Some Aspects of Tuberculosis, With Cases by a General Practitioner.

M. D. 1916.
Introductory
Tuberculosis is probably the most widespread disease affecting the human race. It causes a mortality greater than any other affection. It was spoken of 400 years B.C. as "that mysterious wasting disease." 600 years later similar terms were used in reference to it.

The possibility of the transmission of pulmonary tuberculosis from man to man was known to some of the ancient Greek and Arabian physicians. Galen (131-200 A.D.) first wrote of possible contagiousness of the disease. Avicenna (980-1037), the founder of the Arabian school of medicine, speaks of the contagiousness of phthisis in his "Theriacum medicum principium." Villermé, the French physician, was the first to demonstrate the transmission of tuberculosis from man to animals in 1866—7. In 1870 Seelach & Klats showed the infectiousness of tuberculosis meat & milk from tuberculous cattle. It was demonstrated by Lobachevsky in 1870—80 that tuberculosis was
an infective disease, preparing the way
for Koch's announcement.
In March 1882 Robert Koch of Berlin
proclaimed his discovery of the tubercle
bacillus, probably the greatest bactériolog-
ic discovery in the aid of medical
science which the world has ever known.
He demonstrated that the tubercle bacillus
was always associated with all forms
of tuberculosis.

Bacteriology.
Tubercle Bacillus. Microscopical Character.
Tubercle bacilli are minute rods, measuring
2.5 μ to 3.5 μ in length, 0.3 μ in thickness.
Some times longer forms up to 5 μ in length
are found both in cultures and tissues.
They are straight or slightly curved, and may
show slight swellings at their extremities.
Young bacilli stain uniformly, but in the
older forms there may be uncolored spots
with dark stained parts between. Some
observers think the light spots are albescent,
others think the dark ones are.
The bacilli are non-motile.

Vide Manual of Bacteriology; Annu. & Mitchell. 262.
Staining Reaction

The tubercle bacillus takes up the ordinary stain very slowly, a property which has led to the use of a powerful solution of potassium ferricyanide. One of the best is the yield of the brown color.

Method. Place the specimen (on glass) in this fluid, heat until the steam rises, and let it remain for five minutes. Wash. Decolourise with 20 per cent sulphuric acid, wash. Immerse in a saturated warming solution of methylene blue for half an hour. Wash well. Dry and mount. The bacilli after being stained cannot be decolourised by solutions which readily remove the colour from the tissue and other organisms. Preparation can be made in which the bacilli alone are coloured by the first stain. Bacilli with these staining characteristics are called "acid-fast" bacilli.

It is known that at times it is difficult or impossible to detect tubercle bacilli in old tubercular lesions though material from such is virulent in inoculation.
Much has made investigations and discovered that the tubercle bacilli exist in three forms—

1.) ordinary bacilli stainable by Ziehl-Neelsen method;

2.) a fine bacillary form, not acid fast, which often show granules in its interior;

3.) free granules which also will not stain by the Ziehl-Neelsen method—

b) & c) can be stained by Gram's method if the stain is applied for a long time.

There seems to be no doubt that in certain conditions some tubercle bacilli can be demonstrated in the tissues by Much's method than by the ordinary carbol-fuchsin stain. —Drum & Ritchie p. 265.

Cultivation—Tubercle bacilli were first cultivated by Koch on impressed broth serum, which produced minute points of growth dull white in color, irregular & slightly raised.

On glycerine agar the growth is practically
the same as on serum, but more luxuriant.
In glycerine broth the bacilli grow readily.
On media gives a vigorous growth.
The bacilli grow readily on potatoes, currant,
macerate's an infusion of these substances,
especially if glycerine is added.
The best temperature for growth is 37°C – 38°C
& stops about 42°C - 60° in glycerine potato
broth it will grow even at low temperature
as 22°C though growth usually ceases
below 28°C.

Powers of Resistance - Tubule bacilli retain
their vitality outside the body for a long time.
Viable bacilli have been found in dried
sputum after two months & living bacilli
have been found in organs buried for several
weeks. A temperature of 100°C for an hour
does not kill them if they are dry - but if
in a moist condition they are usually
killed in an hour at 90°C.
Roch found they are rapidly killed by
exposure to direct sunlight.
Dr. Arthur Ransome & Professor Delafleur
experimented (1894) & found that tuberculos
Subcutaneous exposed to both air & light even for two days only, & for one hour of sunshine, were found to have entirely lost their power of evil.

**Pathology**

Tuberculosis is caused by inoculation by the tubercle bacillus. This may be:

1. **Widespread through the blood stream** causing general tuberculosis, or
2. **Local, affecting some organ.**

*Mode of Action:* Local, by definite lesion, called the tubercle nodule.

1. **Constitutionally by train, which cause emaciation, dissemination being through the blood stream.**

The Anatomical appearance is very various. In phthisis, the condition is a progressive invasion of the tubercle bacillus.

Three stages are recognised:

1. **Early tubular deposit**, incipient phthisis; the connective tissue cells become swollen & undergo mitotic division. The resulting epithelioid cells having large pale nuclei, encroaching wherein round. The epithelioid cells,
in the centre gradually become fused and later granular in appearance. Giant cells may occur in the centre of the follicles or after caseation has set in they may be found in the cellular tissue around.

(2) Stage of advancing consolidation, where grey is replaced by yellow tubercle, the latter being due to caseation.

(3) Dissolution & bronchic formation. The caseous matter often gets discharged leaves bronchic which vary in size according to the rate of the disease. At the edge of the tubercular focus the lung tissue assumes a fibroid character; thus the alveolar tissue becomes obscured. The pleura covering the lung is usually involved, there may have been recent fibrous pleurisy & there is almost always thickening of the visceral pleura. The invasion is often in the apex of each individual lobe. The bronchi become congested & thickened & the lungs are often similarly affected. All processes of caseation are
the results of the products of the bacteria.

**Tuberculin**

Tuberculin is the name given to any product of the tubercle bacillus which can produce a specific reaction in any animal organ, i.e., affected by the bacillus—Koch called his first tuberculin lymph or this name it was known for quite a time. Pettenkofer was the first to call the product tuberculin (1884). Robert Koch in 1890 announced that he had discovered in tuberculin a cure for tuberculosis. At that period he believed it acted on the circulation of the parts about the focus that the diseased tissue died and softened, it was discharged. In reaction was due to destruction of lack of tuberculous tissue, or he considered healing was accomplished.

Tuberculin was administered to all cases of many a few far advanced consumption was hurried to his pace. A patient, for example, was given tuberculin to re-acted to 104°F. on the
following day, when he received a second dose
with similar results. This was continued
in some cases till death ensued.
A few observers protested against this con-
donary, but were unheded, 7. finally a
storm of indignation arose which reached
its climax when Virchow (1891) stated
that he found softening of recent extirpa-
tion of disease in patients treated with tuberculin.
7 dying of tuberculosis, 7 the period of
"tuberculin delirium" was over.

Laurence Brown in "Tuberculosis" p. 509.
Virchow later acknowledged that all
the changes he had observed do occur
in untreated patients dying of tuberculosis.
The tuberculin renaissance began about
1901 9 since then many tuberculins
have been widely used. All the
better known ones have led to good
results in various hands.

Some of the principal tuberculins are

_Boullé (human) boiled in brulin,
extracted 6-10% 7 filtered_ This is
the first of all tuberculins _it was introduced
by Koch in 1890.

Tuberculin R. Koch (tuberculin peroxidens)

An unheated 25% glycerine emulsion
of living virulent-powdered tubercle bacilli.

Bacillary Emulsion Koch

An unheated 50% glycerine emulsion
of living virulent-powdered tubercle bacilli – the coarser particles are
removed by centrifugalization.

P.T.O. Pasteur–tuberculin original – Dumper.

A 10% concentrated culture fluid of
tubercle bacilli – filtered – Bovine.

P.T. Pasteur–tuberculin – Dumper

Similar to P.T.O. but stronger – Bovine.

Benzenek's tuberculin TBK

It consists of 50% filtered culture
of human tubercle bacilli & 50%
of extract of bacillary toxiin in 1%
phosphoric acid – Indolplasm is
present in the form of acid albumen.

Koch's tuberculin is rapidly absorbed & has
a quick & sure action which soon passes off.
In this account it is, like other extract
tuberculin of special use for purposes of diagnosis, e.g., it is employed for the conjunctival, cutaneous, or cutaneous tests.

Tuberculin R. (T.R.) contains endoplasm. It does not require anything like the same precaution in its administration as old tuberculin. It is the mildest of Koch's preparations. Its slight toxicity makes it very suitable in all cases of great susceptibility, or where reactions are most undesirable, e.g., in Ridley tuberculosis. It can well be used as a preliminary to a course of old tuberculin or bacillary emulsion. Wright's results were obtained with minute doses of T.R.

Bacillary Somatium is a favorite tuberculin. It is used at many of the Duboisian county dispensaries. It is slowly absorbed from the site of injection except a relatively mild or prolonged action as do other forms of tuberculin endoplasm. Sometimes it produces an unexplained rash reaction. The dosage required may be less than that of T.R. B.E. or T.R. are better borne in febrile
more cases than most other tuberculosis.
P. T. O. is a weak tuberculin. P. T. is about fifty times stronger than are bovine. Grencher made investigations and found that the clinical patients with predominating tubercle infection bacilli were highly susceptible to the toxin of tubercle bacilli, very tolerant to bovine tuberculin; on the other hand that the cases of the predominating infection with the bacillus humans bovines showed hypersusceptibility to the bovine products and the toxins of tubercle bacilli with impunity. He concluded that the toxins of bovine and human tubercle bacilli are entirely different substances quite antagonistic to each other. He recommends as a guide to the general practitioners that any tubercular patient who gives a sharp fever reaction to the initial dose of Koch must be treated with bovine preparation. Those physicians who prefer to employ bovine tuberculin on account of its lesser toxicity must inject preparations of tubercle bacilli as soon as the former
Begin to have a highly toxic action.

"Tuberculin in Diagnosis Treatment"

Buchannan's Report 193.

Wilkinson recommends as a good rule to begin with P.T.O. proceed with P.F. & finish with Old Tuberculin. This method has been largely used at the Birmingham Dispensary.

Carl Dusart was the first to advocate a change of tuberculin if the patient was not responding to the first one used.

Pancecki's Tuberculin TBK is a good example of the milder acting tuberculin. Sahl speaks highly of it, preferring it to Old Tuberculin & TB. He considers the milder tuberculin treatment with no reaction as the best.

TBK is used in the Edinburgh dispensary the injections being given once a week.

Autogenous Tuberculin. If one believes in vaccine treatment, surely all medical men think there is something in it. One would consider there should be special value.
attached to tuberculin prepared from the host's own bacilli - Krause has treated patients with autogenous tuberculin, thought he got better results than with stock products. But the difficulty of preparation makes it unlikely that autogenous tuberculin will ever be much used.

Phagocytosis

Inutchkinoff, the investigator of the inflammation considered that phagocytosis constituted the essence of immunity both natural and acquired - that the bacteria ingested by the leukocytes are digested by means of ferments. When the cells are damaged, these ferments, which are normally intracellular, by the process of phagolysis become shed into the surrounding fluid to constitute complement. It is considered (Bandelie & Roepke) that phagocytosis in Inutchkinoff's sense is of greater importance during the specific treatment of tuberculosis than the determination of the opsonic index. It is much simpler to demonstrate Lowenstein's "has noted intracellular
grouping of bacilli in the leucocytes of sputum often with decreased intensity of staining & retrogressive changes in the more favourable cases, especially those undergoing treatment with tuberculin - Morland has noticed intracellular grouping in patients undergoing specific treatment, exclusively or almost regularly in the positive phase.

Present research shows that phagocytoxis is regularly present when the infection takes a favourable turn for the organism.


The preparation of slides to demonstrate the above requires a little extra care in order to avoid damaging the leucocytes. The phenomenon of phagocytoxis is therefore a valuable indication of injected treatment.

Complement is known at present only as a property of fresh serum - it is rapidly regenerated. Wassermann holds that antibodies by virtue of their avidity for combination with antigen extract the whole quantity of tuberculin injected from the blood & concentrate
it in the tubercular focus. In the union of the antigen (tuberculin) with its antibody (anti-
tuberculin) complement is fixed; consequently there takes place in the tubercular focus an
increase of these elements (leucocytes, ferments) which possess protein-digesting properties, thus
leading to softening of the tubercular tissues.
It is usually accompanied by fever which is the result of the softened tubercular tissue.
Other workers corroborate the above.
Bauer, when investigating complement fixation in children: tuberculosis, found that with the
appearance of a fair amount of anti-tuberculin in the blood, the reactivity of the organism to
tubereous or subtubereous tuberculin decreased.
The increase of antibodies may possibly be used as a general guide to the further course of
the treatment, so that the method of complement fixation may eventually prove valuable
for the control & direction of specific treatment. The technique is not difficult.
Paraphylaxis.

The discovery of the tubercle bacillus in 1882 by Dr. Robert Koch gave a new impulse to the recognition of the necessity of preventive measures to lessen tuberculosis — e.g. by educating the world toward it as an infective disease to take precautions. In various countries laws and regulations followed with the object of preventing tuberculosis in man and cattle. France held a tuberculosis congress in 1898; there was one at Berlin in 1899, and an international one in England in 1901.

Heredity. The way the disease gains entrance to the body has been much discussed. It has been believed to be hereditary for generations. Medical literature records about twenty cases of hereditary tuberculosis — rather more cases are recorded among cattle. Theoretically it could be transmitted through the sperm, or by the blood. The common method of transmission is doubtless through the placental vessels. Baumgartin believes that the tubercle bacillus can lie latent in the tissues and develop at some time when the resisting power of the child is reduced.
Because of the great prevalence of the disease in early life or because of its localization he believes the form to have been present since birth. But it is a fact that children of tuberculous parents if removed from them soon after birth enjoy an immunity from the disease which would be impossible if intra-uterine infection was not extremely uncommon. Experience with cattle favours the belief that post-natal infection is the important factor to guard against. The Bang or Danish system works on this belief; calves with tuberculous mothers are moved to places free from contamination reared on sterilized milk, or milk from healthy cows. The results prove that even in cattle intra-uterine infection is rare. Children in orphanages don't often suffer from tuberculous though it is not uncommon for one or both parents to have died of it. Hereditary Tendency. There is no question about this. The tendency to contract the disease is often transmitted in families. There is a peculiar vulnerability of tissue which may be due to health weakness in
the lung, or owing to small resistance in the
defensive cells of the body.
Relative Immunity.—Adults of good physique,
in functional organic health, possess a
nearly perfect protection against natural
infection by the tubercle bacillus. Barrens,
&c. Any but Saxons seem to have acquired a
certain immunity, either by gradual immu-
nization, or by elimination of the weaker, mes-
on the other hand, Negro & Indians are
very susceptible.
Three essentials in prophylaxis are:
1. A knowledge of the means of transmission;
2. A recognition of the importance of social &
personal environment;
3. A firm conviction that the disease can
be cured, or arrested, if recognized & treated
early.
Infants & young children are very sus-
ceptible to tubercular infection, therefore the
danger of infection justifies every precaution
that can be taken in the feeding & isolation
of the newborn. Unsuspected tuberculosis
is not uncommon & if the mother has a
latent focus there is no time more favorable.
For it to become active than during parturition or lactation, the pure breast feeding must be stopped if there is any suspicious ail-
ment in mother or wet nurse.
Some or later milk is given to infants. Very care must be taken to avoid the dangers of typhoid bacilli in it.
According to Dr. Behring the mucous mem-rane of new born infants possesses no continuous epithelial covering. The gland tubes of the ferment producing glands are little if at all developed at this time.
The laps stress on the infection gaining entrance in early infancy, or having a varying latent period. In the suppression of tuberculosis he considers the following points to be essential.
1) Prevention of the introduction of tubercle bacilli with food especially with milk during infancy life.
2) Introducing tubercle anti bodies with the milk in earliest infancy in order to render immune any inhaled tubercle bacilli.
The production of tubercle free milk will be very easy if my method of cattle immunization.
fulfills in practice the hopes which I have for it—page 59. "Suppression of Tuberculosis." von Behring.

A drawback in the immunization of cattle at present is the use of living bacilli, which may remain latent in the tissues, or, though harmless to the cattle, may be a source of danger in the flesh or milk.

In later investigations von Behring has used tubalase and tuberculase in hopes to gain as good results as with the living virus. If so, the application of specific immunization to man will then follow.

The duration of protection is not yet known, but even if it is only for months, the period of greatest danger might be lessened over till by the growth of natural resistance immunity is established.

At present our cattle are not immune; one fears there is not a dairy free from tuberculosis in the United Kingdom.

The children would have a better chance if the milk came from cows which do not react to tuberculin, if no tuberculous person is employed in the milking, if further, if the milk is protected from dust and flies.
These conditions cannot be fulfilled at present. Therefore some form of sterilization is necessary as a safeguard. Pasteurization is the best method, but, with poor people one recommends boiling because it is more easily quickly done to guard the milk against contamination till it is used.

Children should not live with consumptive parents. In France a society has been formed to prevent it. 60% of children living in such homes were attacked with tuberculosis while 40% died of the disease. The children are sent to selected homes in the country or to the seaside. The mortality has fallen to 25%. There is no time limit. The children may stay away until the supervising physician thinks they are strong enough to resist tuberculosis infection. This is done with the consent of the parents, but till it can be achieved other precautions must be taken.

Tuberculous relatives should be prevented from coming into contact with infants and certainly must not kiss them. In any way phthisical person should live
with children, or prepare their food, much less offer it in any cup or dish they are using. Children should not visit where tuberculous people live. Public places of amusement should be avoided, e.g. the monkey house at the Zoo because monkeys in captivity are often have tuberculosis. Much can be done to strengthen resistance by keeping infants out in all weathers, except the most severe heat or cold. The daily sleep should always be in the open air. After infancy more invigorating measures are effective, e.g. cold swimming to chest or neck, cold breathing exercises etc.

Children are peculiarly susceptible to the tubercle bacillus, but their resistance to the extension of the disease is considerable. The death rate from the end of the first year to the fifteenth year is certainly not as high as during other periods of life. If children should contract the disease one would recommend that they should be sent to a day open air school for phthisical children. In England we
have such schools at- Kinsale, Whitby, Barnby
Rettving, Romish & York etc.

Or better still, are the "Residential Sanatorium
Schools for children with pulmonary tuberculosis"
as carried on at Harpenden, Holt, Kindred,
Hayland & other places. There are also
quite a number of such schools especially
for surgical cases, for which if possible one
would select a seaside situation. The
fact that children are now educated
as well as treated while in residence quite
adds to the value of these schools; the
lessons are given out of doors or on
covered verandahs.

Unfortunately, the number of such schools
is not enough to cope with the tuberculous
children needing treatment; of the re-
mainder, some are admitted to sanatoria
for adults, or to infirmaries or hospitals;
or again others who are excluded from
school keep aimlessly about the streets, or
do housework or something else unsuitable.
All schools should practice some open-air
teaching & in this way impress upon the
children its value. Breathing exercises.
should be better taught -9 month breathing
not allowed - adenoids & teeth must
be attended to.
In New York children's school farms are
arranged. Here children predisposed
to tuberculosis may spend the greater part
of the day gardening, learning to see
why fresh air, cleanliness & sunshine
are necessary to life & health. One hopes
this will teach them to demand such in
their own homes.
But the greatest prophylactic help is
The Tuberculosis Dispensary,
the importance of which cannot be too
strongly emphasized.
Sir R. W. Philips, the father of the tuberculosis
dispensary idea says "A dispensary is a
central institution devoted to the guidance,
supervision & assistance of the tuberculosis
in an information bureau - a clearing house,
a centre for the supervision of home treat-
ment - the connecting link or knot
that completes the chain of other under-
taking for the prevention of tuberculosis."
The following is a diagram of the
Edinburgh anti-tuberculosis scheme.

It illustrates the relationship of the dispensary to other factors in the campaign. It shows what organisation can do and what has accomplished.

Double connecting lines in the plan indicate constant intercommunication - uninterrupted ones less direct communication.

The patients go to dispensaries for advice & treatment - once or twice a week, according to arrangement - many of the cases have
Tuberculin administered in Edinburgh once a week, some places twice a week. They are kept as long as necessary under supervision. Those fit for work are allowed to continue their occupation while under treatment.

In most English towns there is a dispensary, but few have the army in connection with the sanatorium, where work can be supervised and gradually increased as health and strength increase return.

Vaccination is a valuable help in the eradication of tuberculosis. The longer it is in force the greater will be the assistance it gives to prophylaxis. It affords the health visitor great opportunities for giving useful advice, encouraging fresh air, and many ways teaching hygiene. It brings the 'contacts' for examination to the dispensary, so that early cases are discovered and treatment is given while the disease is still young.

Hospital for advanced cases are a great blessing. There are the patients who are most likely to spread infection if at home without trained attention. Often they cough...
much of their weakness can't be careful about the sanatorium. Also with such cases the contact is close, as they have to be washed or even fed—therefore to have them isolated and looked after by nurses who understand the dangers of infection. Knowledge to take necessary precautions is a great prophylactic help.

Subsequent visitors are quite good practice in the education of the public. Children of ten years of age or older should be admitted.

Lectures to school children on the prevention of tuberculosis are more useful than the things they learn.

One would like that there should be a special maternity sanatorium in every large district where tuberculous mothers could go for a few months before their confinement. They should remain in the sanatorium for some time after childbirth. The good effect on the health of the mother and child would compensate for the outlay. The hygienic training which the mother would get would be of lasting benefit to
herself, her family, to the community.
Do tuberculous Government employees have proper supervision? Care? An examination of the chest of every worker who in six months would be helpful in selecting those affected and give them a good chance of an early recovery. One imagines that phthisical inmates of prisons or reformatory are not isolated or discouraged as soon as one would wish, that prophylaxis is neglected in these places.

The Effect of Environment.

Housing. It is now well known that phthisis is found more or less where ever human beings are gathered together, whatever the climate. It is more prevalent where the air is rendered foul by respiration, where the ventilation is bad, where the soil is badly drained and impure, where the dwellings are dirty and ill lighted.

It is rare among the peoples who live an open air life. The aboriginal natives of Australia escape the disease almost entirely; but in the large towns it is as
common as it is in Europe. The Highlanders who inhabit well built-houses on the mainland of Scotland are subject to the same fate as the other inhabitants, but the ill fed, ill clothed fisherman of St Kilda and the Hebrides, who live much in the open air, though of the same race, hardly ever contract the disease.

The Treatment of Phthisis. A. Ransome, M.D.

Investigations made regarding some of the worst districts in Manchester & Salford showed that phthisis was most prevalent in the close courts & alleys, the shut in & blocked up lanes, & above all, in the houses built back to back with no through ventilation. In the course of five or six years many cases were noted of 2 or 3 in the same house. The Edinburgh dispensary has dealt with seventeen cases in one house.

As long ago as 1888, Dr. Barry & P. Gordon Smith reporting on back to back houses said that it appears probable that the want of through ventilation gives rise to an increased mortality from pulmonary disease, phthisis & diarrhea. The writer's experience strongly confirms this.
yet such houses still stand, & for lack of proper accommodation the poor are obliged to live in them. Houses should have plenty of light & air, but even now one still finds windows made not to open!

Occupation is often a predisposing factor. Any work which prevents the free full working of the lungs may cause a tendency to phthisis — mining, book-binding, stitching or work as cells are in instances — a dusty atmosphere renders the lungs less capable of resistance.

All trades which cause pneumoconiosis favour the onset of tuberculosis — e.g. glass workers — stone masons. With case

On the other hand open air occupation increases the resistance of the respiratory tract & promotes heart power.

Ventilation. "In single room it is of greater importance than that which relates to the proper arrangement of ventilation of the dwelling house" (in the prevention of tuberculosis).

Principles & Practice of Medicine Basics p. 263
Ransome said that he never found any satisfactory proof of infection direct or indirect in any well ventilated house in this country, even in spite of close contact, as in the attendance of a wife upon her husband, or in the nursing or sleeping together of near relatives or friends.

Free ventilation and abundance of light are antagonistic to the tubercle bacillus. Specimens of sputum exposed to both air and light for two days become harmless. This happens in about an hour in the sunshine. Living rooms should be flushed several times a day with free currents of the outer air. Fresh air day and night must be admitted to all living rooms. Sunlight must be let in as much as possible. It is nature's best gift for the prevention of disease.

The reports of Dr. Greenhow in 1860 abound in notices of bad ventilation of all kinds of work rooms. Instances of the good effect of ample cubic space and free currents of fresh air. Thanks to our Public Health authorities things have improved since that date, but we can realise that among the
aggravating circumstances that may indefinitely increase lung disease, probably none is so effective as the bad ventilation of the work place.

Overcrowding is usual in prisons, and there tuberculosis is very common. Prisoners are not medically examined before admittance. There is no separation of the affected inmates. Besides the lack of exercise, the depressing influence of confinement. It is small wonder that many succumb.

Light is beneficial to all disease. There is no doubt that sunshine wonderfully helps phthisical patients in fighting the disease. It purifies the air, helping to destroy bacteria. It has an extremely strong action in destroying the residue of tuberculous sputum and dust. The warmth of the sun increases phagocytic action. Recent investigations have shown that direct sunlight kills the tubercle bacillus in from two to ten minutes, if no light-absorbing medium is between the bacillus and the light.
The Effect of Food

Malnutrition Children often suffer from malnutrition, not simply because they are underfed, but because they are short of certain necessary constituents in their food, e.g., fat or protein. It is estimated that about 600,000 in public elementary schools suffer from malnutrition; such a state probably renders the children more vulnerable than any other factor. To prevent this many towns have provided meals for such children, but in some cases only one meal a day is that during about a third of the year only. One fears that such intermittent feeding is not sufficient to greatly raise the resisting power of such children to the tubercle bacillus. The food should be plentiful, rich in fat and protein for children with any tuberculous tendency. Margarine can be recommended instead of butter, if the latter is limited in supply because of its price.

Infection by Food. The procuring of clean, pure milk free from pathogenic sepsis, is recognized as of the greatest importance in fighting tuberculosis. There is a certain proportion...
of cases, chiefly in children, where infection comes from food, principally milk, butter and cheese. This infection could be easily prevented by the elimination of tuberculous milk from dairy cattle, or, until then, by sterilising all milk. If this were done tuberculosis in children would practically be abolished.

One knows well that the children of the well-to-do who have plenty of milk, or who often take it unboiled, suffer comparatively little from tuberculosis—good hygiene helps to combat any infection.

Butcher's meat may be a source of infection. Possibly it is not inspected as rigorously as might be desired. In France as long ago as 1852 whenever the tuberculous process affected the lining membrane of the chest or abdomen, the entire carcass was condemned. But, even now in England, this diseased part is taken away, the rest sold, probably with the idea that if the meat is well cooked it will not be infective. Public slaughter houses should be instituted
in all towns & all such infected carcasses confiscated & the owner compensated.

Flies as agents in dissemination of tubercle bacilli.

Dr. Charles Andre finds that flies are active agents in the spread of tubercle bacilli, polluting food stuffs with bacilli adhering to put after contact with sputum. After feeding on tuberculous sputum they evacuate bacilli within six hours. Food thus polluted by flies will infect guinea pigs. It is therefore of prime importance to disinfect sputum & faces & to protect them from flies. Food must be protected & flies destroyed as far as possible.

_Tuberculosis_ by Klebs, MD. p. 49.

The effect of previous diseases. Measles, whooping cough, broncho-pneumonia, lobar pneumonia with imperfect resorption, often leave behind them a serious tendency to the disease. Causes which produce a temporary or permanent sub-normal resistance to _tuberculosis_ are often of greater importance than heredity or structural weakness. _Tuberculosis_ is
no respect of aetic constitution, rendered temporarily susceptible, though it is often unconsidered in such persons.

Paraphrastic measures for the general public might be tersely summed up:

Open that window.

Kill that fly.

Boil that milk.

Punish spitting.

The writer would be pleased if spitting was made a penal offence.

The Registrar-General reports that about 30,000 deaths occur every year in the United Kingdom from pulmonary tuberculosis; 720,000 more from other forms of tuberculosis. Great efforts are required to combat the disease. It is cheering and encouraging to bear in mind that deaths from phthisis are steadily lessening, as the table on the following page shows.

So prophylaxis is bearing fruit.
TUBERCULOSIS IN SCHOOL CHILDREN.

72. This annual table kindly prepared by Dr. T. H. C. Stevenson, Superintendent of Statistics at the Registrar-General's Office, shows that the mortality from tuberculosis among children and young people continues generally to decrease. The death-rate from all forms of tuberculosis among children (under 15 years of age) is greatest during the first five years of life. The mortality from phthisis is lowest between the ages of 5 and 10 years and shows a steady increase during the remaining age periods, the increase being particularly marked during the 15-20 age period. The mortality from other forms of tuberculosis declines after 5 years of age.

England and Wales: Mortality at several ages from all Causes and from Tuberculous Diseases, 1907-1912. *

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Deaths under 15 years of age per 1,000 Births</th>
<th>Death-rate per 1,000 living</th>
<th>1-5</th>
<th>5-10</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
<th>25-35</th>
<th>35 and up</th>
<th>All Ages</th>
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<tbody>
<tr>
<td>1907.—All causes -</td>
<td>117.63</td>
<td>18.34</td>
<td>3.49</td>
<td>2.06</td>
<td>2.94</td>
<td>3.71</td>
<td>5.68</td>
<td>24.89</td>
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<td>Phthisis -</td>
<td>0.40</td>
<td>0.20</td>
<td>0.17</td>
<td>0.27</td>
<td>0.58</td>
<td>1.33</td>
<td>1.68</td>
<td>1.74</td>
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<td>Other Forms of Tuberculosis.</td>
<td>4.14</td>
<td>1.67</td>
<td>0.31</td>
<td>0.30</td>
<td>0.25</td>
<td>0.21</td>
<td>0.18</td>
<td>0.17</td>
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<td>1908.—All causes -</td>
<td>120.43</td>
<td>16.81</td>
<td>3.56</td>
<td>2.00</td>
<td>2.81</td>
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<td>4.86</td>
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<td>0.16</td>
<td>0.28</td>
<td>0.56</td>
<td>1.35</td>
<td>1.66</td>
<td>1.67</td>
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<tr>
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<td>4.29</td>
<td>1.72</td>
<td>0.50</td>
<td>0.30</td>
<td>0.25</td>
<td>0.31</td>
<td>0.18</td>
<td>0.16</td>
<td>0.47</td>
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<tr>
<td>1909.—All causes -</td>
<td>108.78</td>
<td>16.70</td>
<td>3.48</td>
<td>2.05</td>
<td>2.91</td>
<td>3.61</td>
<td>4.79</td>
<td>24.60</td>
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<tr>
<td>Phthisis -</td>
<td>0.29</td>
<td>0.25</td>
<td>0.16</td>
<td>0.28</td>
<td>0.55</td>
<td>1.31</td>
<td>1.61</td>
<td>1.62</td>
<td>1.06</td>
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<td>3.71</td>
<td>1.84</td>
<td>0.47</td>
<td>0.32</td>
<td>0.27</td>
<td>0.19</td>
<td>0.19</td>
<td>0.16</td>
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<tr>
<td>1910.—All causes -</td>
<td>105.44</td>
<td>14.79</td>
<td>3.05</td>
<td>1.91</td>
<td>2.67</td>
<td>3.40</td>
<td>4.41</td>
<td>22.61</td>
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<tr>
<td>Phthisis -</td>
<td>0.39</td>
<td>0.27</td>
<td>0.18</td>
<td>0.27</td>
<td>0.50</td>
<td>1.23</td>
<td>1.46</td>
<td>1.51</td>
<td>1.02</td>
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<tr>
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<td>3.22</td>
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<td>0.47</td>
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<td>0.21</td>
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<tr>
<td>1911.—All causes -</td>
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<td>2.05</td>
<td>2.88</td>
<td>3.51</td>
<td>4.53</td>
<td>23.13</td>
<td>14.59</td>
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</tr>
<tr>
<td>Phthisis -</td>
<td>0.36</td>
<td>0.25</td>
<td>0.16</td>
<td>0.29</td>
<td>0.88</td>
<td>1.89</td>
<td>1.68</td>
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<tr>
<td>Other Forms of Tuberculosis.</td>
<td>3.46</td>
<td>1.53</td>
<td>0.46</td>
<td>0.29</td>
<td>0.25</td>
<td>0.18</td>
<td>0.15</td>
<td>0.15</td>
<td>0.41</td>
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<tr>
<td>1912.—All causes -</td>
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<td>14.19</td>
<td>3.06</td>
<td>1.90</td>
<td>2.75</td>
<td>3.28</td>
<td>4.29</td>
<td>23.20</td>
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<tr>
<td>Phthisis -</td>
<td>0.23</td>
<td>0.21</td>
<td>0.14</td>
<td>0.26</td>
<td>0.55</td>
<td>1.25</td>
<td>1.46</td>
<td>1.51</td>
<td>1.02</td>
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<tr>
<td>Other Forms of Tuberculosis.</td>
<td>2.38</td>
<td>1.29</td>
<td>0.41</td>
<td>0.25</td>
<td>0.28</td>
<td>0.16</td>
<td>0.14</td>
<td>0.14</td>
<td>0.35</td>
<td></td>
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</tbody>
</table>

* The above rates have been calculated upon fully revised estimates of population based upon the enumerations of 1901 and 1911. In order to secure comparability, deaths from acute military tuberculosis, which from 1911 onwards are classed by the Registrar-General under phthisis, have been included throughout under the heading "Other Forms of Tuberculosis."
Curative Treatment of Tuberculosis.
Inhalation.

Dr. Lee in the Bradshaw Lecture on "Incipient Pulmonary Tuberculosis" says that the abolition of pulmonary tuberculosis is feasible on two conditions: first, that every practitioner shall learn how to detect the disease at its first appearance, long before any bacteriological evidence is available; secondly, that a method of treatment can be employed in the patient's own home which will be simple, harmless, completely effective, yet inexpensive.

The early diagnosis is to be achieved by careful percussion. Dr. Lee takes it for granted that all patients come for advice in this stage. Many do not. One agrees that many general practitioners don't diagnose till the tubercle bacilli are discovered, but to be quite fair, the symptom so often is there with bacilli in it; when the patient first comes for advice.

The method of treatment is by constant continuous antiseptic inhalation. He claims that cases can be cured to which otherwise would have no hope of recovery.
commencement the patient stays in bed for fourteen days, wearing a toasted ice in the inhaler day and night except at meal times.

The following prescription is used:

**Bromide 31/2**

Ac. Carb. 31/2

J. Lax. 31/2

Ph. Other 31/2

Ph. Chlor. 31/2

Sig. Six drops on the inhaler every hour during the day. Once or twice during the night.

The treatment should be for three or four months in an early case but some patients are able to begin work in three or four weeks, continuing to use the inhaler for three or four hours in the evening and during the night. This should be done for six months after recovery. In smoking is allowed.

The writer treated the following case on the above method but in a small hospital, not at home, where fresh air, good diet, and rest were included.
Mrs. S. W. - Age 15 years.

Patient came under my care at the end of June 1912 - with a skin eruption due apparently to malnutrition - for she was thin and stunted looking. She had had measles two weeks previously.

She was put on extra milk & malt extract - A fortnight later an acute pleurisy developed over the lower lobe of the right lung posteriorly.

The chest was very poorly developed; expansion slight & the scapulae projected markedly. The breath sounds all over the chest were very feeble.

The pleurisy cleared up, but the fever expanded, faint breathing & dulness over the lower lobe on the right side posteriorly remained, as did the cough.

There was a little morning emaciation, but tubercle bacilli were not found in it - though repeatedly examined she had phthisis. She was admitted into a small hospital (Homes, West Derby) where she was still under my care to get open air treatment.

Constant inhalation anticipate after the method
of Dr. Lea was carried out. She was in bed for 3 weeks—wearing the inhaler constantly. Tb symptom stopped during the fourth week. At the end of six weeks the cough had gone. Breathing exercises 5 minutes three daily were ordered to gradually increase to double that time & were done either out of doors or in front of the open window. Twice daily she took a short walk which was extended week by week but never was more than 1/2 miles—after three months treatment—Patient did a little light house work half an hour twice daily—1 hour twice daily. About the middle of March 1914 Patient returned to work in a Training Home for Girls. She has now been in domestic service for six months—her mistress says she is in good health; she is one of the writers' friends patient— but has never come for advice. She gained 1st. 2 lb —improved in every way while under treatment. The chest —developed wonderfully—moved well & the breath sounds were much stronger. The charts show the temperature raised now
9 thin, even at the end of the time—several times during its convalescence. The pulse was quicker than one would have wished, but the skin was warm.
Specific Treatment—

(a) Autovaccination—

Dr. Mark Patterson of Frimley Sanatorium has described a system of graduated exercise for his patients with the object—

(1) of raising the patient to his normal or highest known weight—

(2) of raising the patient's specific resisting power to such a degree that he can perform the hardest work without the risk of introducing a dose of pathological products into the blood large enough to produce constitutional disturbance;

(3) of stopping or greatly diminishing discharge of sputum.

"Auto-vaccination in Pulmonary Tuberculosis," p. 8

He thought that if it was possible for consumptive persons under adverse circumstances, without medical guidance, to work hard with extensive physical signs without apparent injury, then under ideal conditions with the work carefully graduated in accordance with their physical state they ought to be capable of undertaking useful labour. He prescribes latrine exercise.
for two periods daily of two hours duration.
When improvement follows the patient
proceed from one grade to a higher.
Grade I. consists of walking exercise. 10 miles.
Grade II. Carrying light weight in basket.
Grade III. Digging broken ground with little shade.
Grade IV. Digging unbroken ground with ordinary
shades. until finally, those who are accus-
tomed to manual labor, can use a pick
shovel for six hours daily without detri-
ment to health.
If the work causes a rise of temperature,
loss of weight etc. the patient is sent back to
a lower grade; or if the temperature rises as
high as 99° with constitutional symptoms he
is put to bed, or, with the exception of diet,
is treated like a typhoid patient.

The object of this complete immob-
ilization is to diminish the discharge of bacter-
ial products into the blood which gradually
regains its resisting properties until the
constitutional symptoms altogether disappear.

(Pathmon)
When bodily strength or the power of the mind
are reduced by sickness, morbid depression
is apt to make the patients discontented.
Any periods of mental or physical inactivity
have a demoralising effect. Graduated
labour has a moral effect which it is
difficult to overestimate in such cases.
This has been realised at the Victoria
Sanatorium near Edinburgh where the
patients for years have done less or more
work, under the direction of Sir W. Phillips.
They begin with walking exercise, or raking
plant—mowing lawns—gardening
in one form or another. Certainly work
was done by the patients at Edinburgh
long enough before Paterson wrote his Auto-
irrationalism.

The results at both places are excellent.
Still at most Sanatoria the only exercise
allowed for is walking. Is this because
of the greater outlay demanded in any
other form of work, or because much more mental
or still are required to suit the work to
the patients’ strength? The control of auto-
irrationalism calls for more care and watching
if the patient is working than if he is leading a
life more or less free from physical exertion.
One has recently come across a case in the quinqucent stage where exercise certainly did mischief. A young lady had been troubled with pleurisy in the neck, for a year with little improvement. Her doctor ordered a change to the seaside 0 hose exercise. A sudden rise of temperature followed, patient was put to bed, the pleurisy inflamed, suppurred, and had to be removed. During this period the girl was often troubled with pain about the knee. It is a year since this occurred, she has been lying in a sanatorium for ten months; the hip is still splinted.

Specific Treatment (continued)

(1) Artificial Tuberulin

There is no doubt that tuberulin is a valuable adjunct in the treatment of tuberculosis. Some dispensaries are using it less than formerly; at some few sanatoria it (e.g., Frodsham Sanatorium) it is hardly used at all. Still it is here to stay.

The writer, even in the limited experience...
of a small private practice has found it useful both in diagnosis and treatment. Well-marked pulmonary tuberculosis is practically always without difficulty, to be recognized by physical examination, or in most cases by tubercle bacilli in the sputum. But if the clinical history is uncertain or the physical signs are negative it is difficult to decide whether the disease is present or not.

While phthisis is such a universal disease such cases will constantly be met diagnosed usually or not at all, unless the best "diagnostic agent," the injection of tuberculin is used, of its result considered along with clinical observation.

The following tests are used for diagnosis.

The conjunctival test — Wolff-Dienes

Ophthalmic reaction — Calmette

is done by injecting one drop of one to four per cent Koch's old tuberculin into the conjunctival sac. Calmette treated 10,000 patients — considered it free from danger.

Other workers think the test is unreliable.
in human phthisis, because reaction may be negative even if active tuberculosis is present as we cannot inject a 10% tuberculin into the eye. Also there are times when the reaction causes more serious trouble than is compatible with the comfort of a general practitioner. It is not much used.

The Cutaneous Test von Pirquet

This test is of great interest and often very useful. The writer has often used it at the request of colleagues on their patients. The Tuberculosis Officer in Derby has accepted patients, both children and adults, for dispensary or sanatorium treatment after seeing the results; the patient being sent for inspection while the reaction was at its height.

The technique is very like that of vaccination. Koch's old tuberculin 25% with ½% carbolic acid was used by von Pirquet. If the result is negative a repetition with old tuberculin is recommended. A control site is done, usually mid way between two tuberculin inoculations, which should be four inches apart.
A positive reaction produces hyperemia, excudation of a slightly raised reddened area, followed by an inoculation papule of varying intensity. It is usually well developed in 24 hours, but at its height in 48. This cutaneous reaction is a diagnostic method as easy as it is harmless. The positive result gives no information as to the site of the disease, or its activity or inactivity, but it shows that the body somewhere has at some time been affected with tubercle bacilli. The diagnostic value is very reliable. It is of most value in children under six or eight years. But in all positive cutaneous or conjunctival cases the subcutaneous method has finally to decide whether tuberculous disease is present or not. If the cutaneous test is positive, but the subcutaneous negative, then it is certain that there is no active pulmonary tuberculosis and the supposition that there is an obsolete, healed or inactive focus is justified.

"Tuberculin in Diagnosis"

Baedeker & Baedeker: page 140
The Sub-cutaneous Test

Is helpful in making an early diagnosis in doubtful cases to determine the course of treatment. In man the limit of 0.005 c.c. (ten milligrams) of the patient's tuberculin, 0.01 c.c. will produce a severe general 3 local reaction. The general reaction consists of fever, 103°–106°, with other symptoms viz. headache, pain in the limbs, great lassitude, loss of appetite, sometimes even jaundice or a measles rash on the chest or neck. A severe local reaction sets in early in four or five or even three hours after the injection and lasts twelve to fifteen hours. In milder reactions, the fever is delayed, occurring in 8–12 hours. The fever then may be of slight duration, therefore unless the temperature be taken every two hours it may be overlooked.

The diagnostic dose is 0.001 c.c. Old tuberculin; if doubtful result, after at least 4–8 hours, give 0.005 c.c. → 0.01 c.c. (10 milligrams) A record of the patient's temperature, for three or four days prior to the injection, should be kept.
If there is a tuberculosis lesion the fever caused by the dose soon abates.

Parnaeus Vincentius says that in the early stages of tuberculosis it has been his uni-
form experience that while during the reaction 1 to 3 days after there is a
loss of weight amounting to 1-3 ib. in proportion to the severity of the reaction, in
the following few days, the weight is not
only restored to the amount before the dose
was given but another 1ib or 1½ ib is added.
Thus within 8 days there is a nett gain of
1-1½ ib in weight (or even more) - and
the patient spontaneously acknowledges a
feeling of improvement.

The following case illustrates this as the
value of the subcutaneous test.

Miss B. M. Age 19½ years.

Family History: Father died of phthisis (29)
Patient is the only living child out of a
family of seven - 2 brothers lived only
one day - one aged six wasted away.
2 sisters died of phthisis at 17 & 25.
One died from unknown cause.
Present Illness. Patient was brought to me about the end of March 1912, because she had a slight cough, no apetite, always felt tired. Her mother feared she was going like her sisters.

Nothing was discovered in the chest. A son Biogar gave a positive reaction. The knowledge that the father and one sister had been nursed entirely at home that consequently the pilot had been much exposed to infection influenced one's treatment. She was put for a fortnight into a small hospital to be watched and observed by the under - The temperature was taken two hourly for three days, before 2 days after the injection, which gave Koch's tuberculin 0.01 cc was injected, resulting in a slight reaction - 48 hours later 0.005 cc was given which resulted in a stronger diagnostic reaction - temp. 100.6 - with headache.

Loss of apetite - Careful examination of the chest - detected harsh breathing at the left apex, no accompaniments - The reaction was at the height at mid night. It might have been overlooked, if the temperature had not been taken two hourly - The weight.
was very interesting—
Ap. 10. 6st. 1½ lb. in night dress.
Ap. 16. 6st. 8½ lb. dressed; scales broken &
patient had to front to be weighed.
Ap. 20. 6st. 8 lb. (one week after injection).
Ap. 21. 6st. 11 lb.
Patient looked better, felt better, ate better!
She had a very pleasant time. The Medical Office
of Health was induced to take the girl into
the Bryn Athyn Sanatorium where she remained
eight weeks & steadily improved. She is on my
hand & has been filling well, keeping steadily
at work since leaving the sanatorium in the
summer of 1912.

**April 1912.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Temp.</th>
<th>Results</th>
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<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>10-13</td>
<td>101°</td>
<td></td>
</tr>
<tr>
<td>10-16</td>
<td>103°</td>
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<td>10-18</td>
<td>105°</td>
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<td>10-20</td>
<td>106°</td>
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<tr>
<td>10-22</td>
<td>108°</td>
<td></td>
</tr>
<tr>
<td>10-25</td>
<td>109°</td>
<td></td>
</tr>
</tbody>
</table>

The temperature for 48 hours after each injection was taken
2 daily. The chart records the highest temp. reached.
Contraindications in the Use of Tuberculin in Diagnosis.

Fever; above 99° in the mouth.

Acute haemoptysis; because the local reaction increases the possibility of death being effected.

Renal disease; because it may cause serious damage, e.g. haematuria - increase of albumen.

Of all the tuberculins the writer has had most experience in the use of T.B. It is an endoplasm preparation, is very soluble and easily absorbed. Its effects are gradually produced so the reactions should be mild and prolonged. In treated tuberculin one's aim is to produce mild, but prolonged local reactions - an immunising response with minimal disturbance of general health. It is with the endoplasm preparation that the small dose system was into prominence in the hands of Wright and his followers. Beranek's tuberculin (T3K) is one of the best examples of the milder acting tuberculins.
T.B or B.E. can both be recommended in localized tuberculosis. Immunity is quite independent of reactions. The important point is by gradually increasing the dose to make the individual insensitive to 100 per cent, since it contains all the immunizing substances of a tubercle culture, at the same time insensitive to the tubercle bacillus—both aimed at avoiding reactions with T.B.

T.B. is especially to be recommended in bone, joint, tuberculocele. In many hands it has given good results in renal and bladder tuberculocele; the former is more frequent than was formerly supposed. In the pathological institute at Prague free were demonstrated in the kidney in 5.6 per cent of the autopsies on adult tuberculosis patients. In many instances it is secondary to pulmonary or other free, which are frequently slight or latent—Occasionally it is primary. Little is known as to why tuberculosis settles in the kidney in one case and not in another. Injury may play a part—Sometimes the disease comes in Multiple kidneys.

It used to be taught that tuberculosis nearly
always began in the bladder, extended up the ureter to the kidneys.

Baumgartner & Kramer have demonstrated by experiments on rabbits that though extensive tuberculosis of the bladder followed the injection of tubercle bacilli into the urethra, it never ascended to the kidney, or down to the testicle, even after a year or a half. But on the other hand, if disease of the kidney was first-produced, it readily affected the bladder.

The tubercle bacilli follows the course of the secretions & excretions in the genital urinary system. Tuberculosis of the bladder is always secondarily infected from the kidneys or genital glands (Bandolin & Rapf) — it has a marked tendency towards recovery after nephrectomy. Some writers recommend the combination of surgical & tuberculin treatment in urgenital tuberculosis, etc. Bevan.

Sir F. Philip considers tuberculin can take the place of surgery: (1) in certain cases in which a topical diagnosis cannot be made with certainty or when the result of the operation is either doubtful or fruitless; (2) in a number of non-surgical cases, for example, on extensive
tuberculosis of the urinary or sexual organs in which a radical operation is impossible. Kano states that the great importance of specific treatment in renal tuberculosis lies in the fact that it not only cures the tuberculous kidney, but also the primary focus or prevents the infection of the other kidney. He considers that treatment after the removal of the primary diseased kidney by operation assists the natural cure of the bladder or genital organs affected by tuberculosis.

The two following cases illustrate the treatment of renal tuberculosis.

A Kochi wound syringe was used for the injections and they were given in the arm. The author made her own dilution according to the direction of Bandelin & Prepke in "Tuberculin in Diagnosis & Treatment."
Mr. B. — Age 54; married 12 months.
Been a widower 14 years.

Family History — Patient is one of 11 children.
4 brothers, 7 sisters in good health.
One died aged seven, gradually
wasted after measles — one when a
child had multiple abscesses in arm
has an ankylosed elbow.
No acknowledged tuberculosis in the
family or relatives —

Previous History — Six years ago, pain in the left
lumbar area — the part was strapped.
Since the menopause at 58. Patient
has been troubled with bad attacks of
sickness, "rafting" for hours but never
vomited food. At the same time a sinking
feeling in the left lumbar region. Headache
attacks lasted for about 24 hours — sometimes
three in a fortnight. Very active, solids for years.

Present Illness. Patient had good health till
the spring of 1912 when she first noticed
some discomfort & slight pain in the hypog.
— faeces making her want to pass
water — at that period this only came on
towards the end of the day. There was no
frequency of micturition, but slight pain at the end of the act. She was under the doctor for a month & improved.

In July 1912 she had micturition in her right arm & was in bed for ten weeks. After being in bed she became troubled with great pain in lower part of the abdomen & to a lesser extent in the left iliac region. Her doctor reported the urine normal.

This attack passed, but this came, more or less frequently, worse. Frequency of micturition was noticed, first during the days, but later at night as well. The urine was never high coloured. Sometimes she noticed little specs of blood in it, sometimes.

Mrs. B. came under my notice in April 1913. She was thin, emaciated, worn out; never free from pain which was worst over the bladder but also in the left lumbar & iliac regions. First days she was obliged to pass water every ten minutes.

A cystoscopic examination showed that the bladder was inflamed & ulcerated. The orifices of the ureters were normal. The bladder felt indurated & thickened.
Uterus & ovaries were normal. Urine - Translucent, grey coloured & heavy deposit, acid sp. gr. 1012, albumen, pus & a little blood. The centrifuged deposit was considerable & consisted of blood stained pus & squamous epithelium from the lower urinary tract. Tube casts & renal cells were not seen. Stained films showed tubercle bacilli (a small number). Careful examination of the chest disclosed no evidence of phthisis.

Diagnosis: Tuberculosis of the left kidney

Ureter (?) or bladder - because of the history of the patient, his symptoms, the acid putrid urine with tubercle bacilli, the ulcerated condition of the bladder.

The patient was rapidly going down hill. Her doctor said the case was hopeless, but on the recommendation of C. Leekmane M.D. handed her over to the writer for tuberculin treatment.

At first, very small doses of 0.5 c.c. were given, afterwards it was thought better to use 1 c.c. to try to avoid all reactions. The patient began to improve in this way.
Anything noteworthy during the course of the treatment was recorded -
June 16, 1913. Sleeping much better.
June 10. Arm stiff after last injection.
June 21. Pain - her own doctor wrote it would not have taken her, she holds so much better.

July 1. Complained after breakfast.
  Urine Acid. Sp. gr. 1012 - a little albumen.
  tur.
July 4 - No albumen
July 8. Gained 3 1/2 lb. in 4 days -!
July 11. Pain on micturition getting gradually
  less - Frequency much less - two nights
  has not risen from 12 to six a.m.
July 13. Has not weighed so much for 3 1/4
  years. Feels better than for 18 months.
July 29. Improving: still slight aching feeling
  when wanting to pass water. Back
  ache on left kidney still present.
Aug. 3. Has been doing nine - but 14 lb.
Aug. 16. Weight 8 ft. 3 lb. 8 oz. Does not think
  she can weigh so much.
Aug. 22. Urine Acid. transparent Sp. gr. 1020
  faint trace albumen. The centrifuge
Sept. failed to show tubular bacilli on microscopic examination (i.e. a stained film). Sept. 19. Has gained 3 lbs in a week. The day after last injection on micturating patient passed blood "about one tablespoonful" & the water was blood stained at the next two acts. "Feels a pleasure to live." Sept. 26. Dull aching feeling present all the time in the left lumbar region. Headaches been headache.

Oct. 3. One day no back ache.

Oct. 17. Lost weight 1 1/2 lb. but has had an elevated skin tone, result of a knock.

Oct. 23. Yesterday twice passed water after 3 hourly intervals. is now able to retain her water for so long quite comfortably.

In the above case the improvement was very considerable. Patient gained 18 lb. in weight. She looked a different woman. The irritability of the bladder had practically gone. As there was no call to empty it more than once in three hours. The hygiene & diet were not so perfect as one would expect.
have wished. Patient had had no paracentesis education & did not value fresh air. A considerable part of the day was passed in a small basement living room in the centre of the town on the few occasions when visited the window was found shut.

The disease is arrested & one is glad to have treated the case.

Patient is still under supervision, but feels well & maintains her weight.

On March 3, 1915 she weighed 8 st. 5½ lb.

The urine was amber coloured & acid to p.1012 & no albumin & pus.

The following are the charts of the case with records of temperature, weight & injections.
Miss Violet Dr. Age 18½ years.

Complaint—Pain on passing water for symptoms.

Family History—Parents in good health. Both grandfather died of phthisis at 42 years of age. Mother's two sisters died of phthisis at age 19. Two brothers & two sisters healthy.


Catarrh began at 14. Periods said to be regular, six weekly, lasting two or three days.

Present Illness—Patient for a chill on Whit Monday, May 12, 1913. Always felt cold since. The deject from this time pain at the vesical orifice just at the end of micturition, which has been steadily getting worse.

Early in July she was first troubled with frequency of micturition by day & by night. She rises four or more times during the night. Sometimes during the day has to pass water every ten minutes. Two doctors have treated her for cystitis, but patient gets worse. Sometimes notices blood in the urine. For backache. Bowels usually active. Often has head aches.
Abdominal examination: Tenderness on palpation above the pubis in the right-iliac region (along the course of the ureter). Kidney palpable or tender.

The chest was small and thin with expansion slight, but there was no disease.

The Urine: (Sept. 5, 1918) Citrates, offensive, turbid, acid, pH 4.8; 1.012 Albumen & two pus. Stained films from the centrifuged deposit showed a small number of tubercle bacilli; some of them bacilli; a few Gram positive micrococci. Tuber casts & cells from the pelvis or parenchyma of the kidney were not seen.

Present State: Patient looks worn, haggard and ill. Has dark circles round his eyes. He has had bouts of sharp pain on the bladder & extending up the right side towards the kidney—somewhat worse than others.

Sept. 26, 1918. Height 6 ft. 9 lb.

Sept. 26. Patient ordered to stay in bed. The temperature to be taken four hourly. Diet: fatidden—3 pint; 1 milk; 1 one pint 1 barley water daily.

Diagnosis: Tuberculosis of the bladder.
of the right kidney. The parents would not allow the child to go into the Borough Sanatorium, but consented to let her have tuberculin treatment at home. In her bed room she got plenty of fresh air, but the window of the living room in spite of all expostulations was kept shut. The mother had little maternal authority, medicines of malt and liver were not taken regularly— if the child was depressed they would be missed for several days at a time.

The following notes were taken during tuberculin administration: I am giving rather fully in case they are required to explain the charts.

Oct. 5, 1913. Headache—no pain as usual but feels better.

Oct. 8. Yesterday from 11 A.M. to 6 p.m. child had bursts of sharp pain over the bladder & in the right iliac region (artery). Prick sensation every five minutes; in ten minutes till the pain gradually died away. Possibly due to on large dose of quina the previous night.


Oct. 15. Can walk better than since Whitmore's.
Oct. 19 - 28-30 hours after the last injection patient had very bad pain for 2 hours into bladder's right-jaw - In 8 out 9 bed 
very fine minutes during the attack - Monthly period Oct. 19 1920

Oct. 29. Feels better.
Mnr. 2. Claimed himself Oct. 30 31 i.e. needed 
a good nurse to make her take nourishment.
Mnr. 3. Better - walked one mile.
Mnr. 9. Much less pain.
Mnr. 12. Old sharp, shooting pain for two hours on Mn. 9 (evening).
Mnr. 16. On Mn. 15 - as above.
Mnr. 19. Yesterday did not pass water for one 
whole hour - the longest interval during 
the day since June.
Mnr. 26. slight burning over the last injection
Mnr. 30. "Heaps better." Patient suggested she 
would come for injections instead of being 
visited!

Dec. 2. Yesterday had three short attacks of 
pain.
Dec. 7. Dec. 6 bad pain for one hour.
Dec. 14. Three good days. Elater improving very 
little -
Jan. 18. Feeling well-- feels better.
March 4. Only rose once between 11 p.m. & 7:30 p.m.!
March 18. Steady rise in weight-- for a month.
April 8. Still a little pain while passing water.
May 13, 1914. Feels better-- menstruating.
Pain in both lumbar regions.
Treatment to stop-- as patient is going to
St. Mary's, Birmingham, for a few weeks.
She has gained 7 lb. since Oct. 14. Now
weighs 68 lb. 13½ lb.
Bladder micturition-- has to be emptied about every
hour during the day. Patient rises only 2
or 3 times at night. There is great
improvement in the condition of the patient--
Vine-- amber-- muddy, diluted by four (small)
acid. sp. p. 1026. Dr. tube casts--
Dr. J. B. discovered when film examined.

Subsequent History
A month later patient had lost six lb.
Her parents decided to let her go into the infir-
mary for open air treatment-- which she had
for three months & later attended the infirmary as out-patient. She was sent for 3 weeks ago & saw the girl after nine months interval. One would not have recognised her kid. The emaciation is most noticeable. She has a cough & spectral fever is an afternoon temperature of 101°-102°. Both spites are affected.

The bladders trouble is much the same as 9 months ago - micturates hourly during the day, but is rising often at night than formerly. There is no tenderness over the bladder, but there is a pretty constant ache in the right lumbar region.

March 20 1855. Urine amber, deposit of pus, acid, trace of blood - Dr. renal cell & tubercle casts. No tubercle bacilli discovered.

This case & the case of Mr. B. are a great contrast. This one, because of the youth of the patient, short duration of the disease before it was recognised (i.e. fairly early treatment) ought to have recovered the more quickly of the two - One was helpful at the end of seven months case - but the girl was despondent, easily
depressed. More cases at Lephyrads with her mother - felt improved because she was ill 9 in various ways. retarded recovery. A sanatorium education might have saved her.

The following are the charts of the case showing the temperature, weight, injections, etc.; the red lines indicate the menstruation periods.
Curative Treatment (continued).

By Rest, Open Air & Diet: It all combined in Sanatorium treat-
ment. The word sanatorium (sanare to heal) implies the curability of the patient.
Sanatorium life is to be advocated largely because of its great educational value to
patients who know nothing of how to conduct
an open air life, or in what ways they
themselves, cough or breath may be a
source of infection to those with whom they
come in contact.

Though the curative measures upon which
the treatment of the tuberculous depends are
for the most part simple in nature, the
essential thing about them is thoroughness.
The facilities, inducements & forces which aid
the patient to keep performing for a long
space of time the little things which are of
such great importance in the cure, are greater
in a sanatorium than at home. Besides
perseverance & thoroughness time must be
pointed about recovery. A week a time in
a sanatorium is not much good form a curative
point of view. Three months should be looked up

as a minimum. Amongst the many better
facilities aiding the cure one not very obvious
one is that obtained through the moral influence
of grouping the people who are striving after
the same end. Being actuated by a common
desire, they fort their personalities, as it were,
to help one another, progress. The treatment
of a sick person at home as a rule inter-
feres with the work of healthy people.
A consumptive is generally a lonely invalid
at home, surrounded by healthy people
who are more likely to hinder than to help his
progress, however much they may desire the
contrary. The patient can be taught more
quickly in a sanatorium than at home that
his life depends upon the thoroughness of the
teaching he receives or his acquisition thereof.
Certain essentials of the treatment are:
(1) Rest, which must be graduated according to
the patient's condition. It is important to have
mental as well as bodily rest—this can
be better prescribed or carried out in a san-
atorium than at home. At all sanatoria
there are strict rest hours—e.g., patients who
are improve or doing well would rest from
hours daily in the open air at the least—
9-10—rest—writing or reading
12 to one—before lunch
2 to three—
6 to seven—silent rest before dinner
9 how much more depends vastly on the
amount of exercise the patient is allowed.

(2) **Open Air**—At a sanatorium there is no
no crowding no unnecessary shutting of
windows. Each patient has as much fresh
air and space as necessary, in fact practically
none in the open air.

(3) There can be no doubt that the chances of
making a good recovery of making it as
quickly as possible, are much better in homes
where the diet is generous and the exercise good.
Many patients in sanatoriums improve more
favorably than at their own homes because
these things are better looked after also they
enjoy taking good meals (plenty of milk,
pudding etc.) are encouraged to do the same
as a matter of course.

(4) **Exercise**—As soon as all trace of fever has
gone exercise should be commenced—alternate
with rest—very little at first—just walking on
the level, to be carefully increased. This
exercise is easier to supervise in a sanatorium
than at home.
In many houses consumptives are more or less
hampered—coddling is especially bad in
cases of tuberculosis. Life in a sanatorium
abridges it.
Sanatoria are homes for the prevention of
consumption, even if they do not always
cure tuberculosis.

The following case received sanatorium
 treatment & benefited by the education of
the life ...

Mr. J. F. consulted the writer in March 1914.
In March 1913 he had had haematuria
for ten days, associated with tenderness on pal-

ination over the right kidney. Off work for 3
weeks. Has felt himself since. Three weeks ago
he had another attack. His doctors said,
"only renal angina." He had a morning
cough & a little sputum.

Urine — absolutely negative — no crystals — no
intact bacilli — no renal cells or tube casts.
An X ray photo of the kidney showed no stone.

On receding the temperature it was found to be over 99° each evening.
The chest was a fine one - Movement good - but there was flattening under the right clavicle.

Harsh breathing above & below it. An accompaniment. The sputum contained tubercle bacilli.

Pulmonary had never been thought of by his medical man!

One urged sanatorium treatment, knowing it was the only sure way of teaching him & his family the necessary hygiene.

To keep him away from the constant hurry of business. He was at Ashren Sanatorium for four months.

The doctor generously permitted the writer to visit & watch the case. Later, accompaniments were present - tubercle acid - though the sputum was thought to be absolutely uninfected till after three months residence at Ashren. He gained 13 lbs in the four months - the sputum lessened but did not disappear. Neither did the cough.

Early in December night sweats became troublesome. A loss of weight for two weeks was disastrous - 2 lbs. So he returned to Ashren for five weeks.
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#### Results

- Temperature (Fahrenheit)
- Pulse
- Respirations
- Bowels
- Weight

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#### Results

- Temperature (Fahrenheit)
- Pulse
- Respirations
- Bowels
- Weight

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#### Results

- Temperature (Fahrenheit)
- Pulse
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### Sanatorium

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#### Results

- Temperature (Fahrenheit)
- Pulse
- Respirations
- Bowels
- Weight
Drug Treatment

Hundreds of drugs have been recommended for pulmonary tuberculosis; new preparations are being constantly added to the list. It is not possible to kill the tubercle bacillus by medicine taken internally. Bitter tonics, i.e., arsenic, at times help to improve the general condition. Cod-liver oil is useful, as a little pool is especially useful with children who are underfed.

Insomnia may be relieved by a little whisky at bedtime but it is a dangerous remedy. Some patients with pulmonary tuberculosis have been harmed rather than helped with alcohol.

Iodine has been much used in tuberculosis. It is of value when there are syphilitic manifestations associated with the disease. Its antiseptic action on the tubercle bacillus is slight. It is said to excite phlegm from the cilia. Potassium iodide or hydriodic acid may aid the cough. Ancient iodine treatment is recommended by some authorities and is as follows: Pot. Iod. 20 grains, xx in a glass of water in the morning.

Chlorine water, 3 fluid ounces, at 12, 4, and 8.
Cases under one's own care have not responded to this treatment - one has had better results from iodine given by night-8 morning in milk, increasing by one minim daily till 3/5 is being taken night-8 morning. Increase of weight & general improvement often follow for a few weeks, but it soon appears to be effect.

The following case illustrates this -

Edward Short - Stone Mason - Age 33.

Came under observation at the end of May 1914.

He was very short of breath had fibros phthisis. There was practically no air getting into the left side of the chest. A bronchial alveolus also a stone mason died of phthisis, complicated with chronic nephritis a year previously. The patient has not been able to resume work & is in a poor way.
### August 1914

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### October 1914

| Date | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Time | 106° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° | 105° |
| Pulse | 82 | 88 | 86 | 86 | 86 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 | 88 |
| Temp. | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° | 97° |

**Name:** Edward Short  
**Age:** 33  
**Disease:** Fibroid Phthisis  
**Results:**
October 1914

Name: Edward Short
Age: 33
Disease: Fibroid Pyometra

| Date | Day of Week | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 |
|------|-------------|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Time |             |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|      |             | 106° | 105° | 104° | 103° | 102° | 101° | 100° | 99° | 98° | 97° | 96° | 95° | 94° | 93° | 92° | 91° | 90° | 89° | 88° | 87° | 86° | 85° | 84° | 83° | 82° | 81° | 80° | 79° |

Temperature in (degrees)

Pulse: 80 Resp: 18

Weight: 82 lb

Annie Jackson
119 Oswald Road
Derby