any other procedure nothing else could have been done, and yet I could not but sympathize with his conviction that such a step ought to have been avoided.

Certificates are also objected to on account of the attendant disturbance of business affairs. A professional man holding several appointments suddenly lost his memory of recent events, although retaining his general intelligence. His affairs were managed by his son, who was his partner, to the satisfaction of every one. Unfortunately, as so frequently happens, the old gentleman became restless at night, and care in an institution was advised. He was quite willing to go away voluntarily, but owing to his defective memory he could hardly remain as a voluntary patient, not being able to remember his position. When certificates were proposed it transpired that they would mean a loss of £400 a year, as his appointments would have to be given up; and, moreover, the power of attorney given to his son would become invalid, so that his whole business affairs would be disorganized. In such a case in all probability a receiver would soon become necessary; yet it seems altogether wrong that such a man should at once be exposed to these disabilities when he breaks down mentally, seeing that he might be away from business for six months, and incapacitated in body and mind, by typhoid fever without any difficulties of this kind.

I have not forgotten a favourite legal maxim, "Hard cases make bad law"—an excuse for injustice which is not very convincing. But the difficulties I have mentioned are not exceptional. It is no exaggeration to say that in at least one quarter of the cases I see in consultation the impossibility of securing effective temporary care, apart from certificates, is a serious matter. One of my case-books contains 239 consecutive cases seen in consultation, and of these 79, or 33 per cent., needed the special care referred to. In a recent acute case it is obviously desirable that asylum care should not be hastily undertaken, and indeed it is only fair to the patient that it should be delayed until the real nature of the case can be made out, and yet at present for rich and poor alike there are no properly equipped homes or sanatoriums where treatment can be given temporarily under favourable conditions.

Directly we begin to consider the possibility of establishing any such hospital we are beset with difficulties. The hospital which I picture in my mind is affiliated to the general hospital of the district; it has a large garden, in which are several pavilions. There is both a resident and a non-resident medical staff, which collectively is able to attack mental disease from all sides. The patients would for the most part be received on a voluntary basis, though, if needful, detention for defined periods would be possible, whilst the equipment would include all appliances likely to assist in diagnosis and treatment.

Such public hospitals would usually, as in Boston and Munich, be municipal institutions, and in the long run they would prove to be a good investment of public money, owing to the large amount of insanity they would prevent.

The establishment of similar institutions for paying patients presents even greater difficulties, unless there is some change in the law. In existing circumstances there would be constant risk of prosecution under the 315th Section of the Lunacy Act, as it would be impossible to prevent patients stepping over the border, and the utility of such a home or sanatorium would be lost if such persons could not temporarily be detained. Hitherto proposals to enlarge existing powers of compulsory detention have been viewed with suspicion by a large section of the public, and several bills designed to meet these difficulties have been rejected by Parliament.

The legal profession views with grave concern any interference with the liberty of the subject, although a lawyer friend of mine, in discussing this matter in relation to the present state of public affairs, cynically remarked that "if there are any liberties left in England, now's the time to remove them."

This problem will not be solved until it is clearly recognized that there is no defined line between sanity and insanity, but rather a vague intermediate zone, and that those who enter this region urgently need the best possible treatment. I would therefore plead for legal recognition of this intermediate borderland state, and, as some power of detention in certain cases is required, safeguards must be provided that will disarm criticism.

The greatest of all safeguards is the absence of any concealment, and at once we find that in this matter public and private interests clash. It is only reasonable that families should not wish the state of an afflicted member to be generally known, and patients temporarily suffering from mania, or indeed any form of insanity, are entitled to privacy. Consequently the wards of the psychiatric hospital cannot be open to the public in quite the same way as those of a general hospital.

The suggestion has been made that the law should recognize a new class of patient suffering from undeveloped insanity, who under certain conditions might be detained for a stated period. How long this should be is a matter for discussion; probably a month in the first place would be sufficient, to be extended with the approval of the supervising authority for a further period of not more than five months. The names of all such patients would doubtless be notified to the Board of Control, and they might be styled "notified" patients, as distinct from voluntary boarders on the one hand and certified patients on the other.

Keeping in view the chief safeguard—absence of concealment—I would suggest that periodic reports of every case should be sent to the Board of Control, and that it should be obligatory to keep records for inspection by visiting members of the Board. I see no reason why the correspondence of "notified" patients should be interfered with. Further, no patient should be detained under this provision except in homes or institutions approved by the Board of Control.

All such approved homes should be inspected regularly by visitors nominated by the Board of Control, or possibly by county councils; if these visitors reported unfavourably in any individual case, the patient would have to be discharged or certified.

I see, moreover, no reason why notified patients should not be received in any recognized institution of the insane, or into special departments of such which the Board of Control might consider suitable for the purpose.

This amendment of the law would prevent evasion and the illegal detention of patients in lodgings or in private care that is now notorious. What has been termed the "back-parlour treatment" of the insane would be abandoned as far as recent incipient cases are concerned, and it is these that are of the most consequence. Special hospitals, such as the Maudsley Hospital, and psychiatric clinics generally, would be able to treat to recovery a large number of patients who must now be certified.

These two recommendations—the establishment of special hospitals or sanatoriums for the treatment of medical disorders in their early stages, and the modification of the law required to render such treatment effective—are, in my opinion, matters of the utmost importance. Not only will they do much to prevent declared insanity, but these special hospitals will become centres of enlightenment, and so disperse the unhappy prejudices and errors that surround the subject, whilst the larger clinics associated with universities will afford students opportunities of studying practical psychiatry which they do not now possess.

REFERENCE.

¹ *Boston Medical and Surgical Journal*, September, 1913.

PERIPHERAL SHOCK AND ITS CENTRAL EFFECTS.

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THE admirable paper in the *BRITISH MEDICAL JOURNAL* of December 11th, 1915, by Dr. F. W. Mott, on "The psychic mechanism of the voice in relation to the emotions," reminds me of a remarkable case of deaf-mutism which came under my observation some years ago. This condition existed in a collier for about seven years, consequent upon receiving a "shock" in an underground colliery explosion. He was eventually cured by another shock during a second colliery explosion underground; he regretted that he never recovered the power of singing, as he had belonged to a choir before the first accident, and was incapable of rejoining it on that account, although he still enjoyed listening to music.

After his recovery this patient came to a surgical ward

at the Cardiff Infirmary, and it was through the accident of my going into the ward during visiting hours and seeing him converse with his wife in the deaf-and-dumb language that I obtained his singular history.

He was one of the few survivors in a big colliery explosion. He remembered nothing of the accident, but on recovering consciousness found that he could neither hear a sound nor articulate a word. After remaining in this condition for a considerable time he went to a school for the deaf and dumb, and eventually married a congenital deaf-mute. He lived happily in this state for some years, and resumed work until the occurrence of a second underground explosion, which was followed by his recovery from deaf-mutism; he stated that he distinctly remembered "hearing the ground tremble" before lapsing into unconsciousness which lasted a few days. When he regained consciousness he got very excited upon discovering that his powers of speech and hearing had returned. The late Dr. Naunton Davies, J.P., of Porth, told me that he knew the man well, and that in his opinion there was a strong hysterical strain in him; Dr. Davies said also that there was no evidence of direct injury to the head.

The present war has added to our knowledge of the causation of symptoms which are clinically so well known, and are described in the textbooks in chapters on concussion of the brain. It is no longer necessary to assume that "*commotio cerebri*" must have taken place, due either to a direct force—a "whack" or "crack" on the head—or to indirect force transmitted through the atlantoid articulations with the occiput producing a jarring of the skull and its contents. It can now be easily realized by those who have seen and studied the effect of high explosive shells upon the buildings of a town or village in the vicinity of which explosions have taken place. The damage which *atmospheric disturbances* alone can do to buildings, even at great distances from the site of the explosion, has strikingly illustrated the effect such air currents must have upon human beings, whether standing or lying down, awake or asleep. To me the damage done to buildings carries the conviction that the general shock to the whole surfaces of skin and mucous membrane which protect the exterior of man may be sufficient to disturb the nervous machinery to a degree which may vary from slight symptoms of concussion of the brain by stages which may reach the extremity of sudden death, without showing evidence of any appreciable naked-eye pathological signs.

I have had the opportunity of seeing the effect of air disturbances caused by colliery explosions, and these are in some aspects as powerful as those of "shell concussion." Further, I am of opinion that many of the freaks of lightning can be best explained upon the hypothesis that the tracks of lightning sparks cause sudden violent air currents, in the nature of vortices, ripples, or waves. These air blasts are often of a weirdly powerful intensity; the most striking example that has come under my own observation since I recorded—at the Oxford Meeting of the British Medical Association in 1902—the cases of two men struck by lightning, was one in which a key that had not been turned on the inside of a door was driven right across a room several feet high, marking by its impact the wall against which it struck; at the same time the beading on the exterior of one of the door-boards was stripped off and carried in an opposite direction to that taken by the key. I do not wish to weary the reader by quoting further illustrations of the effects of lightning air-currents in splitting dry wood or in blowing bark off dead trees. I want merely to emphasize the fact that in a large number of cases violent air-currents striking against skin and mucous membranes, whether originating in war by high explosives, or in civil life by colliery explosions, and by lightning, play *per se* the principal part in the etiological factors which cause disturbances of function in the psychic, physiological, and automatic centres situated in the brain itself through impulses conveyed to it. The special intermediate organs existing between the exterior of man and his brain, such as the eyes and ears, are frequently put out of gear by these air-currents or "shell concussion," and Mr. Jameson Evans, in the number of the BRITISH MEDICAL JOURNAL referred to above, gave some striking illustrations of such damage to vision. On the other hand, cases of severe labyrinthine trouble of the ears have been found to exist after patients recover from

the unconsciousness of severe concussion of the brain, as exemplified by the experiences of a young man who was "blown up" at Loos, and discovered that he could not direct himself to getting out of the side of the bed he wanted to, and that when he did get out he found himself staggering and reeling; these symptoms disappeared in two or three days, leaving in the course of a few weeks only partial deafness of one ear.

It will be noticed in the history of the case of deaf-mutism in a collier related above that he suffered from two types of shock—or symptoms of concussion of the brain—the first one occurring suddenly or instantaneously, that is, without consciousness of the accident on his part; whilst the second one had a latent period, that is, consciousness of the action before he lapsed into unconsciousness. I have observed the same two types of shock in cases of lightning stroke.

It is manifest that it is only in the type of "shell shock" in which a latent period occurs before the onset of the state of unconsciousness that the psychic centres can exert any influence upon the nervous machinery of the emotions.

The grim reality of the misnomer, "hysterical manifestations in a neurotic," is dramatically portrayed in the case related above, where the collier, upon recovering his power of speech and hearing, found himself married to a congenital deaf-mute!

OBSERVATIONS ON CASTELLANI'S "TETRAVACCINE" AND "PENTAVACCINE."

BY

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To Castellani is due the credit of having first proposed prepared, and used, combined vaccines. The preparation of such vaccines is based on the experimental work he carried out in 1901-1902, when he was able to demonstrate that an animal (rabbit) inoculated with more than one species of bacteria, within limits, elaborated agglutinins and immune bodies for the various species injected, and that the amount of such protective substances for each species was not distinctly less than in control animals inoculated with one species only.

Castellani's best-known mixed vaccines are the tetra-vaccine "typhoid + paratyphoid A + paratyphoid B," which he began using in man on a large scale in 1905; the tetra-vaccine "typhoid + paratyphoid A + paratyphoid B + cholera"; the tetra-vaccine "typhoid + paratyphoid A + paratyphoid B + Malta fever"; the pentavaccine "typhoid + paratyphoid A + paratyphoid B + cholera + plague."

It may be of interest to put on record the experience I have had in Serbia of two of Castellani's vaccines—namely, the tetra-vaccine, typhoid + paratyphoid A + paratyphoid B + cholera; and the pentavaccine typhoid + paratyphoid A + paratyphoid B + cholera + Malta fever.

The two vaccines were obtained from Dr. Castellani, who was preparing them in Serbia on a large scale for the American Red Cross Sanitary Commission and for the Serbian army. The details of technique for the preparation of such vaccines may be found in his own publications; I limit myself to stating the results I have had.

Tetra-vaccine.

The tetra-vaccine was used by me to inoculate 3,000 persons, most of whom I was able to follow for two months after inoculation. Two injections only were given ($\frac{1}{2}$ c.c. each) at an interval of five to seven days. The injection was done subcutaneously in the arm, after sterilizing the skin by means of tincture of iodine. The local reaction was generally mild, a few hours after injection a small patch of redness developing, with slight pain, which lasted one to two days. The general reaction was also, as a rule, mild. All the inoculated persons were able to attend to their duties twenty-four to forty-eight hours after the injection. I was able to keep in touch for two months with 2,000 of the inoculated persons; no case of typhoid, paratyphoid A, paratyphoid B, or cholera developed among them. With the kind assistance of Dr. Castellani, I