Mr. Mallock's Electrical Calculating Machine

READERS of NATURE may be interested in some details from my own experience of the electrical calculating machine invented by Mr. R. R. M. Mallock, constructed by the Cambridge Instrument Company, and mentioned in the issue of January 12, p. 63.

Through the kindness of Mr. Mallock and the hospitality of Mr. C. C. Mason, of Cambridge, I was privileged for a few days in October 1933 to see the machine at work. Being a little sceptical, I had provided myself beforehand with certain problems, for some of which I had solutions. I first proposed the solution of six simultaneous equations (coefficients all to 3 decimals), knowing the answers to be :

0·866, − 0·415, 0·173, 0·337, − 0·126, 0·079.

Under Mr. Mallock's direction I set up the coefficients on the switchboard while he connected the plugs. First approximations were quickly read off as : 0·8711, − 0·4046, 0·1866, 0·3493, − 0·1246, 0·0659. Refinements gave in a few minutes the satisfactory results :

0·8650, − 0·4149, 0·1722, 0·3370, − 0·1258, 0·0794.

Much of the time was taken up by questions and explanations, but I note from my records the total time as "11.48 a.m. to 12.26 p.m., 6/10/33". This very short time could have been greatly reduced.

On other occasions I observed the machine perform, to my proposals, the solution of algebraic equations, of characteristic equations of matrices (latent roots), the evaluation of determinants and of quadratic forms in several variables in specified regions, and cognate problems. It seems to me that in this realm, which is one of wide physical and statistical application, the machine has remarkable potentialities, and one hopes that its merits will gain it not merely the publicity, but also the opportunity for practical service which it awaits.

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Points from Foregoing Letters

THE origin of the light of the aurora and of the night sky has been much debated. Prof. J. Kaplan states that he has succeeded in obtaining in the laboratory the green line λ5577, identical with that present both in the aurora and the light of the night sky. This he has done by means of a rapidly interrupted electrical discharge through nitrogen gas containing 1 per cent oxygen. The light emitted contained also other bands (Vegard-Kaplan system) which probably occur in the night sky.

Heavy and ordinary water differ in many of their chemical properties more than would be expected from the extra weight of the hydrogen atom present in the heavy variety. Mr. J. D. Bernal and Mr. G. Tamm ascribe these differences to the angular vibration (libration) of the molecules. Having calculated the energy associated with such libration, they find that it accounts for differences in the specific heat, and heats of evaporation and fusion of H_2O and D_2O, and also for the wave-length shift in the spectrum of light scattered by water.

By centrifuging the cells of the root tips of the bean, Dr. H. W. Beams and Mr. R. L. King note that various cell constituents arrange themselves in layers according to their specific gravity. They submit diagrams showing, among other things, that the Golgi bodies (platelets coloured black by osmium reagent) are in this way separated from the mitochondria (protoplasmic rods and granules), from which they cannot otherwise be readily distinguished.

From the density of several gaseous compounds of carbon (CO_2, C_2H_4, CF_4) compared with that of oxygen by means of a micro-balance, Dr. W. Cawood concludes that 12·01 is a more exact value for the atomic weight of carbon, which would indicate the presence of about 1 per cent of the ^{13}C isotope. The compressibilities of those gases, based upon the newly calculated atomic weight, agree with those experimentally determined. For the atomic weights of nitrogen and fluorine, determined in the same way, the values 14·006 and 18·995 are given.

Dr. Blackman discusses in the light of the quantum theory whether, in the infra-red absorption spectrum of crystals, one should expect certain regions to be insensitive to temperature changes, as was experimentally stated to be the case by Rubens and Hertz. He concludes that the absorption on the short wave-length side of the main vibration should be less sensitive than that on the long wave-length side, and appeals for further experimental work in this field.

Messrs. C. F. Selous and P. W. Perryman give a graph showing how the surface tension of urine varies during the menstrual cycle. It has a maximum value at the time when ovulation probably occurs and a minimum during menstruation, due possibly to the presence of hormones such as prolan A, the hormone stimulating the growth of the follicle containing the ova.

Dr. B. C. Guha and Mr. A. R. Ghosh report that not only the spleen, kidney and liver but also the brain and heart and leg-muscle tissues of the rat have apparently the power of producing vitamin C (ascorbic acid) from the sugar-like substance mannose. They further find that the liver tissues of only those animals which are known to be independent of outside supplies of vitamin C can bring about the conversion of mannose into ascorbic acid. They have hitherto relied upon a chemical method of estimating the quantity of vitamin C produced.

Male hormone (androsterone) prepared from cholesterol (a common wax-like substance present in wool-fat, blood, etc.) has no effect upon the female genital tract according to Mr. F. L. Warren. This shows that the results obtained by previous investigators, who have reported that testicular extracts have the same effect on the female genital tract as the female hormone, must be due to some other substance present in those extracts. Mr. Warren suggests that the male hormone may be the immediate precursor of the female hormone and hopes to convert one into the other by biochemical means.