admitted that they could never recognize a shape, there was only a "feeling that there was something there," something too ill defined to describe. These indefinite forms appeared only in the early stages and generally in blind areas that were recovering. They are probably due to the misinterpretation of feeble and indefinite sensations excited in functionally depressed areas of the visual cortex.

A CASE OF SYMMETRICAL GANGRENE (RAYNAUD'S DISEASE).

BY

EDWIN GOODALL, M.D.LOND., B.S., F.R.C.P.,

TEMP. LIEUT.-COLONEL R.A.M.C.,

OFFICER-IN-CHARGE WELSH METROPOLITAN WAR HOSPITAL (CARDIFF CITY MENTAL HOSPITAL).

THE patient whose case is here related was admitted on May 22nd, 1919, to the Welsh Metropolitan War Hospital from the Bath War Hospital with a diagnosis of subacute mania, possibly general paralysis of the insane. It was reported that the pupils were unequal and sluggish, that there were facial and lingual tremors, and greasiness of the skin of the face. The duration of the mental attack was given as four days.

History.

Patient was 42 years of age. The information supplied by his wife showed nothing of note in respect of family or personal history. His present illness was said to have supervened after five years' military service. The following are extracts from the medical case-sheet received on admission of the patient to this hospital, the medical notes having been taken whilst at a hospital in Cairo:

Admitted on March 26th, 1919, suffering from bronchitis, bronchopneumonia, and Raynaud's disease. Arterio-sclerosis noted, also patches of bronchopneumonia in both lungs, with pleuritic rub below right breast.

On April 11th diarrhoea, with blood and mucus in evacuations; no protozoa; no history of dysentery; urine alkaline, albumin present with phosphates.

On April 17th gangrene threatening the right foot, which is cold and blue; pain, with loss of sensation. Urine, occasional trace of albumin, no casts, no sugar.

On April 18th left foot bluish, right foot improved; little and fourth toes very purple, tender.

On April 20th gangrene threatening both hands, more in right; blue and cold, numb, painful.

On April 21st hands look like Raynaud's disease. Feet almost recovered.

On April 28th hands a little better; fingers still black.

On April 30th feet practically recovered, but little toe of right foot still bluish; fingers improving; still black, numb, and cold.

The patient was stated to have had malaria, but no data were given.

On admission to this hospital it was noted that he showed general wasting; the radial arteries were somewhat thickened; the temporals were not evident. No abnormality of heart; tremor of hands and tongue, and unsteadiness of gait; speech normal; pupils equal, react normally to light and accommodation; knee-jerks brisk; superficial reflexes normal. Systolic blood pressure 152, diastolic 130.

The blood was examined on May 29th and June 17th, with the following result:

Red blood corpuscles 4,933,333 and 5,360,000 to the c.mm.; white blood corpuscles 7,383 and 13,750; haemoglobin percentage, 85 and 95; colour index, 0.87 and 0.95; relative white cell count shows large lymphocytes 48.5 per cent.; small ditto 6.0 per cent.; neutrophils 43.5 per cent. On the second occasion these figures were, 34.5, 18.0; 43.25 per cent. (lymphocytosis). No other peculiarities.

The urine was examined on three occasions—

May 27th: Specific gravity 1028, acid; no sugar; no albumin.

May 30th: Specific gravity 1024, acid; no sugar; no albumin.

June 26th: Specific gravity 1036, slightly alkaline, no sugar, no albumin.

The "Wassermann" reaction, for which I am indebted to Captain H. A. Scholberg, R.A.M.C.(T.), was negative in serum and in cerebro-spinal fluid. Cells in cerebro-spinal fluid 2 to the c.mm. Nitrogen in 1 c.cm. of cerebro-spinal fluid (Stanford's method; for this estimate I am indebted to Dr. R. V. Stanford, research chemist at this hospital) 14.5 hundredths of a milligram.

Although the patient was restless, garrulous, excited and grandiose, he was not, according to the above laboratory findings, a general paralytic. The photographs sufficiently indicate the state of the fingers. The dark portions were gangrenous—black, dry, and insensitive; the nails were still preserved on each finger. The skin of the fingers above the gangrenous portions was reddish-blue, tense, shiny and sensitive to touch; the gangrenous portions, although insensitive to light touch, were sensitive to pin-prick and to deep pressure. The hands generally were somewhat livid; toes, nose, and ears not affected.

On June 30th, the date of writing this report, the patient appears to be almost well from what was presumably an attack of subacute mania. There are no physical indications of general paralysis. It is noted, however, that both pupils are slightly excentric, and there is greasiness of the facial skin. Systolic blood pressure 148, diastolic blood pressure 123; mummification of affected finger-tips; line of demarcation between living and dead portions very obvious.

Raynaud, in his original thesis, published in 1862, states that, out of 25 cases of symmetrical gangrene seen by him, 20 occurred in women and 5 in men; the patients were all under 30, excepting one aged 48. Oppenheim describes the disease as developing exclusively or principally on the basis of the "neuropathic diathesis." Amongst exciting causes, emotional disturbances—fear, etc.—take first place. Sometimes the condition has been preceded by infectious disease—typhoid, influenza. Young women up to 30 years of age are the usual victims, but of the 4 cases which Oppenheim had seen 3 were men. Photographs of the condition given in Oppenheim's work are almost identical with those accompanying the present description. In Raynaud's Plate 1, showing the toes of two feet affected by symmetrical gangrene, the condition is much less advanced than in the case here recorded. For the photographs accompanying these notes I am indebted to Dr. Stanford.

There is no question in this case of ergotism. The bread eaten by this patient whilst in Egypt was the same as that issued to the troops in general. I do not recollect a single instance of this disease amongst the cases of mental disorder seen by me, whether in public institutions or consulting practice, during my twenty-nine years' experience.

I desire to take this opportunity to draw attention to the micro-quantitative methods of estimating the constituents of cerebro-spinal fluid devised by Dr. R. V. Stanford. That for nitrogen is described in the *Zeitschrift für Physiologische Chemie* (Bd. 86, H. 3, of 1913). Details of the results in a large number of cases are given in that paper, and a great many more have been dealt with since. The conclusions are summarized as follows in a memorandum kindly supplied to me by Stanford:

The number of hundredths of a milligram of total nitrogen contained in 1 c.cm. of the cerebro-spinal fluid of a patient is called the "nitrogen number" (NN). In the normal sane individual the nitrogen number is about 15. In the great majority of insane patients, not suffering from general paralysis or gross brain lesion, the NN is between 15 and 20. In a few cases it was found to be higher, but in only one case above 25. In cases of general paralysis the nitrogen number is nearly

always above 20, and generally about 30 or more. In a small percentage of cases a nitrogen number below 20 was found, but the patients were either in a remission or in what may be called a stationary state. In such cases a second puncture after an interval of time would probably settle the diagnosis (compare Table I, bis, loc. cit.). Details are given in the paper cited, where will also be found the figures relating to a patient who was examined when in remission, and subsequently, when the disease had resumed its course, the nitrogen number varied accordingly.

One other exception must be pointed out. The wasted brain of the senile dement is well known *post mortem*. Corresponding with this, it is found that patients who have been insane for a long period, especially if of advanced years, have high nitrogen numbers. Such cases would, however, never be confused with cases of general paralysis. Regarded as an aid to diagnosis in general paralysis, the nitrogen number is very much more reliable than any means hitherto proposed, but in the present state of the investigation of the subject it must be taken in conjunction with the clinical observations.

The above reference to Stanford's method is made with a view to promoting its use as a routine procedure in diagnosis, in cases of organic and functional disease, as seen in neurological and psychiatric practice.

REFERENCE.
1 *Lehrbuch der Nervenkrankheiten*.

THE EFFECTS OF A SCORBUTIC DIET ON THE ADRENAL GLANDS.*

BY

ROBERT McCARRISON, M.D., D.Sc., F.R.C.P.,

BREVET LIEUTENANT-COLONEL I.M.S.

(From the Pasteur Institute of S. India, Coonoor.)

THE effects of a scorbutic diet on the adrenal glands have been studied in guinea-pigs fed on a dietary of crushed oats and autoclaved milk. The naked-eye changes consist in enlargement of the adrenals with increase in their weight and in congestion.

The weight of the adrenals of guinea-pigs dying in consequence of the scorbutic diet is approximately double that of health. Whereas the gross weight of both organs in healthy guinea-pigs ranged between 0.390 and 0.520, with an average weight of 0.467 gram, in guinea-pigs fed on the scorbutic dietary the weight of both glands ranged between 0.850 and 1.150 grams, with an average weight of 0.955 gram. The increase in weight due to the scorbutic diet is even more marked when the weight of the glands is calculated per kilo of *original* and of *final* body-weight.

The histo-pathological changes are haemorrhagic infiltration and disintegration of the cellular elements of the cortex and medulla. These changes occur in animals which may exhibit no clinical evidences of scurvy during life. They are to be regarded as pre-scorbutic in character. The areas of haemorrhagic infiltration are circumscribed, and are situated around the periphery of the adrenal cortex.

The adrenalin content of the suprarenals of guinea-pigs fed on a scorbutic dietary was estimated in five animals by the method of Folin, Cannon, and Dennis. One gland was used for this estimation and the other for histological study. In some cases the right and in others the left gland was used for the estimation. There is no evidence that the organ on one side is more affected than that on the other. On the presumption that each was affected to a like degree the total adrenalin content of both adrenals was calculated from the results obtained with one gland.

It was found that in spite of the fact that the weight of the organs is more than twice as great, the total quantity of adrenalin in the two glands in guinea-pigs fed on a scorbutic diet is less than half that present in healthy guinea-pigs. Similarly the total adrenalin per kilo of *original* body-weight (that is, the weight of the animal before the experiment commenced) is little more than half that of health. When calculated against the *final* body-weight of the guinea-pig the total adrenalin per kilo of body-weight is found to be less markedly reduced—that is to say, the total adrenalin production does not diminish in proportion to the diminution of body-weight. The total adrenalin per gram of gland is less than one-fourth of that found in health. In one guinea-pig in which a coliform organism was cultivated from the heart's blood at autopsy,

the adrenalin content was considerably less than in the other four animals in which no infection was detected by aerobic methods of culture.

A pronounced reduction in the amount of adrenalin in the suprarenal glands is thus found to result in guinea-pigs from a scorbutic dietary of crushed oats and autoclaved milk.

It is of interest to direct attention to the fact that the total adrenalin per gram of gland in healthy pigeons is approximately ten times greater (0.0023 gram) than in healthy guinea-pigs (0.00023 gram). This greater proportion may bear some relation to the fact that uric acid is excreted as such in aves. A further point of interest in connexion with these results in guinea-pigs is the contrast they afford to the great increase in the adrenalin content of the adrenal glands which occurs in pigeons wholly deprived of accessory food factors of all classes. I have found that the adrenalin content of these organs in aves is largely dependent on the class of accessory food factor which is absent from the dietary. When, for example, fresh butter, which contains accessory food factors of the "A" class, is added to a dietary of autoclaved rice, the adrenal glands of pigeons so fed do not, as a rule, contain an amount of adrenalin out of proportion to that found in health; exceptions occur in approximately 10 per cent. of all pigeons so fed. Nevertheless, the evidence so far available, both in birds and mammals, points to the dependence of the functional perfection of the adrenal glands on the adequate provision in the food of accessory food factors of all classes. It appears that lack of factors of the "A" class with excessive production of adrenalin is associated with the occurrence of oedema in aves, and that in guinea-pigs lack of factors of the "C" class, with diminished production of adrenalin, is associated with haemorrhage into the body tissues.

SUDDEN DETACHMENT OF AORTIC INTIMA (SO-CALLED DISSECTING ANEURYSM).

BY

CRANSTON WALKER, M.D., B.Sc.,

PATHOLOGIST, BIRMINGHAM GENERAL HOSPITAL, ETC.,

AND

LENA WALKER, M.D., CH.B.

THE clinical events in the following case may be attributed to the stripping of the aortic intima. From the history of a very sudden onset, without any previous warnings, it may be assumed that the intima began to strip suddenly, that it gave rise to severe shock, and to pain which was referred rather vaguely. The condition of the left leg was probably due to a portion of the loose intima happening to occlude, completely or partially, one of the main arteries to the limb and so shutting off too much blood supply for full muscular metabolism to be carried on; later, collateral channels would be opened up.

As the shock from this stripping nearly killed the patient before his admission, it may be surmised that his sudden death after admission was due to the onset of a second stripping, although two such events could not be traced *post mortem*.

Clinical History.

The patient was a large, well built, muscular man of 65, a plasterer, a steady and respected workman and apparently of temperate habits. He had had no recognized illness since childhood, and was believed by himself and his neighbours to be in hearty good health up to the moment of his sudden seizure.

At 10.30 a.m., after no particular exertion or excitement, he fell to the ground without warning. It is uncertain whether he lost consciousness—bystanders described the occurrence as a "fit"—but within a few minutes he was seen to be conscious and a little later complained of pain in the chest and said that he had lost the use of his left leg.

He was admitted to the General Hospital, Birmingham, about three-quarters of an hour after the event. He was fully conscious, but distracted by abnormal sensations. He complained chiefly of pain and loss of use in the left leg, and also of pain under the sternum; but his chief cause of distress appeared to be some oppressive sensation or conviction for which no words came handy. He felt certain he was about to die. He was restless and pallid, the skin surface was rather cool, the respirations were irregular, rather rapid, and frequently deepened voluntarily. Thus far his aspect was like that of a man suffering from a severe haemorrhage and from pain.

* Abstract of a paper appearing in the July number of the *Indian Journal of Medical Research*. Abstracts of previous papers on the Pathogenesis of Deficiency Disease were published in the *BRITISH MEDICAL JOURNAL* on February 15th, 1919, p. 177, and on July 12th last, p. 36.