

TABLE VI.

No.	Type.	Day of disease serum started.	Day of commencement of arthritis.	No. of days pyrexia	Joints affected.
1	?	Not given.	14	15	Left knee.
2	?	18	18	37	Knees and ankles.
3	?	4	12	60	Knees, ankles, wrists, elbows, shoulders, sterno-clavicular, and manubrio-sternal.
4	Shiga.	Not given.	24	21	Left knee, left hip, left elbow, shoulders, manubrio-sternal.
5	Flexner	..	11	0	Left knee.
6	Shiga.	20	15	63	Ankles, knees, wrists, shoulders, interphalangeal joints, wrists.

only, much of which appeared to be peri-articular, this being most marked in the case of the ankles. Treatment was disappointing, most reliance being placed on absolute rest to the affected joints, the electric-light bath, and large doses of salol internally. The administration of salicylates, iodides, or urotropin was useless in the ordinary doses. In all the cases a certain degree of thickening and restriction of movement of the joints concerned persisted when the patients were evacuated from the hospital.

Only in one case (3) did the commencement of the arthritis bear the same relation to the administration of anti-dysentery serum as in the cases of serum arthritis mentioned below.

Serum Sickness.

The total number of cases treated by serum injections was 148. In 82 of these (56 per cent.) serum sickness occurred. In all of the 82 a serum rash was noted, the average day of its appearance after the initial dose of serum being 7.2. The rash varied in character from an erythema to an urticaria, appearing first of all over the sites of the injections. In severe cases it became generalised and blotchy, often occurring in circinate patches with raised urticarial borders. In such cases there was usually deep conjunctival injection, the fauces were injected and cedematous, the voice husky, and a sense of oppression in the chest experienced. The condition was associated with moderate pyrexia, the temperature rarely rising above 100.5°.

In 18 cases (12.4 per cent.) the serum rash was followed, after a short interval by joint and muscle pains, accompanied either by a second pyrexial period or by an accentuation of the fever which had accompanied the rash, this second pyrexial period, lasting on an average 5.6 days, being of more severe type than that which accompanied the rash, and being often associated with a rapid pulse.

Serum arthritis started on an average on the 10.8 day after the initial injection of serum, the shortest interval being 7, the longest 15. In 10 of the series joint and muscle pains and stiffness, chiefly affecting the lower extremity, were experienced, the joints showing no organic change. In the remaining 8 cases there was actual peri-articular swelling about the finger joints, wrists, knees, and ankles, and in one case even of the sterno-clavicular and temporo-mandibular joints. The symptoms were usually accompanied by a second rash if the original rash had faded, or by an exacerbation of the rash if it still existed, the second rash always being urticarial whatever the nature of the initial rash had been. All serum manifestations cleared up very rapidly when the accompanying pyrexia had subsided and caused no disability. No example of accelerated or abnormal reaction, such as those described by Colonel E. W. Goodall, were noted, although some of the patients had received in the past injections of antitetanic serum; nor did any case of anaphylaxis occur.

An increased liability to intercurrent disease appeared to be present during the course of serum sickness. Thus subtertian malaria occurred during this period in three cases, in one case as a relapse, in the remaining two as the first indication of the disease in an active form, though there was evidence of past attacks. The importance of diagnosis in such cases is obvious. In those observed the unusual severity of the pyrexia, and the fact that it was associated with an apparent

relapse of the colon symptoms, whereas constipation is more usual in serum sickness, drew attention to the condition. Similarly, during the course of serum sickness, in two cases, heat stroke occurred, although the temperature and wet bulb reading were falling at the time. One of these cases proved fatal. In one severe toxic case which was apparently progressing favourably a recrudescence started during serum sickness, was quite uncontrollable, and proved fatal.

In conclusion, I have to acknowledge my indebtedness to Lieutenant-Colonel H. J. Crossley, R.A.M.C., commanding the hospital, for his permission to publish this record, and to Captain C. C. Twort, R.A.M.C. (T.C.), and Captain W. McAdam, R.A.M.C. (T.C.), who carried out the bacteriological investigations.

References.—Goodall: THE LANCET, 1918, i., 323. Ballmann: Munchen. Med. Wchnschr., 1918, xxxi., 1129. Dorendorf: Med. Klinik, 1917, xiii., 519-525.

OEDEMA OBSERVED IN A MONKEY

FED ON A DIET FREE FROM THE FAT-SOLUBLE "A" ACCESSORY FOOD FACTOR AND LOW IN FAT.

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AND

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THE indispensability of the fat-soluble A accessory food factor in the nutrition of the rat is now well established. There is, however, no information as yet available concerning the effect produced by depriving the food of other animals of this factor. This note describes some preliminary experiments instituted with the object of studying the influence of a diet free from the fat-soluble A factor on monkeys. These animals have proved to be very suitable for dietetic experiments. It has been shown by Hart and Lessing (1913), and Harden and Zilva (1919), that by feeding them on a scorbutic diet, scurvy closely resembling the human disease can be induced. It was therefore of interest to watch the behaviour of monkeys subsisting on a diet lacking the fat-soluble A factor.

The Experimental Diet.

Three female monkeys (*Macacus rhesus*), aged about 2 years, were employed. Each of these animals received the following daily diet: Boiled polished rice, 250-300 g.; "Marmite," 10 g.; salt mixture, 2 g. This diet, as will be seen, was free from the fat-soluble A factor. The rice and the "Marmite," which is a yeast preparation, had been tested on rats and found to be free from that principle. The "Marmite" served both as a source of the antineuritic accessory factor and as a nitrogenous supplement to the rice. As an antiscorbutic lemon-juice, from which the acids had been removed according to the method of Harden and Zilva (1918), was employed, a dose equivalent to 4 c.cm. of the original juice being administered daily to each animal. The diet was therefore complete in every respect, except that it lacked the fat-soluble A factor and was low in fat.

Progress of Experiments.

The experiments were commenced on May 16th, 1918. Monkeys 17, 18, and 19 weighed at the time 2460, 2240, and 3280 g. respectively. During the first two months they showed a slight decline in weight, but after that period this ceased and they maintained their weight. On Nov. 30th No. 17 received 10 g. of purified butter-fat and No. 18 10 g. of olive oil per day in addition to their daily ration, whilst the diet of No. 19 was left unchanged. This alteration in diet was introduced in order to see whether the addition of butter-fat would stimulate growth in No. 17 at this stage, whilst olive oil, which has been shown to be free from the fat-soluble factor, was given to No. 18 in order to ascertain the effect of the addition of fat in the absence of the accessory factor. No. 17, however, showed no tendency to grow after the addition of the butter-fat to its diet. It remained very thin to the end of the experiment, was lively, and showed no signs of indisposition.

Monkey No. 18 also did not grow after the addition of the olive oil to its diet. It differed from No. 17 in so far that it gradually developed the characteristics of an animal suffering from malnutrition—namely, staring coat, indolence, and general lack of alertness. This state of malnutrition

could not, however, have been due to a quantitatively inadequate diet, as the animal consumed its entire ration. This condition lasted until Jan 2nd, 1919, when the animal was observed at 11 A.M. to be very ill and was unable to sit up; it succumbed two hours later. Post mortem the animal was found to be in an emaciated condition, but nothing abnormal could be discerned.

Monkey No. 19, which remained on its original diet, maintained its weight until the end of January, after which it commenced to decline. Beyond this fall in weight nothing abnormal could be observed in the animal, its general appearance and deportment being quite normal. The loss of weight continued throughout the month of February. On Feb. 27th the animal first manifested well-pronounced oedema in the right side of the face. The condition improved slightly during the two following days, but on March 2nd the entire face, including the eyelids and tissues surrounding the orbits, were found to be very oedematous. On further examination well-marked oedema was found in the regions of the buttocks, arms, and the backs of the hands. The skin pitted readily on pressure and was not red. A sample of urine was passed directly into a clean vessel; it was pale yellow in colour and on examination revealed no albumin, either on acidifying and boiling or by the salicyl-sulphonic acid method. On March 3rd the oedema in the face was better. The urine showed a very slight turbidity on acidifying and boiling, but it had been collected through the perforated bottom of the cage, and consequently had come in contact with the food. On the following day the oedema was again worse. A sample of the urine collected through the bottom of the cage again showed only a very slight turbidity on acidifying and boiling. The oedema persisted and became gradually worse. On March 1st the animal, for the first time since the commencement of the experiment, left some of its food uneaten; it developed diarrhoea, and by the 11th this had become very severe, and the animal was in such a very weak condition as to be unable to support its head, which showed a tendency to hang down. The oedema was, however, a little better than on the previous day. Knee-jerks were present; rectal temperature 98° F. The animal was then chloroformed owing to its distressed condition. At the post-mortem examination there was found a slight enlargement of the mesenteric glands; the right suprarenal adhered to the kidney, and in the lower part of it there was a small cyst which contained a thick opaque fluid, free from cells.

Monkey No. 17, which was in a lively condition but still very thin, was at this stage put on mixed diet (March 11th).

Results of Experiments.

All the animals had been kept for 198 days on the experimental diet before it was modified by the addition of butter-fat and olive oil. During the whole of that time, although they did not grow, they showed no signs of ill-health. As already mentioned, the addition of butter-fat to the diet of monkey No. 17 did not actually stimulate growth but kept the animal alive for 299 days, after which the experiment was stopped. The addition of olive oil to the diet of No. 18 did not prevent the animal from declining, and eventually succumbing, with no definite symptoms after 262 days. No. 19 first displayed symptoms of oedema 289 days after the experiment had been commenced.

As already noted, the diet employed, in addition to lacking the fat-soluble A factor, had also a very low content of fat and the effect of a low intake of this dietary constituent on monkeys is not yet known. These observations, therefore, can only be considered as of a preliminary character, and further experiments will have to be carried out in greater detail and on a larger number of animals before definite conclusions can be drawn as to the cause of the phenomenon.

Remarks.

Whether the foregoing results have any connexion with the oedemata observed by Bloch in underfed children or with "hunger oedema" it is impossible at present to say. Various experiments are in progress on the subject, but as they are necessarily of a protracted nature we considered it of interest to record the observations already made.

We wish to express our thanks to Dr. J. A. Arkwright for his valuable advice and criticism and for having carried out the post-mortem examinations.

References.—Harden and Zilva (1918): *Biochem. Journ.*, xii., 259. *Ibid.* (1919): *Journ. Path. Bact.*, xxii., 246. Hart and Lessing (1913): *Der Skorbut der kleinen Kinder* (Stuttgart).

SOME CURIOUS CASES OF VIOLENT EXCITEMENT.

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IN a series of almost 800 admissions to the mental ward of a general hospital in France it is not surprising that there should be a few patients of very uncommon types. The following seven cases, in which the leading disorder was a brief and violent attack of excitement, should be of interest to the medical profession, but more particularly to the psychiatrist and the medical jurist. Subjects of such disturbances invariably make their début in a criminal court, though perhaps later they may be confined in an institution for the insane.

The Cases Described.

CASE 1.—Gunner W.; trench mortar battery; aged 37; three years fighting in France. Admitted Nov. 21st, 1917, for observation of mental condition on account of some letters to his mother in which he said he was afraid that his old trouble was coming on again. The men in his own unit were unanimously of opinion that he was sometimes not "right in the head." The patient was a bright, good-looking, intelligent man, and said that ever since he could remember he had had a violent temper; he nearly killed his brother with a horse-whip at the age of 10, and was taken from school at 12 because of his dangerous propensities. He enlisted in the infantry at 16, and soon after was sentenced to seven years' penal servitude for setting fire to a stable. He attempted suicide at Dartmoor, and shortly after release got 18 months' imprisonment for housebreaking. More recently he has lived in America and has had several recurrences in which he has good reason to believe that he has committed murders. He came to France with the 1st Canadian Division, and was 14 days in hospital after being blown up at Ypres in 1915. He states definitely that at irregular intervals a desire to go off by himself comes over him and that at such times he will assault anyone without provocation. His attacks of violence are always preceded by severe headache, and he feels as though a wire was tightly twisted round his head. He never has any recollection of his conduct during the attacks, which are always less frequent when he is at sea. Family history shows an alcoholic father, an insane epileptic maternal aunt, a badly epileptic maternal cousin, and a brother who took fits in early childhood. This man was under my observation for a comparatively long time, but had no attacks, and was well behaved and useful as an assistant orderly.

CASE 2.—Sgt. H.; infantry; aged 35; 16 years' service in Regular Army; D.C.M. in 1915. Admitted to mental ward Feb. 4th, 1917, with the statement that before he was sent to the C.C.S. he had suddenly become violently excited, the attack evidently having been a very brief one. Gives a history of attacks of unconsciousness in 1908 and 1911 (while on reserve), and while at home on leave in 1915 fell down in the street and knew nothing for an hour. No aura, history of convulsions, or signs of hysteria.

CASE 3.—Pte J.; infantry; aged 33. Admitted June 28th, 1918, for observation because, when warned for duty with a working party and addressed as "J." and not as "Private J." he took the N.C.O. by the throat and knocked him down, afterwards making to shoot the party who came to the rescue. His history shows that he had heat-stroke at Singapore six years before (fell down suddenly, was unconscious for two hours, and ill for six weeks); two months after this "ran amok" twice in Yokohama and "laid out" a considerable number of Japanese; he then went to Australia and had similar attacks every six months or so; he knew when they were coming on and went off by himself into the bush. He never had any attacks before the heat-stroke, and alcohol had nothing to do with them. Was rejected for the Australian Army, but came home and joined the English infantry. It may be noted that the present attack occurred in hot weather.

CASE 4.—Gunner L., aged 43. Admitted Nov. 6th, 1917. Reported sick to the regimental M.O. and threw a Mills bomb at him. He was in a semi-conscious condition on admission to the field ambulance, recovered after about five minutes, and had no recollection of what had happened. He stated that he had had a similar attack during the South African war and several in civil life, his conduct having once led to a sentence of 14 days' imprisonment for suddenly and unreasonably attacking an acquaintance with whom he was walking along the street. Was invalided from Salonica after a similar attack. No aura.

MEDICAL MAYOR.—Dr. T. G. Lewis has been selected as Mayor of Newport (Mon.) for the ensuing municipal year.