some cases of the malady under the name of "Melancholic stupor" (Melancholia attonita, Psychocoma).

A noteworthy case of this type has recently been under observation in the Berhampore Lunatic Asylum, and the facts of it merit record.

The patient was a Hindu male, aged about 42 years, who in 1917 suffered from melancholia, which in August of that year became psychocoma. For altogether two and three-quarter years, the patient lay in a state of utter stupor, without manifesting any change that was perceptible to the keen observers placed on watch over him. During the whole of the time, he lay on the flat of his back, in practically the same position, with his forearms flexed at the elbows, his hands flexed at the wrists and meeting over the sternum, and his legs drawn up in semi-flexion. All his limbs were as rigid as could be, and he resisted all efforts made, with any reasonable degree of force, to extend them. The muscles of the back and neck shared in this extraordinary stiffness, so that if he were lifted by the occiput, the entire head, neck and body could be raised as if he were a block of wood. His eyes in wakefulness were always wide open, and had a fixed, vacant, far-away stare, and the veins on his forehead stood out with a certain degree of prominence. There was an utter loss of volitional power. He passed urine and excreta in bed,—just as an unconscious person might do,—and seemed to feel no annoyance or discomfort owing to this circumstance. His expression remained exactly the same throughout,—utterly vacant. Words addressed to or shouted at him made not the slightest difference in his expression. On no occasion was he known to call for food or to manifest any desire for it, and never was he seen or known to help himself to any when food was placed beside him. All his food during this period was, of course, entirely liquid, and the feeding was carried out throughout his illness by means of the nasal tube. He offered no resistance except once for a few days when, for some reason which could not be made out, the muscles of his lower jaw became stiffened. To avoid injury rectal feeding was resorted to during this short time, for it became impossible to insert the nasal tube, as any attempt at doing so caused him to shake his head violently from side to side and thus eject the tube. Occasional attacks of diarrhœa were the only other untoward incidents in the course of the case,—they caused a slight fall in his body-weight from time to time, which was, however, made up in a few days on each occasion. His circulation remained moderately good throughout, and the reflexes remained normal. At no time were there any trophic changes of an undesirable nature, the patient keeping marvellously well-nourished and entirely free from bed-sores or any approach to these,—a circumstance which appears to be characteristic of cases of psychocoma.

He was visited by his mother in 1919, but he seemed totally unaffected by the visit, being apparently unconscious of her presence as she sat beside him, her most affectionate addresses failing to elicit the slightest response. He appeared not to recognise that she was his mother.

On the morning of April 9, 1920, the patient suddenly awoke as if from a long dream. For the first time after nearly three years of the most rigid silence, he spoke in a feeble whisper and indicated his desire to write. He was given pencil and paper, and instantly, in a perfectly legible though somewhat shaky handwriting, he wrote in English a few lines which had a perfectly rational meaning. Thereafter he wrote in the vernacular that speaking was a great effort. Two days thereafter his voice was distinctly audible and his speech quite intelligible. He was able to sit up with help and to take semi-solid food, but appeared to be somewhat depressed. Before the week was out he was able to feed himself, and gradually attained to full vegetarian diet.

On questioning him I elicited the fact that he had only a very vague recollection of what had happened during the past three years, and of the people who had come to see him.

From time to time some persons suspected that a strong element of malingering was present in this case, but I think that even if it were so at the earliest stage, this man very soon crossed the border-line to insanity; this opinion I form on the ground of the extraordinarily consistent manner in which he kept up appearances during the two and one-third years in which I had the opportunity to observe him and his slightest doings, with the aid of a most watchful and intelligent staff.

He has steadily improved since the morning of his re-awakening, and his interest in life has gradually revived and his depression has become correspondingly less. He now smiles, appreciates a jest, reads the illustrated papers and magazines with pleasure, and aims at exercising his mind no less than the muscles of his limbs which have through prolonged disuse become inconveniently stiff. Massage and practice have restored his power of walking.

His recovery has been as remarkable in its suddenness as his entire illness has been in its mysterious nature.

A NOTE ON VACCINE THERAPY IN TYPHOID AND PARATYPHOID FEVER.

By C. J. FOX,

MAJOR, I.M.D.

Assistant Director, Pasteur Institute, Kasauli.

It is many years since E. Fraenkel treated 57 cases of enteric fever with curative doses of vaccine. My attention was drawn to the subject by a paper in the *R. A. M. C. Journal* of 1906 by Major C. Birt. The following is an extract from his paper.

"In a long forgotten paper, which appeared in 1893, E. Fraenkel reported the results of treatment of 57 cases of enteric fever with the subcutaneous inoculation of the typhoid bacillus which had been sterilised by heating to 63° C. Fraenkel satisfied himself that good resulted from this method in the majority of cases and that the fever was aborted in many."

Birt goes on to quote cases of other bacterial infection which have benefited by injections of sterilised cultures of the causal micro-organism during an attack of the disease, *e.g.*, Malta fever. He recommended doses of 10 million bacilli in typhoid fever, regulating the dosage and intervals by the opsonic index or Bordet and Gengou test for fixation of complement. The theory put forward was that the micro-organisms causing the disease did not incapacitate all the defensive forces of the body in the same dtgree. Therefore it was possible to obtain reactivity and antibody production at a healthy site in order that these may be carried to the site of infection and kill the living bacteria there. Birt recommended further work being done.

Sir David Semple, in 1909 (*Lancet*, June 12th, 1909), treated nine cases with very good results. Two of his cases were treated with autogenous vaccines, and judging by the better results obtained, and the concensus of opinion then being in favour of autogenous vaccines over stock vaccines, he strongly recommended autogenous vaccines where practicable. He regulated dosage by the opsonic index.

W. H. Walters and C. A. Easton of Boston University reported thirty cases of enteric fever treated with subcutaneous injections of a stock typhoid vaccine sterilised at 60° C. for twenty minutes and preserved in 0.3 per cent. lysol; 15 to 70 minims of a stock emulsion were given. In nearly all the cases a decline in the temperature was noted, confirming Fraenkel's original observations.

W. P. MacArthur treated 63 cases of enteric fever in Mauritius with vaccine. From 61 of the 63 the causal organism was isolated either from the blood or from the fæces. The cultures from the other two cases were negative, but there was no doubt about the diagnosis. There were only 2 deaths, or a mortality of 3.1 per cent., which is very low. The dosage varied with the age and condition of the patient. For adults the dose was 150 to 300 million. Increasing doses were given at 2 or 3 days' interval. In 45 cases treated before the tenth day of the disease no relapses or complications occurred except a case fatal from broncho-pneumonia. In 11 others the patients had been ill for a fortnight. In several of these complications arose, and there was one death from hæmorrhage. In most cases a stock vaccine was used.

The papers by Birt and Semple made a great impression on me, and I have since treated 12 cases of enteric fever with typhoid vaccine. As I had no opportunity of treating cases in a hospital I had to fall back on such cases as might occur in private practice. There was, and still is, a prejudice against the use of curative doses of vaccine in cases of typhoid fever among general practising physicians, and for which they really cannot be blamed. For one thing, though the theory will appeal to them, they require proof first. They judge by results, and as the cases so far treated are so meagre in numbers they cannot be expected to get quite enthusiastic in the matter and demand curative vaccine treatment for their cases of typhoid. On the other hand, how is the vaccine therapist to give him results unless the physician provides him with patients? There must be co-operation, and this is the object of this note,—*viz.*, to crave a fair trial for curative typhoid injections during the fever. I am absolutely convinced from the cases (though few) that have been treated, and from my personal experience, that this form of treatment will cause a remarkable lowering of the death rate from typhoid fever, and during this time of war and the value of man-power every life saved in the army means much to the State. The cases treated by me in over 5 years numbered twelve. Of these, three were Europeans and the rest Indians. The conditions under which they were treated were the most unfavourable possible. None were in hospital. The three Europeans and one Indian had the benefit of intelligent relatives to nurse them. The other cases lived in crowded bazaars and in the usual insanitary surroundings as regards fresh air and accommodation. The only death was a case in the third relapse, complicated with cholecystitis, and in which vaccine was really not indicated but in which the relatives insisted and two doses only were given of 2½ millions each, the second dose the day before death. In the remaining cases the temperatures of all consistently fell till the cases were just those of an uncomplicated fever. The last case treated was clinically in a very serious condition. It was the 15th day of disease—pulse, 140 and running-respirations, 60—both lungs pneumonic—low muttering, delirium, diarrhœa (12 to 14 motions passed involuntarily daily), and tympanites. In this case small doses were given combined with pneumococcus vaccine, and the child made a good recovery. But only three doses of vaccine were given. The doctor in attendance did not advise any more as the temperature had subsided. When the child had been normal for six days the parents bathed him and he got a relapse. Vaccine was immediately recommended and four doses given, although the temperature came down again to normal after the first of this series of

doses. These results were obtained under the worst possible conditions. What may we not expect from the same treatment under better conditions such as are usual in Station and other Civil Hospitals with good and careful nursing? Apart from the reduction of mortality there is the question of carriers which is a very serious one. These I believe can also be lessened in number, if not altogether prevented, by early diagnosis and early vaccine treatment. For the carrier is so often a case that has not run a very severe course. In such cases one is led to believe that there has not been a great demand for antitoxin or bacteriotropic substances, and therefore the response has been just sufficient to tide the patient over the attack but not sufficient to destroy all bacteria or prevent them from remaining in the gall bladder or intestines. If only it were to reduce the carriers, vaccine therapy is worth trying. In addition to the 12 cases quoted I had one case of cholecystitis, with a low temperature and gastric disturbances for 5 months after an attack of paratyphoid B and which yielded readily to paratyphoid vaccine. One's only opportunity of clearly demonstrating the efficacy of vaccine therapy in typhoid fever to the profession is to give this form of treatment a fair trial in a large hospital, either military or civil, preferably the former. With a very small camp laboratory it would be an easy matter to obtain a blood culture from a case in order to diagnose the causal organism early, a dose of stock vaccine being given if positive to typhoid and an autogenous vaccine prepared within 72 hours. But the chief reason for an investigation is to evolve, if possible, a stock curative vaccine which could be used with safety by all medical practitioners. As I said before, I am convinced this method will yield excellent results.

N.B.—**The above note was written in 1917. What was urged in it is, if anything, emphasised now except for the urgency of the man-power during the war. Typhoid continues to occur in the army, though the death rate from this cause is not very noticeable. There is always the vexed question of carriers and what is to be done with them. It has, however, apparently become more common among Indians. But how far it has affected Indian troops I am not aware. I would therefore urge that the advocated investigation may be systematically carried out, so that the profession may have reliable numbers from which to judge of its efficacy or otherwise.**

SODIUM MORRHUATE AND SODIUM HYDNOCARPATE IN LEPROSY.

By P. GANGULI,

Tempy. Captain, I.M.S.

I took over charge of the Isolation Block 33rd I. G. N. in August, 1919. There was one leprosy case under observation at that time, and I began to treat him with intravenous injections of sodium gynocardate A (or, more correctly, sodium hydnocarpate) which has been the recognised method of treatment since its introduction in 1915 by Sir L. Rogers. I beg to acknowledge my grateful thanks to Captain D. C. Cooper, I.M.S., for kindly drawing my attention to an article in the *Indian Medical Gazette,* written by the same authority, in which he described the action of sodium morrhuate on leprosy. I took up the investigation of the action of this drug on leprosy on the 28th August, 1919.

Besides the case noted above, four more lepers were admitted in the Isolation Block, and I am indebted to Captain Fettis, R.A.M.C., the Dermatological Specialist, Quetta, for confirming the diagnosis.

The following types of leprosy were treated:—

I.	Mixed Nodular and Maculo-Anæsthetic Leprosy	.. 2
II.	Pemphigus Leprosus	.. 1
III.	Nervous Leprosy (Pure)	.. 2
	Total	.. 5

It is necessary to give a somewhat detailed description of each case to follow the significance of the action of the drugs.

I. Mixed Nodular and Nervous Type.

Case I.—D. B. " M." of 4th A. B. C., aged 20.

Family history.—His uncle is a leper.

History.—He had an attack of prodromic fever about a year ago, followed by general weakness, loss of appetite, tingling sensation in the hands, incessant cough and dryness of nostrils. After four or five months, he had another attack of fever, followed by a macular rash on the posterior aspect of the right elbow and forearm, dorsum of the left hand, nose, right temple, and front of the right leg; a few days later there was loss of tactile and thermal sensation, which became so intense that he once burnt his finger without being conscious of the heat; then he noticed gradual loss of muscular power of the hands, wasting of the muscles of the thenar and hypothenar eminences, followed by trophic ulcers on the index and middle fingers; the ring and little fingers became gradually distorted. After a short time nodules began to appear, first on the borders of the macular patches and then on the nose which broadened out. He showed all the above signs when I saw him first in August. Besides these, his ulnar nerves were greatly thickened and there was paresis of the median nerve, as shown by the total loss of the power of movement of the thumb and index finger. There were also changes in the appearance of the nails.

Treatment.—Sodium morrhuate treatment was begun from 28th August, 1919.

Re-action.—Patient developed asthmatic lung troubles (which might have been inter-current) after each injection; râles and rhonchi were audible throughout the chest. These subsided