those of red blood corpuscles are potassium and the phosphatic anion. It enables diatoms to take out silica for their skeletons from the minutest traces in sea or pond water, and the osseous tissues similarly to adsorb calcium phosphate.

The most striking instance of all of this delicate equipoise between colloids and crystalloids is the regulation of the amount of saline in the cells and circulating fluids of the body. From the evolutionary point of view this regulation is much more ancient than that of body temperature, and its pathological variations are probably more important than those of the temperature could we only discover as ready a means of studying them as is the clinical thermometer in the case of temperature.

This equipoise of salt concentration started in evolution at the level of the fishes, with the teleostean, and up that long range of evolution to man, through countless types and channels, there is scarcely a flutter in its value. The variations in all species may probably be said not to lie outside the limits marked in isotonic saline by 0.7 and 0.9 per cent., and in any one given species the physiological range is many times narrower.

What is the mechanism of this exquisite adjustment throughout such a wide range of the animal world, and with any variation in the external environment, from fresh pond water, or the very hypotonic fluids daily in use by man and other animals, up to the salinity of sea water, which is manifold hypertonic to the blood of all teleostean fishes? The answer is that this amount is that which is in equilibrium or colloidal adsorption with the colloids of cells and plasma. Any additional amount becomes free in the circulation, and is promptly removed by excretion. In other words, isotonic saline expresses the balance between colloids and crystalloids.

The union between colloid and crystalloid is very slight; it is a molecular union in which the units are molecules not atoms, and there are no atomic linkages. It much more closely resembles the union of salts to their water of crystallization, and such physical properties as electrical conductivity are not interfered with. Nevertheless, the union is quite definite, and without it life as it now exists would be impossible.

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¹ *Compt. rend. de l'Acad. des Sciences*, Tome 169, 1919, p. 9. ² *Bio-chemical Journal*, vol. v, 1909, p. 1. ³ *Amer. Journ. of Physiology*, vol. vii, 1902, p. 261. ⁴ *Bio-chemical Journal*, vol. ii, 1906, p. 34. ⁵ *Amer. Journ. of Physiology*, vol. xx, 1907, p. 127. ⁶ *Proceedings Royal Society*, vol. 89 B, 1916, p. 384.

THE TREATMENT OF INCIPIENT MENTAL DISEASE.*

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THIS subject is a matter of great public importance, because the cost of maintaining the insane and the mental defectives of this country implies a vast financial burden upon the rates and taxes, now amounting to about four million pounds a year, and this burden has been gradually increasing for many years. So far as reliable lunacy statistics could inform us the total number of insane persons in England and Wales had reached, at the end of 1914, the alarming total of 140,466 persons, or 1 to every 266 of the estimated population. These were the exact numbers on January 1st, 1915. Since the commencement of the war no official record of the total numbers has been obtainable, because soldiers and sailors and airmen, as well as others serving with the forces, who may have become insane or who may have suffered from a temporary mental and nervous breakdown and who required care, have been treated in war hospitals, and have not been regarded as insane. They have not been certified, and therefore have not come under the jurisdiction of the Board of Control (Lunacy Commissioners); consequently accurate statistics of official insanity in England and Wales have not been possible. Naturally, since the above

date the total officially recorded in asylums and private establishments has considerably diminished, but the numbers must be misleading and unreliable if they are taken to reflect the exact incidence of insanity among the people.

The special point dealt with here is the treatment of insanity in its early stages, and every medical practitioner must have had experience of the difficulties presented by mental cases in private practice—not only in their actual treatment of the disorder, but also from the strong feelings aroused and expressed by the certificate and the consequent compulsory removal and detention of those certified into the various mental hospitals or into the private asylums which are recognized by the law and are the most suitable curative establishments. In order to obtain the best remedial treatment in these places, it is obligatory and compulsory for all, except the voluntary boarders, which only applies to private or paying patients, to be first certified as insane, and every doctor, as well as all the friends and relatives of a mental patient, realize the hardships which the certificate of insanity imposes upon the person certified, as also the undeserved stigma which is reflected upon him and his friends by its issue. A few of these disabilities are that the medical certificate of insanity separates the sufferer from his friends, it removes him from his home, it cuts him off from all social privileges, it removes from him his domestic rights, it takes away all his former financial control over his own affairs, it disfranchises him so long as he is under its ban, and it practically dispossesses him of all the rights and liberties which men hold dear. No other illness is more dreaded nor more costly, yet no other illness under skilled care is recovered from more quickly. The need for skilled care was so well insisted upon by Sir Henry Hallford when he was called in to treat His Majesty King George III after the failure of Dr. Willis that he was fully justified in the statement made that the care and control of a mental patient was the most responsible duty imposed upon any physician, and success in treatment depended upon qualities of head and heart such as no other disease demanded from the nurse and doctor; but success in mental cases is attended with infinite satisfaction and credit, and he was enabled by it to gain the confidence and respect of his sovereign in four reigns, for he became the confidential adviser in turn to King George IV, to William IV, and to Queen Victoria, thus exercising for himself as well as for the medical profession a reputation of distinction as well as gratitude for personal service, marked skill, and steadfast devotion.

The first cry that one hears when called upon to advise or to treat a case of mental disease is "Please don't put mother away"; "Please don't send her away to an asylum to associate with lunatics"; "I couldn't bear the idea when she got well that we should have been a party to having her certified as insane." And these are real grievances, especially to the lower middle classes, who are the real workers in the State, who bear their ills without revolt, and who often suffer in silence. The rich or the well-to-do can be received as voluntary boarders into any mental hospital or into any private establishment, but the less financially favoured, who constitute the great majority in the State, must be certified insane and detained until they have shown their right to be free, if they desire to undergo treatment, or their friends wish it. There is no place wherein to send the poor unless previously stigmatized by the certificate as lunatics.

Before the war it was so fully realized that even if recovery occurred the painful memory of association with cases worse than themselves, and the recollection of an illness with its distressing consequences would tend to precipitate a relapse, and that the stigma of a mental illness would remain for the whole of life and would be a blot upon his record, so that he would have no chances of success in the future. His detention as a lunatic would cause him to be shunned and avoided by all his former friends, and on leaving the asylum he would be isolated in a world of his own and viewed with suspicion and distrust. Owing to the nature of his illness he would be left without friends, without work, and without sympathy, even though, as in most instances, he was not to blame for his illness or misfortune. However short the detention, the disastrous consequence of certification remained; and not only did the undeserved reproach adhere to him, but it reflected also upon members of his family

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and upon those dependent on him. It marred their prospects as well, and certainly prevented them from being regarded favourably as to marriage, so that, owing to his illness, they descended to a lower social plane from which it often became impossible for them to emerge. So cruel were these reflections felt to be, and so undeserved yet so inevitable, that a strong effort was made before the war to obtain legislation so as to enable all mental cases to be treated in the early stages without the commitment certificate. So much impressed was the Director-General of the Army Medical Service with the reasonableness of this complaint that he decided no insane soldier or officer should be certified to be insane when suffering from a mental or nervous breakdown either until nine months had elapsed after the commencement of his illness, or unless the illness on the face of it presented incurable features or symptoms of chronicity or irrecoverability such as would be implied by cases of general paralysis, epileptic insanity, confirmed dementia praecox, or chronic delusional insanity.

Probably over 20,000 cases from among the soldiers at home and overseas presenting mental symptoms have been treated by the Army Medical Services in war hospitals during the last five years, and many of these must have recovered early, yet with the exceptions referred to not one of them has been allowed to suffer from the stigma of insanity. It is most urgently necessary—and this is only in accordance with the dictates of humanity—that the same treatment which is meted out to the mentally sick soldier should be extended to his civilian relations, as the benefits conferred upon the soldier would be extended equally to them, for in the early stages recovery is the rule.

In the statistics of Claybury, one of the asylums of the London County Council of which I had personal knowledge, the recovery rate for 1912 and 1913, the two years preceding the war, was respectively 41.95 and 38.58 per cent., whilst the average recovery rate for England and Wales was 32.3 and 31.9 respectively, and in the number of recoveries for 1913, the year immediately before the war, 70 per cent. were discharged recovered after a residence of less than nine months, and of these 60 per cent. were resident less than six months, and 17 per cent. less than three months, whilst less than a third of those who recovered did so after nine months and up to several years.

It is most strongly desired that those persons who may be suffering from their first attack of insanity should have the chance and the opportunity of recovery without being certified, and without incurring the disabilities already referred to. In order to show the need for this opportunity, it may be mentioned that no fewer than 18,000 cases of insanity occurred in one year—that is, in persons for the first time—and 90 per cent. of these were received into the county and borough asylums of England and Wales, all these being among the poorer, and financially less favoured, classes, who would deeply appreciate an escape from the certificate of insanity.

Many patients fear an indefinite detention in an asylum more than actual death, and they are themselves deeply suspicious and resentful of restraint. Such a feeling engenders hatred of the system, delays treatment, and lessens the chances of recovery. Already the poor may enter hospitals for bodily ailments voluntarily, but they cannot receive treatment for the more disabling mental illnesses without the certificate of insanity; and it is an anomaly, whilst admitting persons voluntarily for bodily complaints, to insist upon an aggression on personal liberty for the relief of mental illness. As the law stands at present, it is definitely set against the curative treatment of mental ailments. It clearly places obstacles upon the recovery of persons suffering from these diseases, and it interferes with the work of the physician who is concerned with mental healing. It is maintained that four definite points should be aimed at in any effort to better the treatment of early cases of insanity: (1) The extension of the voluntary boarder system from the rich to the poor insane and the contribution to their maintenance by the new Ministry of Health; (2) the sanction or approval of special homes for their reception and treatment, as is the case with mental defectives; (3) treatment for a period of six or nine months without certification; and (4) supplying to the patient an atmosphere of recovery, which the present asylum treatment does not do.

Discussion.

In the course of the discussion that followed, Dr. C. HUBERT BOND, one of the Commissioners of the Board of Control, made the following remarks:

I wish to dwell upon two points: one is the inference that may be drawn from the satisfactory proportion of recoveries at Claybury, and the other is the fact that all the cases out of which those recoveries occurred had, in accordance with the law, required to be certified under the Lunacy Acts before he or she could obtain admission with a view to treatment; and it ought further to be borne in mind that many of those recoveries took place within three months after admission, by far most of them within six months and but few after nine or twelve months. It is legitimate to inquire whether, and indeed to assume, that some of those who failed to recover at all might have done so had they received more prompt treatment in the earliest stages of their mental illness.

The stigma referred to as attaching to the certification of insanity is deep-rooted; it certainly delays prompt treatment; and it tends to make the treatment of the psychoses a discredited section of general medicine, instead of being, as it is, a highly important branch and a most difficult field of investigation and research.

Civilization has progressed, and much advance has been made since the original Lunacy Acts were framed and passed, largely to meet abuses—real or alleged; yet human nature being what it is, their relaxation without adequate supervision would probably be followed again by a re-appearance of at least some of those abuses which have long since disappeared; however, in view of the enlightenment of public opinion and of the intolerance of abuses to-day, my colleagues on the Board of Control as well as myself, and in fact many others who have a right to form an opinion upon this subject, and whom we have consulted, all feel strongly that an alteration in certain sections of the Lunacy Acts might now safely be made, and with great advantage to the patients whose interests they are primarily to protect. Such a modification ought to be made that may enable a person suffering from symptoms of incipient or early insanity to obtain with or without payment, according to the patient's circumstances, and expeditiously, such skilled treatment as may be necessary, but for a limited period (say six months) without the certificate of insanity. He should be under adequate supervision either (1) in one of the institutions for the insane, or (2) in a general hospital (either the large charitable or voluntary ones or those which it has been suggested some local authorities should ultimately provide), or (3) in such a place as a nursing home specially equipped and adapted for the purpose—each of these three groups of establishments to be encouraged and allowed to make special arrangements to deal not merely with an occasional patient, but with a number of such cases; or (4) as a single patient in any nursing home or private house.

So earnestly do my colleagues and myself desire to secure earlier and more prompt treatment for cases of mental illness, and if possible to break down that popular prejudice which is so prevalent in regard to mental illness, and which even denies its existence when present and delays its appropriate treatment, that if a change in the law can be secured—and this is necessary before any further steps can be taken—the Board of Control have suggested that, besides the absence of certification for a prescribed period, no notification to them of the names of the patients so treated need be made, being content with a facility to visit from time to time and see such patients, with an access to records and with certain provisos as to the forwarding of such patients' letters; but as respects private institutions and houses maintained for profit, we think that on each occasion of the reception of a patient under the proposed Act, notification of the fact (not of the patient's name) should be required, and subsequently of his or her departure.

I am not suggesting that all early cases of certifiable mental disorder could be suitably or properly dealt with under the legislation proposed, or that legal facilities should be sought to cover all early cases. My meaning will be clearer if such cases are regarded as divisible roughly into three classes: the "willing," who desire and consent to remain and undergo treatment; the "indifferent," who, owing to their mental illness, are unable to express consent or refusal; and the "unwilling,"

who would resent and refuse the restrictions upon their liberty necessary for treatment. For this third group it is considered, for the protection of all concerned, that the safeguards of the existing law should still be maintained; in other words, the freedom of action in treatment which we should like to see made legally available would not include a power of detention.

I should like to return to the subject of help from general hospitals, for it is one I have cherished for a long time, and to which I have several times made public allusion elsewhere. I would reiterate that no substantial progress can be made in the early treatment of mental disorder, and that the barriers which so unfortunately segregate the treatment of mental disorders cannot be removed, until the general hospitals agree to abandon their practice of giving the "cold shoulder"—if I may use the expression—to every case in which the symptoms are predominantly mental. I would like to appeal strongly to those in authority and to ask them to consider whether the time has not now arrived when this old policy may properly, and with all-round advantage, be reversed. I am familiar with the history for this attitude, and realize there are certain inherent difficulties in coping with it, but am confident that with sympathy and a desire to adopt a change in policy on this matter they could be overcome. The financial one might be overcome if the Legislature would empower the local authorities to subsidize the maintenance of patients suffering from early mental disorder, in special wards in or associated with a general hospital, and would authorize local authorities alone or in combination either to subsidize the provision of these special departments or to establish special hospitals of their own—the former alternative by preference. I venture to think that it is both timely and opportune that this reference to general hospitals should be made at the West London Hospital, where some of my audience are carrying on so efficiently the work of relief.

It is highly desirable that adequate interest should be aroused in these matters, because the proper development of such facilities would naturally lead up to the establishment of psychiatric clinics, the absence of which in this country is a reflection at least upon our sympathy with the treatment of mental diseases. Their establishment would help to educate the public in matters of health, and certainly in respect of mental health. But besides that educational mission and besides their great therapeutic utility, they are urgently needed for the better education of medical practitioners and students, and for research in psychiatry. It is gratifying that at least three universities in this country have taken this matter into their serious consideration.

THE CURE OF BILHARZIA DISEASE BY INTRAVENOUS INJECTIONS OF ANTIMONY TARTRATE;

THE PROPHYLACTIC ACTION OF THE DRUG.

BY

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WITHOUT exception all the recent reports of cases so treated confirm the statement that antimony is a specific cure for bilharzia disease. In other words, antimony so used kills the parent worm in the tributaries of the portal vein of the patient and cures him of the disease.

But there is a wider interpretation of the formula "antimony cures bilharzia" than this, and it is the application of the larger meaning which makes the effect of the drug so complete—one might almost say wonderful.

In our paper in the *Journal of Tropical Medicine and Hygiene* of July 15th, 1919, pp. 129-144, we (J. R. Newlove and J. B. C.) show that the shells of the ova of *Bilharzia haematobia* and *mansoni* are permeable to water (they do not hatch out in urine without the addition of water), and that they are permeable also to chemicals such as formalin and potassic tartrate of antimony. The fact that bilharzia ova do not as a rule hatch out in undiluted urine and faeces indicates, it is true in negative manner, that the embryo within the ovum is

physiologically aware of the lack of favourable conditions of the medium in which the ovum is suspended, and therefore will not develop. The embryo in the ovum is "in touch" with the world without. This can only be explained satisfactorily on the assumption of permeability of the egg "shell."

The fact that the shell of the bilharzia ovum (*haematobia* and *mansoni*) is permeable to formalin, whilst that of ankylostomum is not, has a practical application, and is demonstrated in the ordinary method which we adopt at the Khartoum Civil Hospital for the examination of faeces for parasitic ova and worms; we find that after the addition to an ordinary stool of 1 oz. of 40 per cent. formalin, bilharzia ova in the stool are sterilized (will not hatch) whilst ankylostomum ova are unaffected and hatch out.

The permeability of the bilharzia shell to antimony has a still more far-reaching application.

If it is true, then my statement¹ that antimony not only kills first the parasite, *Schistosoma haematobia* and *mansoni*, in situ, but, later, kills the embryos in the ova deposited in the tissues, and that the patient is cured, not only of his bilharzia parasites, but that he ceases to be a bilharzia carrier and cannot propagate the disease, is a very important one, for it means nothing less than this, that we have in antimony a practical means of eliminating bilharzia as an endemic disease from Egypt and from those countries where it prevails, such as the Sudan and South Africa, or, at any rate, of converting an endemic disease of national importance into a sporadic disease of parochial importance only. For if we can stop the supply of infected ova to the intermediate host at its source by treating bilharzia patients with potassic antimonium tartrate then *Bullinus dybowskii*, *B. innesi*, *B. contortus*, and *Planorbis boissyi*, and other species of fresh-water molluscs which act as intermediate hosts for bilharziosis in Egypt, will cease to be infected, and they in their turn will be incapable of infecting the human host with bilharzia disease.

The fact that antimony given to a bilharzia patient kills the parent worms in the patient means benefit to one human being, but the fact that antimony also sterilizes the ova which have been deposited by the parent worms before death in bladder and rectum, renders the effect of antimony a hundredfold greater, for the benefit extends possibly to hundreds who might be infected by the patient, and it goes on acting all the time ova are being eliminated.

According to our own observations these deposited ova in some cases continue to be eliminated in batches for one or even two years after we may assume the parent worms have died (that is, after the completion of the course of injections).

There is another fact which suggests the permeability of the eggshell of bilharzia ova. After being deposited by the female parent worm in the bladder and the rectum the ova probably remain alive in the tissues for many months in a condition of suspended animation or development—they can only so remain alive on the assumption that the shells are permeable to the small exchange of nutriment required to keep "body and soul" together. Lying in the tissues when the injections are given, the very dilute solution of antimony in the blood slowly but surely penetrates the ova and attacks the embryos inside the shell and kills them.

If it is a fact that the deposited ova are sterilized and rendered harmless, it is a fact of the utmost importance, for in this event the patient cannot go on infecting fresh-water snails and through them other human beings, he ceases to be a bilharzia carrier and a danger to the community, and a direct means of offensive advance on bilharzia as a devastating disease is practicable in the shape of a frontal attack, and it is more than probable that by means of the prophylactic action of antimony (tartrate) bilharzia disease will be, practically speaking, banished from countries such as Egypt, where it is endemic and where it has so baneful an effect.

REFERENCE.

¹ *Lancet*, June 14th, 1919.

THE late Dr. J. Ewing Mears of Philadelphia bequeathed £20,000 to the Harvard University to be applied to the study of methods directed to the reform and cure of criminals and mentally deficient persons by surgical measures.