, however, given a test dose of Old Tuberculin, on the 14th. of December, but although no febrile reaction was reported, there was considerable local reaction, and as there was considerable doubt as to the accuracy of temperatures, it was thought wise to regard this reaction as positive, and commence treatment with P.T.O., in addition to the digestive treatment. The patient has now reached a dose of P.T.O. .4, and is feeling much better in herself. She complained of severe headache on February 9th., temperature rising up to 104, and running up in the evening to 100, for about a week, but this seemed to be due to an intercurrent influenza, as her temperature has since been within normal limits.

B.K. No.72.

Aged 29. She first came under observation in October 1911. Complained of cough for 9 months. She had had pain in the chest, with a good deal of expectoration, constantly present; a bad family

history. There were crepitations and rhonchi over the whole chest. The patient was recommended to Cranham Sanatorium, in the Cotswolds, where she remained for 3 months. The report was: rather extensive and active disease on the left side upper lobe, with much catarrh, and the extreme right apex had also been infiltrated. She has done very well, and fibrosis has taken place. Condition much less active. Her weight was said to have increased from 7 st. 1 lb. to 7 st. 9 lbs. She resumed attendance at the Out-patient Department on January 12th. 1912. Her sputum, at this time, was found to contain tubercle bacilli, and her temperature was running up to anything between 100 and 101 in the evening, and 96 to 97 in the morning. There was now quite extensive bronchial condition superadded. The patient was recommended to stay in bed. During the second week of observation the temperature came down to normal in the afternoon and evening and to 97 in the morning. She commenced treatment on February 2nd. with P.T.O. .008; so far doing very well, although she occasionally complains of her sputum being streaked. Her weight now is 7 st. 7 lbs.

Note:- A case of this kind illustrates very well how the sanatorium improvement is often apparent, rather than real.

K.M. No.73.

Aged 30. Came under observation in April 1911. Extensive fibrous condition of the right side, with

cough in the morning. She was sent to Cranham Sanatorium, after decayed teeth had been extracted, and remained there for two months, gaining half a stone in weight. The report from there is, cough, only in the morning, with very little expectoration, that she was very thin, pulse was rather rapid, appetite bad, general condition good, old fibroid disease of the upper lobe on the right side, not much caseation of the lower apex now, but the heart drawn over towards the right side. In the left lung nothing was found. The patient returned to the Out-patient Department in July, 1911, and when first seen her temperature was 100·2. The patient was examined by the radiographer at the Middlesex Hospital, and her heart was found to be displaced to the right side to beyond the nipple line, on the right side. Apparently the right lung has shrunk up, and the left lung has correspondingly expanded. The patient continued to have medical treatment until November 24th. She had,however, been taking her temperature for seven weeks previously, in the hope that it would settle down, although it continued to swing up to 99.8 to 99.4, in the evening, and it was resolved to commence tuberculin, with a dose of P.T.O. .0005. The patient has had very few reactions, and is now having a dose of P.T. .3. Her temperature, however, still remains of the same type, as at first. The patient fells better in herself, and attends regularly.

Note:- Whilst under observation, before tuberculin was commenced, this patient appeared to con-

firm the observation of Dr. W.H.Wynne that in tuberculous patients frequently the temperature is more unstable during the week preceding menstruation, and becomes more stable during it.

A.Z. No.74.

Aged 30. She first came under observation in July 1911, when very extensive disease of the left side was diagnosed, History of haemoptysis two years previously, pain in the left shoulder, slight expectoration, loss of 9 lbs. in weight. In October her sputum was examined, and tubercle bacilli found to be present. She commenced tuberculin treatment with a dose of .001 on October 7th., and has been subject to slight reactions, however she feels so much benefit from the tuberculin as regards pain in her chest and breathlessness, after the reaction passes off, that she is very loath to miss an injection. Her dose at present is P.T. .09. Her weight is 6 st. 11½ lbs., as against 6 st. 12 lbs., when the tuberculin treatment commenced.

E.S. No.75.

Aged 35. First came under observation in June 1911. In his case there were rhonchi all over the chest, and dyspnoea, with copious expectoration and cough, which had lasted five years. No tubercle bacilli were found in his sputum, on the first examination. In October 1911, his sputum was again examined, and tubercle bacilli were found to be present. He reported that after severe exertion

his sputum was stained for a day or two. The patient commenced tuberculin treatment on October 23rd., being a pyrexial case, he was put on bacillary emulsion rather than P.T.O. and made steady progress. His breathlessness gradually diminished. During January and the first half of February, he was at Fairlight Sanatorium, where the treatment was continued. He is now having 12 minims of bacillary emulsion, Solution B. His weight has increased from 8 st. 5 lbs. to 8 st. 8 lbs., and his breathlessness, though still present, he says is much less than it was in the autumn.

Note:- This man received no striking benefit from his stay at the sanatorium, and was certainly more breathless on the return, than when he went.

A.S. No.76.

Aged 30. This patient was treated first at Mount Vernon Outpatient Department in November 1911. She has rather a bronchial type of disease, but tubercle bacilli have repeatedly been present in her sputum. Her temperature before treatment commenced, was between 97 and 99.8. She was, therefore, put on bacillary emulsion, receiving an initial dose of 1/200,000 milligram. She has maintained this swinging temperature, not apparently affected by the doses of tuberculin, which have been steadily increased until she is now having 4 minims of A. Solution of bacillary emulsion. In February it was reported that her sputum contained staphylococcus pyogenes, in

addition to the tubercle bacilli, but the pathologist did not consider there was any predominant organism to warrant a vaccine. Her general condition is much the same as it was. Her weight is 8 st. 8 lbs., and has remained constant.

K.W. No.77.

Aged 41. She came under observation on the 4th. November 1910. Cough for 10 years, haemoptysis 3 years before, and considerable haemoptysis the week before she presented herself. Pain in the right shoulder, shortness of breath, constipation. She continued to have haemoptyses, and pain in shoulder. In November 1911 she was examined and dulness was found on both sides, rather more on the right, vocal resonance greatly increased, crepitations and an area of friction at the level of the third rib on the right side. She commenced tuberculin treatment with .001 P.T.O., and was at first sensitive; however she passed out of the sensitive stage, and has been progressing very satisfactorily. Her weight is 4 lbs. more than when treatment commenced, and she is able to do her house-work, without fatigue and no haemoptysis.

A.W. No.78.

Aged 49. Came under observation first on February 3rd. 1911. A daughter had died of phthisis. Had had cough for a year with phlegm, and he was hoarse, and his phlegm was streaked with

blood. Extensive dulness was at that time reported on the left side, and also at the right apex. He was passed into Fairlight Sanatorium, where he remained from February to July, and while there gained one stone in weight. Said to have had pneumonia there, in April, and not to have been so well since. He was examined again in October, three months after leaving Fairlight, and was found to have dulness on the left side, down to the fourth rib, in front, and to the angle of the scapula, behind, bronchial breathing, and in addition to this there were crepitations and rhonchi all over both sides of the chest. The patient's complaint was more particularly of breathlessness, and his voice was affected. He commenced tuberculin treatment on October 16th. 1911 with .001 P.T.O. His present dose is P.T. .1. His weight has increased 3 lbs. during the tuberculin treatment. His voice has improved slightly, and his breathlessness has greatly diminished. His feeling of wellbeing has increased.

G.H. No.79.

Aged 46. First came under observation in July 1911. Complained of nasal catarrh, with a hacking cough for ten weeks. Slight pain in the left shoulder, much expectoration, no haemoptysis. He had lost 11 lbs. in weight. Shortness of breath, with fairly good condition, bowels regular, and temperature fairly good. Crepitations were found on the right side, and in the region of the right apex, before and behind. The patient was passed into

Fairlight Sanatorium, where he remained for 3 months. The physician reported that the disease was arrested. His weight, on discharge,was 11 st. 7 lbs., a gain of 20 lbs., whilst there. He presented himself at the Outpatient Department again, in November, weighing 11 st., tubercle bacilli present in his sputum, his breath sounds very feeble all over. The physical signs at the right apex had rather increased, and he still complained of pain in the right side. He commenced tuberculin treatment on Dec. 1st., and has gone on steadily and is now having a dose of P.T. .15. His weight is 1 lb. less than when tuberculin was commenced. His nasal catarrh is the only thing he complains of now. He is able to do his day's work without fatigue. There are still a few crepitations in the left apex.

L.B. No.80.

Aged 22. She came up on the 17th. November, 1911, complaining of sharp pain under the right shoulder blade, and in the right breast. The cough was slight, no expectoration, lost 10 lbs. in weight, in four months. Very short of breath, complained of headache, appetite good, bowels constipated, teeth fairly good. On examination she was found to have dulness, above and below the clavicle, on the right side, in front and behind, down to the fourth rib. There were crepitations all over the right lung, and bronchial breathing at the apex. On examination of her sputum, no tubercle were found, but with fairly definite physical signs

and with bad family history, it was decided to try tuberculin. Her temperature, during the week previous to the first injection, was slightly febrile, and she was, therefore, put on bacillary emulsion, and has been strikingly afebrile most of the time. However, since her doses have reached 2 minims of Dilution A., she has had two reactions, temperature up to 100.6. Her general condition has greatly improved, the cough has diminished, and there are fewer crepitations in her lung.

B.H. No.90.

Aged 15. Was first seen on February 20th. 1911. His mother has phthisis. Winter cough, glands in the neck, been operated on, and shortness of breath. Dulness was found at the right apex, with prolonged expiration. His sputum was examined and no tubercle bacilli were found. The patient was recommended for sanatorium treatment, but returned after 2 months. January 19th., treatment with tuberculin was commenced. Dose now .03 P.T.O. The patient has lost 5 lbs. since leaving the sanatorium.