modate 192 students and the chemical laboratories 480 students.

AT the University of Virginia, Dr. Sydney William Britton, of the Johns Hopkins University, has been appointed professor of physiology as successor to Dr. Homer W. Smith, who has become head of the physiological department of New York University.

DR. EDWARD F. CASTETTER, associate professor of botany in the Iowa State College, has resigned to accept the headship of the department of biology of the University of New Mexico at Albuquerque.

A. BRAZIER HOWELL, secretary of the American Society of Mammalogists, who for the last six years has been connected with the U. S. Biological Survey and the U. S. National Museum, has been appointed lecturer in comparative anatomy at the Johns Hopkins Medical School. Dr. Clarence E. Ferree has been made resident lecturer in ophthalmology and director of the laboratory for physiological optics. His wife, Dr. Gertrude Rand, will be associate professor of ophthalmology.

PROFESSOR E. A. MILNE, Beyer professor of applied mathematics in the University of Manchester, has been appointed as from January 1, 1929, to the Rouse Ball professorship of mathematics at Oxford. Under the will of Mr. W. W. Rouse Ball, of Trinity College, Cambridge, money was bequeathed for the foundation of Rouse Ball chairs of mathematics at Oxford and Cambridge. Early this year Professor J. E. Littlewood was appointed to the Cambridge chair.

DISCUSSION AND CORRESPONDENCE

SPARING ACTION OF FAT ON THE ANTI-NEURITIC VITAMIN

IF fat be added to an almost fat-free diet,[1] the amount of the anti-neuritic vitamin required to establish any definite level of growth or frequency of ovulation is always less than is required when fat is absent; in other words, fat acts to spare the water soluble anti-neuritic vitamin. Animals on inadequate levels of the vitamin are not only more gravely impaired in stature and ovulation when fat is absent than when present, but they invariably develop fatal beriberi sooner. A level of anti-neuritic vitamin can be found, for instance, on which all animals deprived of fat die in slightly over a month, but on which animals allowed ten per cent. of dietary fat invariably live over four months. Furthermore, fat-free animals near death from beriberi when given only three doses of rice-polish-extract resume more energetic growth if also shifted to a diet with fat present; in spite of this growth and hence increased body substance they also come down later with their second attack of beriberi. Our experiments have been performed with adequate levels of the other water soluble vitamin B (P P) and of the fat soluble vitamins A, D and E, so that we are not at liberty to assign the remarkable favorable action of fat to increased amounts of these substances. Nor have we been able thus far to establish the presence of the anti-neuritic vitamin itself in the fats used. It would appear that we must recognize their mediation in those unknown metabolic processes for which anti-neuritic vitamin is essential. The clear-cut facts herein reported go far toward explaining the beneficial effect of fats[2] recently emphasized by us in earlier studies on highly purified diets.

HERBERT M. EVANS,
SAMUEL LEPKOVSKY
UNIVERSITY OF CALIFORNIA

[1] We have employed Diet 542 (casein—extracted one week with acid water—20, cane-sugar 70, autoclaved yeast 10, salts 4, 2 drops cod-liver oil (Patch) daily) and Diet 550 (casein 20, cane-sugar 59, lard 10, autoclaved yeast 10, salts 4, 2 drops cod-liver oil (Patch) daily). For both diets the anti-neuritic vitamin was furnished at various levels by separately fed unautoclaved yeast. E is administered as a few drops of wheat germ oil daily.

NOTATION IN ATOMIC STRUCTURE

IN most books and papers on atomic structure little attempt is made to distinguish between frequencies and wave numbers except where it becomes necessary to give numerical examples. Both these quantities are usually designated by the letter ν.

It is our practice to use a tilde over the symbol when it indicates wave number, *i.e.*, $\tilde{\nu} = \nu/c$. Similarly, when dealing with the Zeeman effect, it is sometimes desirable to use the wave number corresponding to the frequency of the Larmor precession. This frequency may be designated by L, and the wave number L/c is then denoted by $\tilde{L}$. We have found this notation extremely convenient.

There is need for standardization of the symbol for Schrödinger's wave amplitude. We usually indicate this by the symbol Ψ. The wave amplitude referring to an individual quantum state of a system of one degree of freedom is indicated by Ψ_n, where n is the quantum number of this state, and then

$$\Psi_n = \psi_n \exp(-2\pi i E_n t/h)$$

where ψ_n indicates the part of Ψ_n depending on the coordinates. The choice of the minus sign in the exponential factor is dictated by the fact that we often use the transformation

[2] Evans and Burr, "A New Dietary Deficiency with Highly Purified Diets," *Proc. Soc. Exp. Biol. and Med.*, Vol. 24, 740 (1927); Vol. 25, 41 and 390 (1927–1928).

$$\Psi = \exp(2\pi i W/h)$$

W may be considered as a generalization of Hamilton's principal function, $-Et+S$, where S is the action. The writers feel that much good would come from the establishment of committees on mathematical notation in each of the national societies dealing with physical and chemical science, and trust that this note will evoke discussion directed toward this aim.

ARTHUR EDWARD RUARK
HAROLD C. UREY

MELLON INSTITUTE

MONOLITHIC SOIL PROFILES

EVER since the serious study of soils began, the preparation of portable monolithic soil profiles has been a time-consuming task. The department of agronomy of the North Dakota Agricultural College and Experiment Station has developed a rapid method of taking monolithic soil profiles to the depth of forty inches in stone-free soils.

Bore a hole forty-six inches deep with a nine-inch basket type post-hole auger. With a spade, dig a rectangular recess two to four inches in depth opposite the portion of the exposed soil to be sampled. After removing the débris from the hole, square the surface opposite the recess and place the open side of a rectangular trough of eighteen gauge galvanized steel two inches by four inches by 40 inches against the prepared surface. Place rigid backing against the steel trough to prevent its buckling under pressure. After placing footing in the recess introduce a short jack with three-foot handle (known as a balloon tire jack) between the footing and the trough and apply pressure near the bottom end of the trough and again near the top of the trough. If pressure is applied in excess of the pressure needed to fill the trough, layers develop in the soil at right angles to the direction of the pressure facilitating the removal of the filled trough. Placing the spade in the soil two or three inches from the open side of the trough pointing toward the trough and extending gentle pressure toward the excavation, the profile is easily broken away.

A monolithic profile may be taken from stone-free soils in one to one and a half hours. All students of soil phenomena will find this method worthy of trial.

A more complete description of this method and its adaptation to glacial soils will appear later.

J. E. CHAPMAN

FARGO, NORTH DAKOTA

AN EXTINCT CAMEL FROM UTAH

IN SCIENCE for July 6 my friend Dr. Alfred S. Romer gave us an interesting account of the discovery of a skull of a camel, probably *Camelops hesternus*, in a dry lava-flow cavern near Fillmore, Utah. According to the statements furnished, the partial skull was buried at a depth of three or four feet in a fine eolian dust, about two hundred feet back from the mouth of the cavern. The bone had undergone no fossilization and there adhered to it a fragment of organic matter regarded as muscle. Dr. Romer holds that this discovery shows that this species lived in the west up to a relatively late time, only several centuries or at most several thousands of years ago. The present writer suggests that the recent deposits along the streams of the Great Basin be carefully scrutinized for additional remains of these modern camels.

Dr. Romer further concludes that my theories about the succession of Pleistocene vertebrates are thereby rendered much in need of revision. If I may judge from his suggestions that the fossils found at Lake Lahontan, Rancho La Brea and Frederick, Oklahoma, may be of a rather late date, his revision of Pleistocene history will restore the happy time when any species whatever of Pleistocene mammal might be expected to occur in any late Pleistocene deposit whatever, especially if its occurrence appeared to have any bearing on human history. A revision of that kind would evidently bring relief to some geologists and to many, if not to most, of our anthropological colleagues.

The determination of the geological age of the skull in question will turn upon two considerations. The first has regard to the length of time organic matter can endure in the conditions described by Dr. Romer. He grants that it might last indefinitely if bacterial action be prevented. Why not then a half million years? If the flesh has lasted until it has become covered with fine dust three or four feet thick, how are the destructive bacteria to reach it? Even if the dust were to be wet the bacteria would be filtered out before reaching the putrescible substance. Aqueous solutions of organic matter will endure indefinitely if bacteria are excluded. And probably that dust has never been wetted since it was deposited.

Dr. Romer is sure that the muscle could not have resisted decay for a half million years because that climate enjoys an annual rainfall of fifteen inches. From Bigbone Cave, Van Buren County, Tennessee, Dr. Harlan obtained megalonyx bones which, buried in fine dust, retained patches of cartilage, shreds of ligaments and pieces of the horny nails; and this was in a region where there is an annual rainfall of fifty or more inches.

The second consideration bearing on the age of the camel is the age of the cavern; and Dr. Romer, basing