

MEDICAL SCIENCES CLUB

Minutes of the 23rd meeting held at the University, 13th April 1923.

Present Drs.G.and M.Brown, Bull, Chapman, Grant, Hayward, Lendon, Nott, Plummer, Pulleine, Ray, Robertson, Rogers, Southwood and Tiegs.

Visitor Mr.H.R.Marston.

In the absence of the President, Dr.Hayward moved Dr.Lendon seconded that Dr.Rogers should take the chair. The motion was carried.

The minutes of the preceding meeting were read and confirmed.

The Secretary reported a credit balance of £21-13-1.1/2, and raised the question whether the annual subscription should be remitted for a year, or whether funds should be permitted to accumulate until the Club might find some special use for them. Moved by Dr.Pullein seconded by Dr. Hayward that funds be allowed to accumulate.

Election of officers Moved Dr.Lendon, seconded Dr.Nott that Professor Cleland be elected President for 1923. No other nominations were received and Professor Cleland was declared elected.

Moved Dr.Lendon, seconded Dr.Ray that the present Secretary continue in office for the year 1923. The Secretary consented subject to his being relieved of the duties of Treasurer. This was agreed to, and no other nominations being received the Secretary was declared re-elected.

Moved Dr.Lendon, seconded Dr.Ray that Dr.Pulleine be re-elected Councillor with the duties of Treasurer. The motion was adopted.

Moved Dr.Nott, seconded Dr.Brown that Dr.Bull act as Councillor for the year 1923. No other nominations were received and Dr.Bull was declared elected.

Nomination of new members. The following new members had been nominated for election at the forthcoming meeting in May:- Dr.Brian Swift nominated by Dr.Ray; Professor Harvey Johnston nominated by Professor Cleland; Mr.H.R.Marston nominated by Professor Robertson.

SCIENTIFIC COMMUNICATIONS

Professor Robertson demonstrated the action of Insulin in inducing acidosis with convulsions in rabbits in consequence of excessive hypoglycaemia. A prompt recovery followed the sub-cutaneous injection of glucose.

Dr.G.Brown recalled the fact that in a severe case of acidosis following anaesthesia, the patient having reached such a serious condition as to display Cheyne-Stokes respiration, within one hour after injection of glucose the patient was well on the road to recovery.

Dr.Lendon inquired whether the administration of Insulin to diabetic patients resulted in the cure of the condition, or whether, as in the case of administration of Thyroid extract, the administration requires to be continued throughout life. Professor Robertson stated that so far as our very limited experience of the new treatment extends at present it would appear that administration of Insulin must be kept up throughout life. It had been observed that after discontinuance of administration for a few days the hyperglycaemia did not immediately return to the pre-administration level. This might indicate the possibility of occasional intermissions of brief duration. Dr.Lendon pointed out that in a case of hypothyroidism which had required the administration of thyroid for a large number of years, it had been possible to discontinue administration in the later years of the patient's life, indicating either that the thyroid had recovered sufficiently to maintain the patient in normal condition, or that the requirements of the body at a relatively advanced age in respect of the thyroid hormone are less than they are at an earlier age.

Dr.O.W.Tiegs described a number of new observations concerning the structure of striated muscle. He finds that the striations are not discs completely separated by intervals, but that they are continuous in the form of a double spiral proceeding from end to end of the muscle fibre. The striations in skeletal muscles are so disposed in the fibrils as to collectively form spirals, while in the wing muscles of insects in which the whole muscle fibre originates from a single cell, exactly the same spiral structure of the striations is seen. For the purpose of studying the striations in greater detail Dr.Tiegs employed the hypertrophied muscles of insect larvae in which the sarcomeres are about 6 times the normal size, so that when these are magnified by 3000 diameters their apparent size is equivalent to a magnification of normal muscle by no less than 18,000 diameters. He finds that contraction of muscle fibre is not accompanied, as has been generally supposed, by the accumulation of deeply staining material in the middle of the sarcomere, but by its accumulation at each end of the sarcomere in the neighbourhood of Krause's membrane. This leads to bulging of the ends of the sarcomeres and the appearance of relative constriction in the middle. Fine tubules can be seen in many specimens leading from the interior of the sarcomere to the ends upon which the deeply staining material presumably travels during contraction.

Dr.Tiegs has, moreover, been able to show that Krause's membrane is

similarly disposed in a spiral and that the excitatory stimulus in muscle fibrils actually travels down the spiral membrane. This can be shown by the fact that after muscle fibres have been immersed in distilled water for 5 minutes they become incapable of contraction, but still retain the power of conducting stimuli. On fixing and staining the fibres thus treated it is found that the striations have all disappeared, but that Krause's membrane is intact. The excitatory stimulus ^{is thus} propagated through muscle in a spiral and this accounts for its slower apparent rate of transmission in muscle than in nerve. If we measure the breadth of the fibres and the distance between striations we find that the impulse in human muscle actually travels 20 times the distance that it proceeds in a forward direction along the fibre; and if we multiply the observed rate of transmission of the excitatory impulse in muscle by this factor we obtain an actual rate of transmission almost ~~exactly~~ equal to the observed rate of transmission in nerve. It can, moreover, be shown that the nuclei of the muscle cells are physically continuous with Krause's membrane, and the nerve endings proceeding to the muscle can be perceived to end on the nucleus or on Krause's membrane.

Mr. Marston drew attention to the recent researches of Fulton who had succeeded in diazotizing novocain with the production of a deeply brown substance, retaining all of the physiological actions of the drug, which, being a dye, permitted direct observation of the seat of action of the drug. On subjecting muscle fibres to the action of this diazotized ~~novocain~~ ^{novocain} Fulton observed the muscle nuclei to be deeply stained. Mr. Marston drew attention to the fact that this technique opens up a general method of investigating the seat of action of drugs.

Dr. Ray stated that at a previous meeting the question had been raised whether glucose can be absorbed from the rectum or not. He could now report an experiment which established the fact that glucose so administered is actually absorbed. A diabetic patient who volunteered to undergo the experiment, was rendered sugar-free on an intake of 50 grs. of carbohydrate. His carbohydrate intake was now reduced to 40 grs. for two days, and then one pint of 4% glucose was administered per rectum. In a few hours the patient was passing abundant ^{sugar}, thus proving that the glucose had been absorbed. The bowel was then washed out. The diet remained unaltered and the patient soon became sugar-free and remained so. Hence in administering glucose per rectum in pneumonia we can rest assured that it is actually absorbed.

Jos. Cleland.

4. v. 23