possibly be due to the viscosity of the blood. Parkes Weber showed this to be much above the natural in his cases, and the observation has been confirmed. But this could only act by delaying the flow, and when, as in my case, the heart is natural, the pulse regular, and the blood pressure at the usual level, it cannot reasonably be supposed that the blood is passing the lungs with such difficulty as to cause dyspnoea.

On the other hand, dyspnoea is not a natural consequence of a mere increase in red cells. Rather the contrary. If they were good red cells they would increase the amount of oxygen in the blood. It does not seem likely that this would cause dyspnoea, but the condition has never been reproduced in experiments.

But even if we remain doubtful about dyspnoea, we can safely say that the polycythaemia, or erythrocythaemia, would not by itself cause cyanosis. Now cyanosis is not a constant symptom. Some of the cases are at any rate rather florid than cyanotic. But cyanosis is frequently found, and it has often been noticed that the blood when drawn for examination is very dark. And again, even florid cases become blue on exertion. How can this be explained? It looks as if, in spite of the erythrocythaemia, and in spite of the amount of haemoglobin, which has been sometimes as high as 180 per cent., there was less oxygen in the blood than usual. I do not think this has ever been measured, but it seems worthy of investigation, for it seems possible that in this may lie the secret of the disease. Suppose for a moment that there is some fault in the cytoplasm or in the haemoglobin of the red cells which prevents them from being good oxygen carriers, or make the more likely supposition that there is some abnormal reducing agent in the blood which reduces oxyhaemoglobin but does not turn it into methaemoglobin or sulph-haemoglobin. The want of oxygen might stimulate the bone marrow to form fresh cells, as it does where high altitudes or heart disease is the cause. This increase of the cells, erythrocythaemia, may be in some cases adequate. There will then be much more blood in the body, but it will be fairly red, though each cell carries less than a healthy cell. These patients will be florid. In other cases increase in the red cells will not suffice. The fresh cells may be affected from the first with the same illness as the others, or the reducing agent may be of such power that they cannot counteract it. Then the patients will be blue. And whether they are florid or blue a little effort, by calling for more oxygen, will at once deepen the cyanosis. Even the florid patients will have very little margin.

Such an explanation, which I propose with great diffidence, would not change the part ascribed to the bone marrow. The replacement of the natural marrow by erythroblastic tissue was noticed by Rendu and Vidal in 1899, and they referred the erythrocythaemia to this source. Their observations have been confirmed by Parkes Weber, and, I believe I am right in saying, by every observer who has examined the bones.

I am merely supposing that the erythroblastic tissue is stimulated to activity, not by the destruction of red cells, as is suggested by Weber, but by some disease which, without destroying them, renders them inadequate for their office. As far as I know, there is no evidence of haemolysis in this disease. The red cells do not, as in pernicious anaemia, vary greatly from the normal. They are usually described as natural in appearance. A few normoblasts are occasionally seen, and that is all. Nor has any iron been found in the viscera, as the result of destruction of the red cells. On the other hand, if there were in the blood an abnormal reducing agent, or even a normal reducing agent in excessive quantity, this disease would be analogous to the conditions of methaemoglobinemia and sulph-haemoglobinaemia, which is not a great stretch of the imagination.

REFERENCE.

¹ Wood Clarke and Hurtley, *Journ. of Physiology*, xxxvi, 1907, p. 62.

THE report for the year 1907 presented by the Committee of Visitors to the annual meeting of the Royal Institution on May 1st, testified to continued prosperity and efficient management; 41 new members had been elected; 63 lectures and 19 evening courses were delivered, and 896 volumes had been added to the library, including 203 presented. The Duke of Northumberland was re-elected President, and Sir James Orlinton-Browne, who presided, Treasurer.

THE RECOGNITION AND TRAINING OF CONGENITAL MENTAL DEFECTIVES.*

By W. A. POTTS, B.A. CANTAB., M.D. EDIN., M.D. BIRM.,

MEDICAL INVESTIGATOR TO THE ROYAL COMMISSION ON THE CARE AND CONTROL OF THE FEEBLE-MINDED.

CONGENITAL mental defectives are not entirely a product of modern civilization; there can be little doubt, however, that in recent years their numbers have increased out of reasonable proportion to the ordinary population. This is probably the real reason why public attention has at last been focussed upon them. It is to be hoped that the report of the Royal Commission on this subject, when issued, will lead to measures calculated to prevent continued rapid increase in their numbers. The fact that the Sandwell Hall Boarding School for mentally defective children was opened last autumn, and that the Monyhull Colony for mentally defective and epileptic persons will be ready in a few days, indicates that in this district the authorities are alive to the exigencies of the situation, though it is doubtful whether they have yet fully grappled with the problem. While work such as this is being done at home, we find that Canada refuses any longer to be a dumping-ground for wastrels, but will only admit and retain such individuals as are capable of paying their way and keeping out of the hands of the police. These considerations emphasize the necessity for recognizing congenital mental defect as early as possible, and the importance of being able to forecast whether a particular case can ever be turned loose at home or abroad.

Increasing experience would seem to show that there is no single sign on which a diagnosis can be based; for this purpose both an intellectual and a physical examination are necessary, together with an investigation of the attitude and demeanour, and an inquiry into the conduct and mode of life. In many cases the examination can be much curtailed, only a few intellectual tests being required. The omission of any of the means for detection, however, always involves a possibility of error; for instance, a few days ago a boy of 5 was brought to me; he answered questions pretty well for a child of his age, and showed but little sign of abnormality; I was, however, informed that he was dirty in his habits, and could not be broken of this. As he was in a well-regulated institution, and had been there much longer than is generally necessary to put all right with normal children who are suffering from neglect, this fact had much significance. Again, it is matter of common knowledge that children are sometimes branded as feeble-minded when they are only deaf or short-sighted; the same mistake may be made with children of 10 or 11 who cannot read or write because they are suffering from such a condition as cardiac disease, which has involved never going to school.

The examination must be adapted to the age of the child. Reading and writing are, of course, important tests, while the power of calculation must be carefully appraised. With young children the objective method should be employed; counters, pennies, or matches are always available; only the simplest questions are necessary, as a feeble-minded child of 9 or 10 is often unable to add 4 to 7, if, indeed, he does not fall with an easier sum. For older children, the number of halfpennies in so many pence and the comparative value of three halfpennies and two pennies are useful questions. In the case of adults, the value of half a crown and then of three or four half-crowns can be asked; three half-crowns is often the limit of defectives. Arithmetic is a great stumbling-block to weak brains, but alone does not constitute a sufficient test; those who are very weak in other directions are sometimes surprisingly quick at figures. The child may also be asked—what animal says "bow-wow"? what the cat says? where milk comes from? the use of horses? and so on. Here again with young children the question should always take an objective form, pictures being shown in the absence of the real object. Questions on these lines readily suggest themselves. Colour tests can also be easily applied, but are of no great value. Ordinary individuals are sometimes colour blind, and among the very poor at least young children are sometimes ignorant of the names even of the fundamental colours, unless they have been taught them at school.

* A paper read at a meeting of the Midland Medical Society on April 8th, 1908.

Backward children, who suffer entirely from neglect and an abnormal environment, but are not really defective, are not very uncommon in these days when parental responsibilities are so readily undertaken by the State and charitable people. If the father drinks and loafs, and the mother goes out to work all day, leaving the children shut up in a back room with no food, and without a fire, for fear of accidents, it is little wonder that the offspring fall greatly behind the standard of more fortunate children. This type, when properly fed and placed in a more stimulating atmosphere, soon responds to educational influence.

In the case of children under 7 an intellectual test is of comparatively little value; a history of dirty habits, and of backwardness in walking and speaking, counts for much. An exact history is of real value in prognosis, for Lapege, after examining over 300 cases, was able to demonstrate that the later the child learns to talk and walk the greater is the degree of mental deficiency. The defective child is slow in learning to sit, to hold up his head, or use his hands. In infancy want of muscular power in the lower lip or peculiar formation of the lower jaw often makes it impossible to take hold either of the breast or the bottle. When, in addition to signs such as these, the cranial configuration and features clearly conform to one of the recognized types of congenital mental defect, such as the microcephalic or Mongolian, a diagnosis can be made at a very early stage; if there is the least doubt, the decision is better deferred till the child is 7 years of age.

In all cases a study of the attitude and demeanour gives great help; a feeble-minded child seldom carries himself well. When a group of children is marched past, those who are mentally defective can often be picked out immediately by their evident lack of spontaneity and vitality, and also of muscular power and control. Even with adults the weaklings can often be recognized quickly in the same way. The face should be carefully watched, for defects of expression are common; it is difficult to describe or classify the deficiencies, but with practice they can often be recognized. During an examination sometimes more importance must be attached to the manner of the suspect when questions are asked, rather than to the actual answer. The power of attention is an important point; its duration and intensity greatly influence the prognosis. In some instances it is impossible to come to a decision without an account of the habits and conduct; if these cannot be supplied from a reliable source, it is well to place the child or young person for a few weeks in an institution, where he can be under the eye of a competent observer; under such circumstances his real capacity soon declares itself.

In discussing the physical examination it is necessary to deal first with the stigmata of degeneration. At one time there was a tendency to think that one or more of these would constitute an all-sufficient test. Careful investigation has, however, shown that they may be present in normal individuals, while defectives may be quite free. Lapege made a careful investigation in Manchester of 250 defective children and found that 90.5 per cent. showed some well-marked physical anomaly. This confirms the observation, frequently made, that the more common abnormalities are twice as frequent among the feeble-minded. Lapege, however, found that a distinguishing feature between an ordinary school child and a feeble-minded one was that the anomalies in the former tend to be single, while in the latter they are usually in combination. My own experience would amply confirm this. The stigmata to be looked for are irregularities and peculiarities of the ear, of the teeth, face, tongue, cranium, and hand. An epicanthic fold is not in itself of great significance; associated, however, with a small and oblique orbital fissure, a transversely-furrowed tongue, or some other distinguishing feature of the Mongolian, it carries full weight. I have already stated that there is no one diagnostic sign; a possible exception to this rule exists in the case of a small head circumference. Normal school children with a measurement of less than 19 inches are very rare. All the same a typical microcephalic is a person with a head of a characteristic configuration rather than of a special size, the distinguishing feature being the two pointed angles at the nose and vertex, due to the absence of chin and the rapidly receding forehead. Excessive size of the head is also suggestive.

There is no difficulty about putting a tape round the widest part of the head, and this should always be done; antero-posterior, transverse, and other diameters can be readily taken with a special head spanner or a pair of callipers, but are not usually necessary for an ordinary examination. Marked asymmetry of the head or face is a bad sign. Dental irregularities should always be looked for. Having thoroughly examined the head, the hand should be placed under review; a little finger falling short of the distal interphalangeal joint of the fourth has sometimes been accounted a sign of considerable importance; after examining a large number of individuals, normal and defective, it appears to me that while of some value in association with other abnormalities it is no guide whatever as a mark by itself. The appearance of the whole hand should be noted; the little broad hands with short squat fingers, often characteristic of the Mongolian type, being decidedly suggestive. The state of the skin should always be noted; it is frequently dry or scaly, or even eczematous, and often there is a growth of hair in abnormal situations.

The special types into which defectives are often divided, such as macrocephalic, microcephalic, Mongolian, etc., are largely matters of academic interest; the practical point in connexion with them is this: if a child has such a combination of distinctive features as will assign it to one of these groups, no doubt is left as to the want of mental capacity. Special classification, therefore, is not without value, especially as I believe it often gives a clue to the predominating cause.

No examination is complete without an investigation of the other organs, and especially of the heart. I have already alluded to the possibility of apparent mental defect being due to serious cardiac mischief, which has prevented any education. The heart is often diseased in defectives; indeed, this is one of the reasons why their careers, as a rule, are comparatively short; 40 is a limit beyond which most defectives never go. Barr collected records of 625 cases, and found that only 8 of them, or little more than 1 per cent., survived 40; more than half the whole number died between 10 and 20 years of age.

Turning to education, it may be said at once that practically nothing can be done with idiots and imbeciles; with those of a higher grade the first point is to make sense impressions and arouse attention; objective methods are of paramount importance throughout; the pace must always be exceedingly slow. The great essential for success is that the teacher should adopt Froebel's motto, and "live with the children." School work must not be attempted till 7 years of age, and as the large majority, if not all, of this class stop developing at 16, in marked contradistinction to ordinary individuals, we may well exclaim at the limited time in which we have to work. Before 7 the time must often be occupied in training to cleanly habits and in developing functions which the normal acquire almost of themselves. If there are defects of speech they must be dealt with in the ordinary way by teaching first abdominal breathing, and following it up with tongue drill; to start by calling upon the child to pronounce difficult words or combinations of words is but to court failure. When the very elements of sound are a stumbling-block great patience is necessary; making the vowel sounds to music acts as a useful stimulus in certain cases. If learning to walk is such a laborious task as to tire out even the mother's patience something may be achieved by placing the child in a square frame on wheels with a hand-rail.

As regards school work, when there is but little capacity, the less time spent with books the better. To be able to read is, however, such an incalculable advantage to every individual, that as long as there is any hope great efforts are legitimate. Wherever possible, too, every one should be taught the name and value of the various coins, especially the less valuable ones. Having achieved this, the sooner attention is devoted almost entirely to manual work the better. It must never be forgotten that the education of the power of attention is of paramount importance. With this object tasks and lessons must be made as interesting as possible. By means of manual work not only does the defective learn to contribute to his own support, and that with considerable satisfaction to himself, but also some of the best avenues to the brain are opened up. Till recently America has been far ahead of this

country in the practical instruction provided for degenerates. During the last year, however, Mr. Burden, assisted by Mrs. Hume Pinsent, has set a splendid example in the arrangements of the work at the boarding school at Sandwell. Gardening, carpentry, bootmaking, brush-making, laundry work, carpet weaving, and tailoring are all in full swing. It is anticipated that each of these departments with, as a rule, only one instructor, will soon be capable of meeting the requirements of the whole institution. One of the most satisfactory departments is the garden, where fourteen of the boys, working with two men, have at the end of nine months cleared expenses and made a profit, although the land was previously in a neglected state. As these unfortunate individuals must be segregated, it is of great importance that they should contribute something to their own support; Sandwell has demonstrated the possibility of accomplishing this, even in aggravated cases, for it must be remembered that as a rule only those children are admitted to Sandwell who are unfit for the special schools that now exist in most of our large towns. In conclusion, I have only to add that amusement has always been a recognized agent in training feeble minds and bodies; due provision for simple entertainments should be made in every institution for defectives.

AN OUTBREAK OF BERI-BERI ON BOARD A MERCHANT VESSEL.

By STAFF SURGEON SIDNEY ROACH, R.N.

[Communicated by the DIRECTOR GENERAL, R.N.]

A SAILING ship left Rangoon on July 3rd, 1907, for Queenstown with a cargo of teak. She had 15 persons on board, all told, comprising captain, 2 mates, carpenter, sail-maker, steward, and 9 hands (10 Norwegians, 1 Dane, 1 Swede, and 3 negroes).

Soon after leaving Rangoon the carpenter was taken ill with what the captain described as bronchitis; but I am inclined to believe, from the account of his death given me by one of the mates, that the cause of death, which took place on August 18th, was a cardiac attack of beri-beri.

The ship arrived at Ascension on October 11th, as the captain wanted medical assistance. I went on board, and found that the captain realized the cases to be beri-beri and had been diligently treating them with tincture of digitalis. I found five well-marked cases of beri-beri, one of sore throat, one of secondary syphilis, and one of so-called rheumatism. Two of the cases of beri-beri were acutely ill, and these two the captain wished to land, and then proceed on his voyage. I advised him to give up all idea of proceeding to sea with such a sickly crew, and pointed out the danger of leaving cases of beri-beri in the ship where they had apparently contracted the disease. He accordingly took my advice, and anchored that evening.

With the captain's permission, I went over the ship in order to ascertain the condition under which his men lived. The crew lived in a deckhouse forward, which struck me as being very clean and airy and, under the circumstances, not crowded. The officers and one man working his passage lived aft in cabins.

The following itinerary will show the movements of the ship previous to her arrival at Ascension, and also the occurrence of the disease, which would appear to have started on the voyage from Rio de Janeiro to Rangoon.

Itinerary.	Length of Voyage.	Cargo.	Incidence of Sickness.
Left Sweden Nov. 9th, 1906	39 days	Wood	Nil.
Arrived Rio Jan. 17th, 1907		Goods	One accident at Rio.
Left Rio Feb. 26th, 1907		Stone	
Arrived Rangoon May 9th, 1907	72 days	Ballast	Two slight cases of beri-beri. Some illness; no beri-beri while in harbour.
Left Rangoon July 3rd, 1907	99 days	Teak	
Arrived Ascension Oct. 11th, 1907			Several cases of beri-beri.

It is worthy of note that the carpenter who subsequently died was one of the slight cases of beri-beri which

occurred on the passage from Rio de Janeiro to Rangoon. The former voyages of the ship are here appended. It is noticeable that the usual cargo of the ship appears to have been timber.

Former Voyages.

Leith to North America	...	Ballast.
North America to Buenos Aires	...	Lumber.
Buenos Aires to Europe	...	Quebrache wood.

Unfortunately, as the captain and crew only joined the ship before she sailed from Sweden, no information could be gathered as to whether beri-beri had appeared on board before this particular voyage.

It appeared that the cargo of teak was shipped in the river at Rangoon. The teak was brought down the river in rafts, taken alongside, and hoisted into the hold while wet and muddy. The hatches were taken off when about three weeks out from Rangoon, and the timber was then still hot, wet and steamy, so much so that the captain deemed it advisable to sprinkle carbolic acid over it. The presence of a damp, hot, steaming atmosphere may be sufficient to account for the outbreak of the disease, as it fulfils the conditions under which, according to Sir Patrick Manson, the disease occurs.

DIETARY.

The question of food revealed nothing that shed any light on the outbreak of the disease. The actual diet table differs little from that of any European sailing ship, and would appear sufficient so far as the food value is concerned.

The question of the use of rice was inquired into. The master informed me that rice was used in small quantities on board for ordinary purposes, such as stews, puddings, etc.; it was not issued as a vegetable or in any large quantities. The rice was of good quality, and was not weevily; it was used whole, and not ground. Bread was baked on board once or twice a week. The bread was made of wheat flour. Biscuit was, of course, in store, but the master being suspicious of its appearance, and noting that it was very hard and unpalatable, would not issue it to the crew. The master was well posted up in the theories of the origin of beri-beri, and was aware of the danger of the excessive use of rice. With reference to the biscuit, he was suspicious that it was made of rice flour, and on that account would not use it.

All drinking water used on board was boiled before being put into the scuttle-butts.

On leaving port the master was in the habit of taking on board fresh vegetables, fowls, pigs, etc., but necessarily these supplies did not last long. It will also be noticed that dry fish was used on board. No rum or spirit of any kind was issued on board; lime-juice was, as will be seen, issued regularly. The use of quinine was also inquired into. The master issued it whenever he thought it necessary.

Daily Ration.

	Grams	Ozs. Average.
Bread <i>ad libitum</i> per man	—	—
Salt beef, per man, per day, thrice a week	625	22
Pork with beef, per man, per day, thrice a week	101	3½
Preserved meat, per man, per day, twice a week	250	8½
Dry fish, per man, per day, once a week	350	12½
Fish balls, per man, per day, once a week	350	12½
Potatoes, fresh, per man, per week	3000	105
Vegetables, fresh or salt, per man, per week	1100	38
Dried fruits, per man, per week	150	5½
Condensed milk, per man, per week	150	5½
Coffee, per man, per week	225	7½
Tea, per man, per week	25	½
Sugar, per man, per week	350	12½
Butter or marmalade, per man, per week	500	17½
Oatmeal, per man, per week	500	17½
Lime juice, per man, per day, about	25	½
Peas, beans, rice, per man, per week, ½ litre	—	11½ fluid oz.
Salt, mustard, vinegar, as required.	—	—