never been satisfactorily investigated. With regard to diet, it is manifestly impossible to calculate the calories in the daily diet of individual children whose food is not accurately estimated at every meal. The digestive organs of normal children can deal within reasonable limits with many varieties of diet.

What we aim at recording is the manifest excess or privation of the various elements considered necessary in all diets, and to note the types of diet in common use among children of the various classes of the community, and to compare their apparent results. In noting failure of nutrition we observe the want of muscle substance and loss of muscle tone. "Tuberculosis toxins would seem to act specially on neuro-muscular structures. The dystrophic influence is seen in the progressive loss of sarcous substance and associated enfeeblement and irritability of muscle. Hence early manifestation of motor weakness, both of limbs and of viscera—the feeling of tiredness, the disinclination for effort, the softening of pulse, and the gastro-intestinal sluggishness. These are generally in evidence long before cough or expectoration or other indication of local lesion is forthcoming ..... loss of muscle counts in tuberculous intoxication rather than loss of fat. Patients with advanced tuberculous intoxication may have abundance of adipose tissue" (Philip[3]).

It is with the object of testing such statements and of finding out whether or not they form any guide to the differentiation of tuberculous from other toxins that we draw attention to them in the investigation of failure of nutrition. Sir James Mackenzie has clearly demonstrated the existence of muscular rigidity in connexion with underlying visceral disease and its value in diagnosis. Pottenger [2] affirms that in tuberculous disease of the lungs muscular rigidity may be detected. The spasm, he says, varies in position with the lesion; if in front, the sterno-mastoid, scaleni, pectorals, and intercostals are affected; if behind, the trapezius, levator anguli scapulæ, and rhomboidei. So far we have not found this borne out in our examination of early cases of phthisis, but it is well to bear the statement in mind and to continue to test its worth. Exhaustion is always a sign that a child is not well. Already we know that there are various types of exhaustion, possibly distinctive of different toxæmias. Another hopeful field is the investigation of anæmias. It is quite impossible to estimate the severity of an anæmia by the appearance of the patient, or even in many cases to determine whether or not anæmia is present. Therefore in all cases in which pallor is a symptom we are having blood examinations made at the Institute. If time permitted of this, we believe that valuable information might be obtained by the routine examination of blood in all cases of illness in children. Something distinctive in the way of blood pictures might be found in connexion with the onset of various diseases. It is unnecessary to insist on the necessity for observing irregularities of temperature which may be slight and therefore overlooked. The condition of the pulse must be carefully observed in all its aspects. Rapidity and softening, by which is meant loss of tone with apparent fullness of the artery and feeble impulse communicated to the examining finger, are always suggestive of an active toxæmia. X ray examination of the chest is made in all children with glandular enlargement, with the object of observing, as far as may be possible, the condition of the mediastinal glands and the state of the lungs. We are also examining the chests of a number of healthy children; without a knowledge of varieties in the normal, which have not yet been sufficiently investigated, it is impossible to recognise and interpret the abnormal. Urine examinations of a somewhat more elaborate nature than is possible in every-day practice are made in the chemical laboratory in all cases of failure of nutrition.

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(*Continued at foot of next column.*

A CASE OF

POISONING BY CANTHARIDIN.

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THE following case of poisoning by cantharidin, the active principle of cantharides, seems worth recording, as it may help to throw a little light on inflammations of the kidney. I can find no record of any other case in which cantharidin itself has been taken.

At about 4 P.M. on June 7th, 1921, a medical student tasted, out of misplaced curiosity, some crystals of cantharidin; no unpleasant taste was noticed. He stated that he took as much as would go on a pin's head—almost certainly at least one-fiftieth of a grain. As tincture of cantharides contains only 0·01 per cent. of cantharidin, this would be the equivalent of about 220 minims of tincture of cantharides, or over 40 times the maximum pharmacopœial dose. Shortly afterwards the patient had tea, including some bread and butter. About 7 P.M. he noticed pain in the left lumbar region, shooting round to the front, but not very severe. A few hours later he felt much slighter pain in the right lumbar region. At 8 P.M. he began to pass urine in small quantities about every quarter of an hour; there was some pain on micturition. At 9 P.M. he began to feel unwell and noticed blood in his urine; this increased in quantity later. During the night he micturated only five or six times and obtained some sleep. About 3 A.M. next day he vomited twice. In the morning he came to St. Bartholomew's Hospital and was admitted to the wards; he was then passing urine containing blood about every two hours, and he still complained of lumbar pain, mainly on the left side.

On admission he looked pale and rather anxious; his mouth and tongue were not at all blistered. Nothing abnormal was discovered in his chest, his blood pressure was 125 mm. Hg (systolic) and 80 mm. (diastolic). There was tenderness on deep palpation in the left lumbar region; no œdema anywhere. His temperature was 99·6°F., his pulse 120, his respirations 24. He gave no history pointing to previous nephritis; he had never, to his knowledge, had scarlet fever. The urine was red in colour and acid; it contained 0·64 per cent. albumin (Aufrecht), large numbers of red blood cells, and no more leucocytes than could be accounted for by the amount of blood present; no casts or epithelial cells were seen.

On the 9th the patient's condition had improved; his pain was less. 53 oz. of urine were passed (intake 84 oz.). There was still much blood, but polymorphonuclear leucocytes were nearly as numerous as red cells. Two red-cell casts were seen, but no other casts. His temperature was down to normal; he passed a dark green stool, which was negative to benzidine. On the 10th he passed 27 oz. urine (intake 50 oz.). On the 11th he looked less well and passed only 20 oz. (intake 68 oz.). This still contained much blood and a few red and white celled casts; the albumin was 0·1 per cent.

The patient's condition then began to clear up rapidly. By the 13th he was passing 43 oz. of urine, which contained no blood microscopically (intake 70 oz.). There was only a faint haze of albumin. By the 15th no albumin could be detected. In the centrifuged deposit three red cells were seen, fair numbers of leucocytes and many casts, mostly hyaline, a few epithelial and granular. By the 20th no red cells and no casts could be found, and only a few leucocytes. Throughout the course there was no headache, no mental symptoms.

(*Continued from previous column.*)

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no aphrodisiac symptoms or œdema. The blood pressure remained constant (125 mm. systolic, 80 diastolic). The blood count on the 10th showed 6,150,000 red cells and 11,000 leucocytes per c.mm.; hæmoglobin 94 per cent.; there was no departure from normal in the differential count.

Treatment.—The patient took fluids very freely until admission; he was then limited to 2½ pints of fluid and no solids for 24 hours; he was given 4 oz. of lactose daily. On the 10th the fluids were increased to 3½ pints and he was allowed plentiful carbohydrates. Fats were added on the 13th and limited proteins on the 14th. He got up on the 24th and was discharged on the 28th.

Tests for renal function.—For four or five days after the patient's admission each specimen of urine passed was kept and tested separately. On admission the diastase content of the urine was low (5 units), but the patient was then drinking much fluid. Next day it was 20 units, and specimens tested during the next four days always contained between 10 and 20 units. Only one other specimen, on June 13th, gave a reading as low as 5 units. The blood-sugar was at first on the low limit of normal (0·085 g. per 100 c.cm. on admission), while the urinary sugar was 0·032 g. per 100 c.cm. But by 11th the blood-sugar had risen to 0·136 g. per 100 c.cm.; and the sugar in urine in g. per 100 c.cm. was in different specimens 0·080, 0·100 on the 9th; 0·120, 0·109, 0·106 on the 10th; 0·116, 0·122 on the 11th; 0·141 on the 12th; on the 13th it had fallen to 0·096 and 0·092. The sugar was estimated by Dr. R. L. Mackenzie Wallis, using his method for normal urinary sugar; the normal limits by this method are 0·06 to 0·08 g. per 100 c.cm. It must be remembered that over this period the patient was taking 4 oz. of lactose daily as well as other carbohydrates later, and the figures must be compared with the quantities of urine passed.

On admission the urea in his urine was 0·8 per cent. It was not thought justifiable to test his excretion of urea or iodides during the acute stage. His blood-urea on admission was 30 mg. per 100 c.cm.; 36·5 mg. per 100 c.cm. on the 11th—i.e., well within normal limits.

The patient was seen again on July 22nd, 1921, after a holiday. His urine contained no albumin, and no casts, red or white cells were seen in the centrifuged deposit. His blood count showed 6,600,000 red and 7400 white cells per c.mm. His blood pressure had, however, risen to 140 mm. (systolic) and 95 mm. (diastolic). A few weeks later his blood pressure had fallen to 112 mm. (systolic).

Discussion.

The case presents several interesting features, especially as regards the kidney lesion:—

1. The absence of vesication in the mouth and the relatively slight damage after a comparatively large dose of cantharidin suggests that not all of it can have been absorbed; cantharides, however, takes some time to blister. Much worse damage has followed the taking of a relatively smaller amount of tincture of cantharides in which the presence of chloroform as a solvent would perhaps assist the absorption of the cantharidin. Possibly in this case the butter taken with the patient's tea helped the absorption of the drug.

2. The rapidity with which the condition cleared up is worthy of note.

3. The signs and symptoms are those of a glomerular nephritis. Of particular note in this connexion are: (*a*) absence of œdema; (*b*) no great reduction in the fluid output; (*c*) hæmaturia with large numbers of leucocytes in the urine, moderate numbers of casts soon disappearing; (*d*) normal blood-urea; (*e*) normal diastase output; (*f*) a blood-sugar on the lower limits of normal (at first) with a urinary sugar on the upper limits of normal. It is as yet too early to lay much stress on this.

I am indebted to Dr. J. H. Drysdale for permission to publish the clinical details and to Dr. Mackenzie Wallis for permission to give the results of his investigations into the chemical pathology.

DISABLED SOLDIERS' AND SAILORS' WORKSHOPS CHARITY.—A subscription dance is to be held at Rectors on Wednesday, Nov. 16th, under the auspices of the Disabled Soldiers' and Sailors' Workshops Charity. The dancing salon has been given for the evening by the management, and the Duchess of Sutherland has consented to act as hostess. Price of tickets, if purchased before Nov. 16th, £2 each; if purchased on that day, £3 each. Tickets, and any further information desired, can be obtained from the Hon. Organiser, 177A, Kensington High-street, W. 8; remittances should be made payable to the Duchess of Sutherland.

Reviews and Notices of Books.

BIOCHEMISTRY.

A Study of the Origin, Reactions, and Equilibria of Living Matter. By BENJAMIN MOORE, M.A., D.Sc., F.R.S., Whitley Professor of Biochemistry, University of Oxford. London: Edward Arnold. 1921. Pp. 340. 21*s*.

Prof. Moore defines biochemistry as the study of the chemical substances produced by biotic energy, or the energy of life, in the bodies of living plants and animals, and the further study of the energy processes by which such substances are elaborated and used subsequently to their production for carrying on the life of the cell. The living cell and its energy exchanges are subject to physical and chemical laws, but the peculiar structure of living matter is inhabited by a type of energy not producible in the absence of life. The theme of the book is biotic energy. We have before us all the author's views on this subject. Though not accepted in their entirety by his colleagues, these views afford material for consideration and thought, as well as for further investigation.

Part of the book is a reprint of some of the author's papers in the Proceedings of the Royal Society and part is a re-edition of his contributions to Advances and Recent Advances in Physiology. The book is not a text-book on the subject. The reader must already be acquainted with the elements of physical and organic chemistry so as to follow the reasoning of the author. The papers reprinted from the Proceedings of the Royal Society are those on the origin of life. Life originates by the catalytic action of certain hydroxides, such as that of iron, upon the traces of carbon dioxide in the atmosphere. Light energy is converted into chemical energy by the reduction process to formaldehyde. Further chemical energy arises by the reduction of nitrates to nitrites in water by the action of light. Through the agency of the chemical energy so produced complex organic compounds are built up by unknown stages and ultimately the chloroplast as a special energy transformer. The small supply of nitrates, insufficient for existing life, can be supplemented by the conversion of atmospheric nitrogen by certain algæ. The living cell is peculiar in its special structure, consisting of a mixture of colloids and crystalloids in common solution in water. This mixture is endowed with an aggregate of physical properties and thus differs from a simple colloid like starch or albumin. Hence the cell has biotic energy. Living matter acts as a transformer between biotic energy and other forms of energy. All the energy is supplied by changes arising from chemical reactions in solution and they are initiated and controlled by the substances in the cell and in its secretions.

In Chapter XIV., on Secretion and Glandular Mechanisms, the most interesting section in the book, Prof. Moore explains the inner working of the cell. He argues thus: Since a really impermeable membrane does not exist and no animal cell has been proved to possess even a semi-permeable membrane, the peculiarity of the presence of excess of potassium in the cell and of excess of sodium in the plasma must be attributed to an active process of selective absorption against osmotic pressure. The cell structure has a definite affinity for the different ions; each ion passes in and out, but only in accordance with the affinity; the amount that passes through in either direction may be so small that it is not detected by chemical means. The work done in the secretion of urine can only be determined by reference to each constituent separately. In the case of urea, the concentration in the urine is over fifty times that in the blood, of sodium chloride scarcely double. By using a suitable formula the work done in their secretion is represented by 1214 calories per day. The chapter concludes with an excellent description of Pavlov's work on the connexion of the nervous system with secretion