from polyneuritis for at least sixty to a hundred days, when this ration was supplemented by $\frac{1}{3}$ the body-weight of washed parboiled rice or by $\frac{1}{10}$ the body-weight of polished rice the birds contracted the disease in twenty to thirty days.

Experiments were next carried out with the object of ascertaining more precisely what effect increasing the carbohydrate component of a dietary had upon the rate of onset of polyneuritis. In these experiments altogether thirty birds (chickens and pigeons) were employed.

It was found that:

1. Whereas pigeons fed on $\frac{1}{5}$ their body-weight of polished rice and $\frac{1}{2500}$ of dry yeast daily developed polyneuritis in from thirty-nine to ninety-five days, when the ration of rice was increased to $\frac{1}{10}$ the body-weight the birds fell ill in twenty-two to forty-six days.

2. While pigeons fed on $\frac{1}{10}$ their body-weight of polished rice and $\frac{1}{2500}$ of yeast developed polyneuritis in from thirty-two to forty-four days, they became affected with the disease in from fifteen to twenty-two days when the polished rice ration was increased to $\frac{1}{5}$ the body-weight.

3. Whereas chickens fed on $\frac{1}{4}$ their body-weight of polished rice and $\frac{1}{2500}$ of yeast did not fall ill with polyneuritis until from sixty-five to one hundred days had elapsed, when this dietary was supplemented by $\frac{1}{10}$ the body-weight of sago the birds contracted the disease in from thirteen to thirty days.

By doubling the carbohydrate ration of the dietary the rate of onset of polyneuritis was thus actually increased as much as from two- to four-fold.

The results so far obtained demonstrated that the amount of antineuritic substance required by the organism increases with the quantity of carbohydrate ingested.

There are at least two possible explanations of this phenomenon. First, the view already advanced by Funk (1914) that the active substance participates in some way in carbohydrate metabolism, and thus the more metabolic work the organism is called upon to undertake the greater its demand in respect of this essential substance. Secondly, that when large rations of starch are ingested the absorption of the antineuritic material is interfered with owing to the presence in the alimentary canal of excess of undigested carbohydrate.

Experiments were therefore next carried out to ascertain which of these was the true interpretation, and it was found that even when daily rations of polished rice as great as $\frac{1}{10}$ the body-weight were fed to chickens together with varying amounts of yeast, 93 to 98 per cent. of the starch was digested and absorbed, and the excreta were free from the antineuritic substance. It was also observed that *in vitro* starch did not absorb the substance from aqueous solution. Furthermore, pigeons fed exclusively on glucose, which is rapidly absorbed, developed polyneuritis. These observations exclude the physical factor, and show that the antineuritic substance is utilized in some way during carbohydrate metabolism.

Whatever be the mechanism involved, it is clear that for the maintenance of health the intake of active substance must be adjusted in relation to the ration of carbohydrate supplied, and it is when this necessary balance is not maintained in the dietary that beri-beri results.

The precise relation which must subsist between the supply of antineuritic substance and the amount of carbohydrate ingested has not yet been ascertained, nor has the corresponding relation for each of the other normal components of a dietary (protein and fat) been determined. Funk (1914), however, has made some experiments which indicate that protein and carbohydrate can be interchanged in a dietary without materially affecting the rate of onset of polyneuritis, whereas if these food materials be replaced by fat the disease develops less readily.

The fact that attention must be paid not merely to the absolute amount of antineuritic foodstuff incorporated in the dietary but also to the proportion which this bears to its total calorific value is of great practical importance in framing a dietary for the prevention of beri-beri.

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A CASE OF HYPOTHYROIDISM IN A MALE.

BY

IVO GEIKIE COBB, M.D., M.R.C.S.ENG.,

ASSISTANT TO OUT-PATIENT PHYSICIAN, MIDDLESEX HOSPITAL; LATE
RESIDENT HOUSE-SURGEON, GREAT YARMOUTH HOSPITAL.

THE following case of hypothyroidism presents interesting features, as it exhibits many of the less well-known signs which have been attributed to a diminished secretion of the thyroid gland:

H. L., a man aged 28, who had previously always been in good health, consulted me on April 20th on account of a fainting attack on the previous day. He had been playing golf, when he suddenly felt very faint, and had to lie down on the links to prevent himself losing consciousness. This had occurred on the Sunday morning; he had played three rounds of golf on the Saturday, had felt perfectly well on that day and when he had commenced to play after breakfast on the Sunday. When the fainting attack commenced there was an immediate desire to go to stool, and he passed a watery motion. He felt better in the course of the next few minutes and resumed play, but had to abandon his game after another four holes, as the fainting again supervened. He then motored back to town, and I saw him on the following morning. He complained of abnormal sensations in the region of the heart, which he described as similar to cramp and associated with a great deal of apprehensive fear and some gastric discomfort.

He was a well-nourished man, with dark hair, prematurely grey over the temples, with a large amount of adipose tissue, especially over the shoulders, supraclavicular region, and abdomen. The pulse was 48 in the radial artery, and was thin, but regular. The blood pressure was 110. The area of cardiac dullness was increased to the right of the sternum, but the apex-beat was in the normal situation and no murmurs were audible over the various valves. There were no abnormal signs in the chest or abdomen, and the reflexes were normal.

The urine, except that the specific gravity was somewhat high, had no abnormal characters.

I advised complete rest for the next few days, a low diet, advised the patient to remain in bed, and ordered a purge.

Two days later the patient had a further attack of fainting, but did not lose consciousness. This came on while in bed, and I saw him before the attack had passed. The pulse-rate was then 44. This was temporarily remedied by the administration of ether, and with the increase in the rate of the heart's action the syncopal symptoms passed away. He was removed to a nursing home the following day. On admission the pulse was 48, the temperature 97°, and the blood pressure 110. I ordered a saline powder each morning on waking, consisting of magnesium sulphate and sodium sulphate aa gr. 40, sodium hyposulphite gr. 10, in a tumblerful of hot water, and dry diet, consisting of easily digested food, with all the necessary fluids between meals, and followed by a digestive mixture. This regime was followed for about a week, but no improvement was ascertainable either in the pulse-rate or in the subjective cardiac sensations complained of by the patient. The temperature remained subnormal, and the pulse varied between 44 and 52.

My attention was directed to the thyroid by the pads of fat especially noticeable over the supraclavicular region, and by the dryness and rough condition of the skin. It was not possible to detect the gland by palpation, neither did it become obvious on swallowing. Of further signs indicative of thyroid deficiency mention may be made of the weight of the patient (about 14 st.), his height being 5 ft. 11 in.; this weight was mainly due to excess of fat, which was typically myxoedematous in distribution. There were well-marked patches of psoriasis on the left upper arm and the right fibial region. The temperature, as has already been stated, was markedly subnormal and the heart's action slow. The hair, with the exception of the premature grayness over the temples, was normal, and there was no lack of lustre and no falling out. The nails were normal, and the teeth in good condition. The outer third of each eyebrow, however, exhibited the sign, upon which L. Levi and H. de Rothschild lay, emphasis—namely, a paucity of hair as compared with the inner and middle of the eyebrow. A Wassermann reaction made after the patient had been in the home a few days was negative.

The clinical picture just described led me to believe that the thyroid was the determining factor in the present condition, and I therefore prescribed 1 grain of the dried thyroid extract to be taken in the form of a cachet four times daily. He began to take it on the Saturday week after admission to the home, and no noticeable effect was ascertainable until the following Monday, when the pulse rose to 60, and the temperature became normal at one of the four-hourly readings. From this time onwards both the pulse and temperature steadily rose, until when the patient had been taking thyroid extract for three weeks the temperature was normal. During the first week of thyroid administration the pulse rose from 50 to 65 (approximately), the second week to 75, and the third week to about 85. The patient was now allowed to get up and to indulge in increasing amounts of exercise, which he was able to undertake without any fatigue, and without any return of the subjective cardiac sensations which had previously been

present. He then left the home and went to the country, where he has remained, leading an ordinary life, and able to undertake any exercise.

The interesting features of this case are the past history, the age of the patient, and the presence of many insignificant signs which have from time to time been stated to be observable in hypothyroidism.

It was ascertained that the patient had first noticed, six months previously, that he was rapidly putting on flesh and was not feeling so "fit" as formerly. About this time he was subjected to a considerable amount of business worry, which, coinciding with his engagement and forthcoming marriage, seems clearly to constitute the predisposing cause of the hypothyroidism. The exciting cause would seem to be over-exertion on the golf course, associated with some slight gastric disturbance brought about by injudicious diet.

While thyroid deficiency is seen at all ages and in both sexes, it is not very commonly observed in young men of this age.

The signs observed in this case presented a typical picture of what has been referred to as "submyxoedema," and many small factors, insignificant in themselves, helped to form the clinical picture. Of these the temperature and pulse were the most marked, while the presence of the rough skin, the patches of psoriasis, and the premature greyness were all compatible with what is seen in thyroid deficiency.

The diagnosis was confirmed by the extreme rapidity with which the symptoms improved, and the signs disappeared as soon as this deficiency in the normal thyroid secretion was remedied by the administration of thyroid extract.

CEREBRAL CYST WITHOUT LOCALIZING SYMPTOMS.

By ARTHUR TURNBULL, M.B., CH.B. GLASG.

B. G., aged 5, was admitted to the Western Infirmary on January 18th, 1910, as an urgent case. She had been healthy up to September, 1909. At the end of that month she had scarlet fever and was transferred to one of the fever hospitals. Both ears began to run about two and a half weeks after admission to the hospital. The running continued, especially from the right side. Some three and a half weeks after admission an abscess developed at the back of the right ear, and this was lanced. An attack of diphtheria then supervened. She was dismissed as convalescent on January 14th. Her mother had noticed that "her manner was rather peculiar," but had paid no great attention to this as the general condition appeared good.

On January 15th, 1910, she complained of pain in the neck and in the stomach, pressed her brow on the pillow, and appeared to feel pain in the forehead. She awoke crying the next morning and did not appear to be quite *compos mentis*. Vomiting began on the evening of January 15th, 1910, and continued till January 18th; it bore no relation to food, and drugs had no effect on it. She appeared to be losing strength. The face was alternately flushed and pale. Her mother stated that her arms and legs had never been paralysed, but were weak owing to lying in bed. She kept rolling her eyes wildly from side to side; there was no squint, nystagmus, or facial paresis, but much pain all over the head, especially at the back. The bowels were constipated. The family history was good.

Condition on Admission.

The child was puny and thin, and very pale. Occasionally rapid flushings of the face could be noticed. The temperature was 102° F., the pulse 132, and the respirations 36. She was in a condition resembling coma, alternately restless and soporose, and dropping off after turns of excitement into a condition resembling sleep. During the attacks of excitement she was very restless, throwing her arms about and struggling against any movement of the head. She seemed to feel the cold very acutely, the teeth chattered, and she drew the blankets up round her. She sometimes pressed her hands to her forehead, as if in pain. There was no strabismus. The pupils were equal and very dilated, and reacted equally to light. The movements of the eyes were very irregular,

preventing proper ophthalmoscopic examination. There was slight paresis of the left side of the face. There was absolutely no evidence of unilateral intracranial pressure. Both tympanic membranes had been destroyed. Traces of discharge were seen on the right side and granulation tissue in the tympanic cavity; on the left side there was copious exudation of foul pus. At a later examination there was an exceedingly foul discharge from both ears. Behind the left ear the old incision wound was discharging foul-smelling pus.

Operation.

On the day of admission Sir William Macewen operated on both sides of the head.

On the left side the old Wilde's incision was reopened and enlarged, and a large scale of necrotic bone removed. On the right side a radical mastoid operation was performed. On reaching the middle ear copious purulent material issued from the cavity, and on further excavation in an upward direction it was found that the destructive process had affected the tegmen tympani, and large quantities of serous and very foul fluid containing numerous small white particles began to issue from the upper limit of the tympanic cavity. The quantity of exuding fluid was such as to indicate origin from the cerebrum. Exploring higher and more posteriorly a large cyst was discovered in the temporo-sphenoidal lobe. The walls were thickened, but after probing with dressing forceps and searcher and perforating some intracystic partitions large quantities of foul serum escaped, interspersed with many pieces of broken-down brain tissue. The amount of fluid and material discharged was sufficient to indicate a cavity the size of a small Tangerine orange, and therefore one which had encroached upon the descending horn of the lateral ventricle. A portion of broken-down brain tissue composing the cyst wall was removed. Iodoform-boracic crystals were introduced into the cavity exposed, and one piece of iodoform gauze inserted, while ear packing steeped in carbolic oil was used for the external auditory canal.

During most of the operation a right external squint was evident, and the pupils were very variable.

During the night after operation several convulsive seizures took place, and the next morning coma supervened, the flushing of the face being extreme; death occurred twelve hours after operation.

A *post-mortem* examination was, unfortunately, not obtained; but the importance of the case does not depend on whether the infection was pyogenic or secondary to a tuberculous process. The important point is that a patient with a large unilateral brain cyst may manifest absolutely no localizing symptoms, both when life was apparently not threatened (the child not even being thought ill) and on the symptoms becoming urgent shortly before death. This is, of course, already well known, but it seems desirable to emphasize it.

NOTES OF A CASE OF CONTRACTION OF THE UPPER AND LOWER LIMBS AFTER STILL'S DISEASE.

By J. CRAWFORD RENTON, M.D.,

SURGEON AND LECTURER ON CLINICAL SURGERY, WESTERN INFIRMARY, GLASGOW.

M. L., aged 7, was placed under my care by Professor Stockman, with the history of an attack of Still's disease when aged 3 years.

Her condition on October 19th, 1912, is well shown in Fig. 1. She was quite unable to walk; she lay with her legs and thighs drawn up, and could not extend them. There was contraction of both the adductor and hamstring muscles, the knee-joints and ankles were swollen, and creaked on moving. The flexors of both hands were contracted. When the child was placed on the floor she could not move her legs. When the weight of her body was supported she was unable to use either leg owing to the contractions.

On October 28th, 1912, the adductor tendons at their origin were dissected out according to the method of Mr. Robert Jones of Liverpool. The hamstring tendons on the right side were divided freely subcutaneously, and on the left side portions were dissected out. The limbs