

has in many cases proved inert. Quinine, Dover's powder and camphor sometimes act most beneficially in warding off an impending attack. The treatment of broncho-pneumonia in influenza does not differ much from the ordinary routine treatment, but due care is necessary to protect the heart. Strychnine and digitalis should be given according to the requirements of the case. Insomnia is a constant complication of influenza and can be removed by the exhibition of Dover's powder and camphor. Calomel relieves constipation. Alcohol, which is very much deprecated by the leading men of the present age, is, in my opinion, an excellent thing, and can be absolutely relied upon during prostration. Musk and "makaradh-waj" are generally resorted to by irresponsible practitioners in anticipation that they may be of immense service in preventing heart failure. This hybrid system of treatment is to be condemned. Mercury can under no circumstances be a stimulant. Aspirin and phenalgene are to be used with very great caution. Rest in bed and avoidance of exertion are the only remedies to be relied upon in expediting convalescence.

NOTE ON THE OPEN AIR TREATMENT OF PULMONARY TUBERCULOSIS IN MADRAS PRESIDENCY.

By C. F. FEARNSIDE,
LIEUT.-COL., I.M.S. (retd.).

CONDITIONS NECESSARY FOR TREATMENT.

THE open air treatment of tuberculosis mainly consists of placing patients in the most healthy surroundings in open air chalets protected from violent winds and dust, good food, and regulated rest and exercise. As a result of this treatment, temperature falls, night sweats disappear, cough is lessened, appetite returns, sputum decreases, and marked gain in weight and vitality follows.

The tuberculosis institutions of which I have personal experience in England ensured these conditions. They were surrounded by many acres of grass land free from dust, with no dusty roads, and had wind screens in the shape of woods where patients could remain all day even in a gale.

The treatment of tuberculosis in Madras presents a far more difficult problem than in Europe: in the first place, owing to the higher temperature throughout the year (in England patients do far better in the winter than in the summer); secondly, there are few trees to act as wind screens and for shade; and, thirdly, for many months in the year the winds are laden with septic dust.

The three essentials for the open air treatment in this part of India are:—(1) Equable climate, (2) numerous trees, both for wind protection and shade, (3) freedom from dust. The first two can be had easily in the Presidency and only require selection in the one case and

time on the other, but the last is most difficult to secure. One does not need to be a tubercular patient to know the discomfort to nose, throat and chest caused by the dust-laden winds of the south-west monsoon. In those suffering from pulmonary tuberculosis strong winds have a very deleterious effect on the healing of wounded tissue, especially when the wind inhaled is laden with bacteria-carrying dust whose flora are easily pictured by exposing a Petri dish containing sterile nutrient agar for a few moments. The healing of the lung cavities depends entirely on air free of micro-organisms. One can readily realise therefore how difficult it is to alleviate the symptoms of late cases or help to cure early cases. The open air treatment in India therefore resolves itself into pure air treatment, and how this may be procured I shall show.

FARM COLONY.

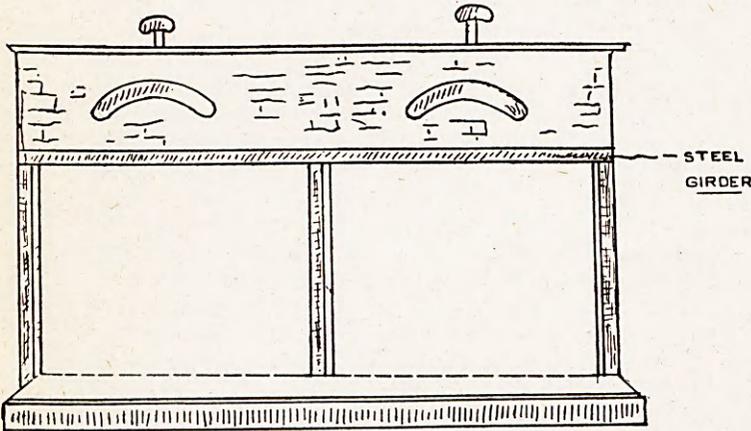
The ideal place is an island in some large tank or, failing that, any high land lying between two tanks, lying south-east to north-west with the institution placed between them. Wind passing from the north-east or south-west and *vice versa* during the monsoons will be practically dust-free, most of its impurities being deposited in the water. As the water recedes during the warmer months the grass growing in the bed of the tank will decrease the amount of dust whisked up from the ground and at the same time furnish useful grazing for the cattle required to supply milk to the patients. During these months the dust nuisance can also be partly counteracted by cus-cus (farm grown) tatties with continuous irrigation from above. The moist atmosphere generated will greatly relieve cough when a very dry and hot air is blowing, which is very irritant to cases complicated by posterior rhinitis, laryngitis, etc. Another advantage is that the water of the tank can be utilized by the patients for gardening, and watering trees and hedges, besides growing crops. In other words, a farm colony is most suitable for the outdoor treatment of the tuberculous.

The sanatorium will shortly give place to the farm colony in the treatment of pulmonary tuberculosis, and I do not think there would be much difficulty in finding a suitable site such as I have mentioned where the dust nuisance would be greatly in abeyance. Waste land might be taken up and artificial tanks made by utilizing the services of short-term prisoners to build the bunds. No walls should be erected round the buildings, only an entanglement of barbed wire, of which there will be plenty available shortly from France. It should be divided into two sections: A—for latent cases and those in stages I and II; B—for advanced cases hospitals which should be some distance away from A. Section A should consist of chalets or well ventilated rooms, the usual treatment of rest and silence during certain hours being enforced in these chalets.

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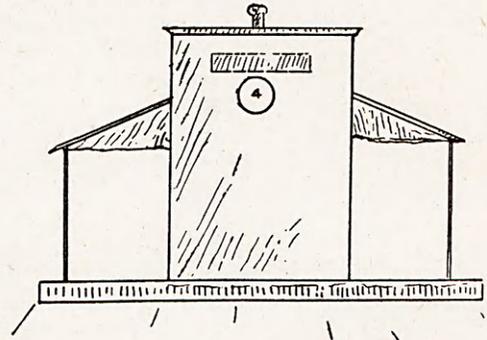
By C. F. FEARNSIDE,
LIEUT.-COL., I.M.S. (retd.).

CHÂLETS (ATTACHED)



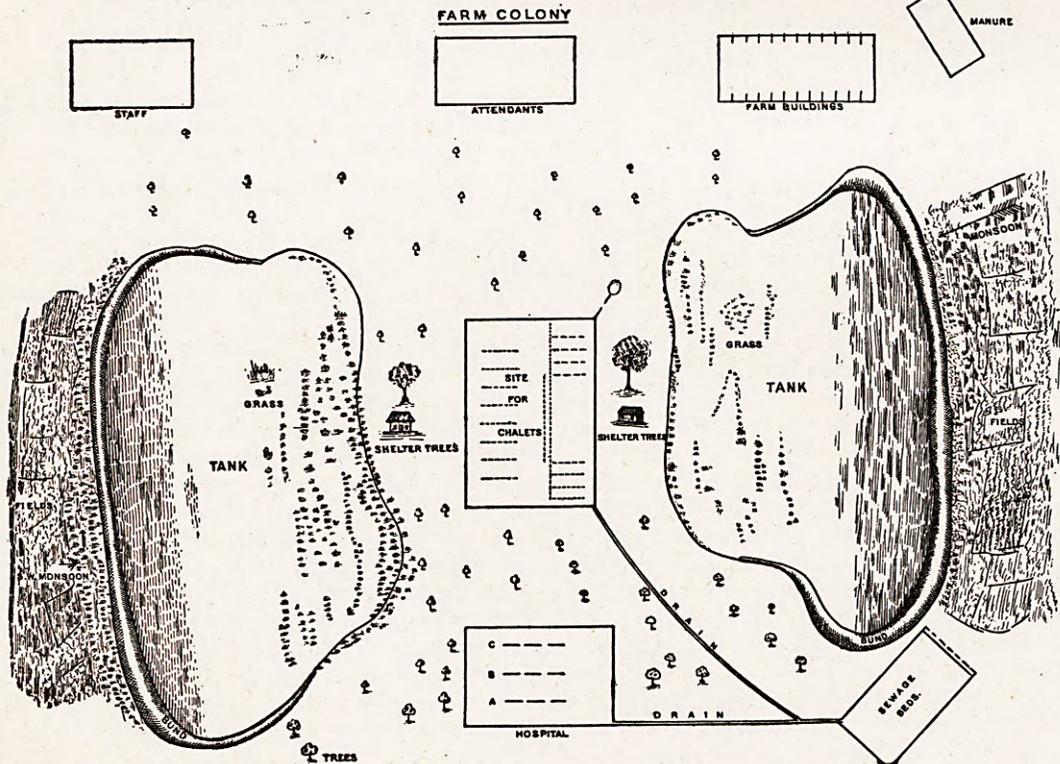
I

These can be constructed in rows open both in front and behind so that there is a free passage of air going on continuously.



II

SIDE VIEW OF NO. I.
Tatties (cus-cus) can be placed all along the verandah.



CHALETS.

Those patients who are in stages I and II of the disease should be located in châteaux. The very earliest cases can be detected by the double cuti-reaction test, and it is not necessary to isolate them entirely from those whose sputum contains tubercle bacilli. The rows of châteaux can be utilized for patients in the different stages of the disease and according to the work and exercise approved by the doctor. It is a well known fact that the healthy attendants of a sanatorium are seldom attacked by the disease. Two plans of châteaux are suggested:—(1) Detached and (2) Attached.

(1) Central room with low parapet wall and the upper part open and protected by chicks of bamboo. There should be a verandah in front and behind where the patient can sleep practically in the open at night. The room need only be occupied during rest hours or in inclement weather. Roof—Mangalore tiles with flat tiles and boarding, the eaves being extended well down on both sides; or, better still, a thick thatch of straw. These châteaux can be placed a short distance from one another in rows. Floors of cement or Cuddapah slabs or red tiles. Instead of brick pillars, which retain the heat and obstruct air, old rails should be utilized for supporting the roof.

(2) In these the side ventilation will not be so good and the treatment will not be so effective. They should consist of a number of rooms side by side open in front and behind so that the air may pass freely through. These rooms should have deep double verandahs which help to keep the rooms cool during the day and can be utilized for the patients to sleep in at night.

HOSPITAL.

The hospital buildings should be placed at a good distance away from the châteaux. The hospital should consist of three wards: (A) for those who have a temporary setback, *e.g.*, hæmorrhage, pleurisy, systemic disturbance; (B) for those in the later stage, whose comfort should be mainly attended to since the prognosis is bad; (C) for surgical cases. It is better to have upstairs buildings open all round with verandahs on both sides so that patients may be placed in the verandahs when necessary. The wards should be open above with a wall of planking 3½ in. to 4 in. high to protect the beds from any strong winds, all above that being open. Iron uprights instead of brick pillars for the freer passage of air should be utilized. Ordinary chicks or those of the roll top desk pattern or tatties of cus-cus for dust protection should be put up on both sides so that any strong breeze can be neutralised. A "D" ward should be cut off from the main ward at the end for moribund cases. The ground floor of the wards can be utilized for those patients who are able to come down during the day.

WORK.

With an ample supply of water the patients can be employed in garden work, such as preparing the ground for vegetables, sowing seeds and weeding and especially planting tamarind, acacia and other good shade trees, but for how many hours a day this will be possible experience alone will determine. Working in the middle of the day in the hot sun may be found to be injurious on account of systemic disturbance, and it may be found necessary during the hotter hours of the day to employ the patients in open air workshops, chopping and sawing wood, weaving and other industries. Some alteration of the rest hours from those usually given in temperate climates may have to be made. During rainy days they will also have to be under cover. Open air workshops such as have been constructed for ordinary healthy prisoners in Coimbatore Jail are the most suitable, being of simple design and inexpensive.

To each patient should be allotted his work daily or weekly, as the case may be, provided there is no setback, such as a rise of temperature, loss of weight, etc., and he should wear a coloured disc on his coat indicating the work assigned him for the week. In a smaller institution this may not be necessary, but where there is a large number with several medical officers it is absolutely necessary to prevent patients doing other than their allotted work. The exercise begins with walking exercise and is graded up to heavy digging work and physical drill, but all must have the prescribed hour's rest, one hour before each meal during the day. In India this may have to be altered to several hours' rest in the middle of the day, or it may be absolutely necessary to have the patients at work under cover during the hotter hours of the working day. Milk being an important and costly item in the dietary the patients can look after the cows, which should form part of the farm colony, and thus help to diminish the expense of diet.

DISPOSAL OF INFECTED MATERIAL.

The disposal of the fæces, urine and sputum in England is a simple matter as they pass into the usual sewers after disinfection. In India there is only the dry-earth system of getting rid of highly infectious material. It is a known fact that the tubercle bacillus is destroyed in a few hours if exposed to the sun in the tropics, but it may in favourable conditions survive for a year or more. It is not known at present how long the tubercle bacillus may remain virulent if buried with the nightsoil. The only safe method in my opinion is to dry and incinerate the infective material, a method recommended in getting rid of ankylostoma and other ova. It is certainly inadvisable to utilize the nightsoil for gardening and farm manure because of risk to the herd of cows which will supply milk to the colony. The sputum mixed

with sawdust or chopped straw should also be incinerated. The watery elements of the sputum, urine and faeces can be evaporated in cauldrons over an oven and the dried material utilized as fuel. This, of course, should be done some distance from the main buildings in a special shed.

TUBERCULAR PRISONERS.

It is proposed to construct buildings for tubercular prisoners to the north of Coimbatore Jail, the site alone costing about Rs. 27,000. How far does this site meet the requirements for the successful treatment and alleviation of the symptoms of those affected? It is an open, treeless field, wind-swept during the monsoon months, with semi-black cotton soil. On the west side is a main artery to the town whence clouds of dust sweep across it daily during the south-west monsoon. It is within municipal limits (which fact alone condemns it) with rising suburbs to the east as well as to the west between which will be a number of tubercular patients in close proximity. The danger of the contaminated soil being blown to these areas is obvious, and no amount of training of Indians in protective methods will prevent their contaminating the soil for many years to come. They, however, are not alone in this respect, for it is very difficult to convince educated European patients of the danger they are to others. Another grave danger is the spread of the disease by flies. In Port Blair it was with the greatest difficulty that this nuisance could be kept down in the large tubercle wards, owing to the fact that the prisoners would not realize the danger of infection to others from this source. What applies to the two suburbs mentioned equally applies to the prisoners in Coimbatore Jail and the Police Recruit School, *viz.*, there is considerable risk of dried infected sputa, etc., being blown into the prison and thereby risking the health of the inmates. Incarceration at all times has a depressant effect, and if to this is added the frequent mental depression so common amongst those suffering from tuberculosis, how can any good results accrue? Further, high walls on still days become very hot and occlude any little breeze that may be blowing at the time and give off heat at night. This is not conducive to the reduction of temperature, which is one of the features of the fresh air treatment.

TREATMENT OF KALA-AZAR WITH INTRAMUSCULAR INJECTIONS OF HYPER-ACID ANTIMONYL TARTRATE (+URETHANE).

By U. N. BRAMACHARI, M.A., M.D., Ph.D.,

Teacher of Medicine at the Campbell Medical School, Calcutta.

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SINCE the discovery of antimony as a specific in the treatment of kala-azar, attempts have

been made to discover a preparation which could be given intramuscularly without local reaction. The ordinary antimonial preparations, such as tartar emetic or antimonyl sodium tartrate, give rise to violent local reaction and cannot therefore be used intramuscularly.

Caronia has used acetyl-p-aminophenyl-stibiate of sodium intramuscularly in the treatment of infantile kala-azar with good results and subsequently it was used by Kharina-Marinucci.

In seeking for a preparation of antimony which will give little local irritation, we should use one which will be quickly absorbed without dissociation or decomposition. Such a preparation I have found in hyper-acid antimonyl tartrate (+ urethane). It is very soluble in water, stable in aqueous solution for indefinite periods, and is quickly absorbed without decomposition after intramuscular injection. As urethane is not a base, it probably remains in solution with the antimonyl compound in the form of a mixture.

Experiments are being conducted by me to determine its toxic dose as compared with its curative dose, and, so far as I have been able to determine, it appears to be the least toxic of all the antimonial preparations and its curative dose seems to be much smaller than that of other antimonial preparations. Further observations on this subject will be communicated in a future paper.

The following are the series of the first four successive cases which have been treated successfully with this compound. In each of these cases the diagnosis was made by the presence of the L. D. bodies in the spleen and the cure was shown by their disappearance therefrom:—

1. Patient B. S. was admitted into my ward on 25-9-19, with the spleen extending 6 in. below the costal margin in the left nipple line. He was given intramuscularly 2½ c.c. of a 2 per cent. solution of the hyper-salt with urethane. Altogether 14 injections were given from twice to four times a week. The results of treatment were as follows:—

(1) R.B.C.—2,800,000, W.B.C.—1,800, Hb—46 per cent. on 26-9-19 (before treatment).

(2) R.B.C.—4,700,000, W.B.C.—13,800, Hb—60 per cent. on 5-1-20 (after treatment).

There is marked increase in weight, the spleen cannot be felt below the costal arch, and no L. D. bodies can be found on spleen puncture and the fever has subsided.

2. Patient M. was admitted into my ward on 23-8-19, the spleen extending 5 in. below the costal margin in the left nipple line. He was given 2½ to 5 c.c. of a 2 per cent. solution of the hyper-salt with urethane intramuscularly. Altogether 15 injections were given from twice to four times a week. The results of treatment were as follows:—