George's Hospital, London, author of an atlas of sections of the brain of the cat and monkey, and joint author with Victor Horsley of a number of papers in *Brain*, on June 22, aged seventy-five years, and of M. Albert Viger, for thirty years president of the French National Horticultural Society, and seven times minister of agriculture, on July 8.

THE New York Cancer Association, of which Dr. Isaac Levine is director and Dr. George D. Stewart, professor of surgery at New York University, is chairman of the executive committee, plans to establish in New York City a laboratory for the study of cancer, with twelve research workers and twenty-four technical assistants. A budget of $108,000 for the first year has been arranged.

A SITE for a botanical garden, comprising forty-four acres on Strawberry Hill, has been offered to the City of Stamford, Conn., by Mrs. Albert Crane in memory of her late husband. Mrs. Crane also plans the gift of $50,000 outright for the preparation of the land and a trust fund of $100,000, the income to be used in the maintenance of the land as a botanical garden. Dr. William T. Hornaday, who recently resigned as director of the New York Zoological Park after a long term of service, has made a survey of the land and pronounces it excellent for a botanical garden. Dr. Hornaday, now a resident of Stamford, is much interested in the project and will lend his aid in the preparations, if it is accepted by the city. In his report to Mrs. Crane, he finds that about $20,000 will be needed annually to maintain the land in addition to the income from the trust fund. The city is asked to agree to furnish this sum yearly in consideration for the gift of the park. Mrs. Crane would keep her home and about four acres of land on the site during her life-time.

THE London Mathematical Society has begun publication of a second periodical, in addition to its *Proceedings*, to be called *The Journal of the London Mathematical Society*. It will contain proceedings of meetings, abstracts, obituary notices, etc., besides short original articles.

Nature reports that the Air Ministry of Great Britain has announced that five hundred aircraft apprentices, between the ages of 15 and 17 years, are required by the Royal Air Force for entry into the Schools of Technical Training, Halton, Bucks and Flowerdown, near Winchester. They will be enlisted as the result of an open and a limited competition held by the Civil Service Commissioners and the Air Ministry respectively. Successful candidates will be required to complete a period of twelve years' regular Air Force service from the age of 18 years, in addition to the training period. Full information regarding the aircraft apprentice scheme, which offers a good opportunity to well-educated boys of obtaining a three-years' apprentice course of a high standard and of following an interesting technical career, can be obtained on application to the Secretary, Air Ministry, Kingsway, London, W.C.2.

HITHERTO unknown archeological ruins, called Macanxoc, meaning "You can not read it," were found by E. S. Thompson and J. Charlot, of the Carnegie Institution, on May 24, according to information reported to Washington by Dr. Sylvanus G. Morley, in charge of the extensive diggings centered at Chichon Itza. Macanxoc is said to be the religious and ceremonial center of Coba, a large provincial Old Maya Empire City, fifty miles east of Chichen Itza. Inscriptions on stelae have been found that date from 364 to 413 A. D. From the style, sculpture and dates of the hieroglyphics on the remains, it is supposed that Macanxoc is the oldest center of Maya civilization thus far known to Yucatan. The most brilliant Maya paintings so far known and the best preserved painted serpent heads yet found were unearthed recently in the Temple of the Warriors at Chichen Itza by E. H. Morris. Remains of a serpent column temple decorated with these works of art were revealed when a corner pyramid was excavated.

UNIVERSITY AND EDUCATIONAL NOTES

THE Presbyterian Hospital, built at a cost of $6,000,000, which when completed will be the general hospital for the proposed new medical center of the University of Pittsburgh, provides for a hospital of 600 beds, to be erected on the "knoll" now occupied by the Faculty Club. It has been announced that the Eye and Ear Hospital will join in the medical center and erect a $1,000,000 structure opposite the new children's hospital on the university's site. Plans are being considered for the affiliation of the Montefiore and another special hospital with the medical center.

DR. H. R. KRAYBILL, formerly biochemist of Boyce Thompson Institute for Plant Research, has been appointed professor of agricultural chemistry in Purdue University and state chemist and seed commissioner.

GLENN V. BROWN, who received his Ph.D. from the University of Pennsylvania, has been made associate professor of chemical engineering in the college of applied science at Syracuse University.

J. C. WARNER, of Goshen, Ind., a graduate of the University of Indiana, has been appointed instructor in chemical engineering at the Carnegie Institute of Technology.

AT the University of Minnesota promotions to full professorships include: Darrel H. Davis, geography; Wilson D. Wallis, anthropology, and Jacob O. Jones, engineering. Promotions to associate professorships are: William S. Cooper, botany; John H. Van Vleck, physics; George C. Priester, engineering, and George H. Montillon and Lloyd H. Reyerson, chemistry.

PROFESSOR G. VIALE, of the chair of physiology at the University of Sassari, Italy, has been appointed to a similar chair at the University of Buenos Aires.

DR. J. S. DUNKERLY, lecturer in parasitology at the University of Glasgow, has been appointed professor of zoology and director of the museum at the University of Manchester.

DR. A. W. BORTHWICK, formerly lecturer in forest botany at the University of Edinburgh and afterwards serving on the Forestry Commission, has been appointed to the new chair in forestry at the University of Aberdeen.

DISCUSSION

THE MOST PROBABLE VALUE OF CERTAIN BASIC CONSTANTS

THE first volume of the new International Critical Tables (I. C. T.) contains, on page 17, a list of nine so-called basic constants, and on the following page, a list of twenty-one constants derived from the nine basic constants by direct substitution in certain accepted formulas. In other words, each of the twenty-one derived constants is some function of two or more of the basic constants.

Now it sometimes happens that one can measure a certain function of two or more quantities with a greater precision than that attainable in the measurement of each separate quantity. The numerical value of such a function thus constitutes a condition which should be given due weight, in adopting a *system* of values of the separate constants. The constants given in the I. C. T. were adopted early in the year 1923, and it is questionable whether at that time it was possible to devise a thoroughly satisfactory system. The situation is much better at the present time, as will appear from the following discussion. This relates to the values only of e, e/m, h, and c, *i.e.*, those constants which are of direct concern in spectroscopy.

Because of the general acceptance of the values of 4.774×10^{-10} es for the electronic charge, and 2.9986×10^{10} cm sec^{-1} for the velocity of light (as given in the I. C. T.), we shall tentatively assume these to be correct. We may then calculate h from the observed ratio h/e, since this is now the most accurate method for obtaining the value of the Planck constant.

E. O. Lawrence (*Phys. Rev.* 27, 809, 1926) by the method of critical potentials obtains 10.399 ($\pm$ 0.007) volts for the ionization potential of mercury. From the quantum relation we have

$$h/e = \text{volts} \times 10^8/(c^2 \times \text{cm}^{-1}),$$

and with cm^{-1} = 84,178 for mercury, one obtains

$$h/e = 1.3739 \ (\pm 0.0009) \times 10^{-17} \text{ erg sec es}^{-1},$$

and therefore

$$h = 6.559 \ (\pm 0.0044) \times 10^{-27} \text{ erg sec.}$$

The indicated error in the voltage and in h/e is the purely experimental error, while that in h is consequently the probable error *exclusive* of the error in e. (Lawrence gives $h/e = 1.3735$, and $h = 6.550$. Even if 1.3735 were correct, the resulting value of h would be 6.557.)

The second method of obtaining h/e is by means of the continuous X-ray spectrum. The most accurate result, by Duane, Palmer and Yeh (Proc. Nat. Acad. Sci. 7, 237, 1921) leads to $h = 6.5562 \pm 0.0050$, where again the indicated error (deduced by the writer) is exclusive of the error in e. But these investigators used 3.028 for the grating constant of calcite, while 3.029 is now considered the best value. (See, for instance, Compton, Beets and De Foe, *Phys. Rev.* 25, 625, 1925.) Making this correction one obtains $h =$ 6.5586, in extremely good agreement with the Lawrence value.

The value of h adopted by the I. C. T. is 6.554. This is the value calculated by the writer (*Phys. Rev.* 14, 361, 1919) in a general discussion of the most probable value of this quantity. On the basis of later work the writer (*Nature* 111, 811, 1923) gave 6.557, with a stated probable error of a few units in the last place. (The I. C. T. give 0.001 as the total probable error in h. This is certainly far too small.) The chief source of error, as previously noted (*loc. cit.*), is that in Millikan's value of e (4.774 $\pm$ 0.005) since this quantity occurs to some positive power in every determination of h. The above new results for h indicate that the most probable value is now somewhat higher, and upon the basis of all available data, I now judge 6.560 to be a better value, with the probable error as before. This value evidently satisfies the known values of h/e within limits of error.

A well known relation between c, e, e/m, and h, is that given by the Rydberg constant for infinite mass

$$N_\infty = (2\pi^2 \times e^5)/(h^3 \times c^2 \times e/m) \text{ cm}^{-1},$$

where e/m is in em units. Using 109,677.6 cm^{-1} as the most probable value of the Rydberg constant for hydrogen, and assuming $e/m = 1.760 \times 10^7$ em for the evaluation of the small corrective term (59.7 cm^{-1}),