Letters to the Editor

On Printing Wings of Insects for the Study of Venation

The wing to be printed is placed between two glass slides, being careful that all folds are pressed out. A drop of alcohol will facilitate smoothing out wings that have a tendency to fold. Labels may be prepared by writing on the glass slide with India ink. The slide is then used as an ordinary negative, placed in a photographic enlarger, and printed on sensitive photographic paper in the usual manner. The length of exposure will depend upon the type and thickness of the wing being printed.

All clear or transparent wings, such as those belonging to the orders of Diptera, Hymenoptera, Homoptera, etc., may be treated in this manner. It is possible to remove the scales on the wings of some of the Lepidoptera by soaking the wings in glacial acetic acid or concentrated ammonium hydroxide for about 24 hours. The scales may then be removed by gently brushing them off with the finger.

DARRELL T. SULLIVAN

Department of Horticulture, University of Georgia

Newton and Applied Mathematics

In the leading article entitled "On the problem of applied mathematics" (*Science*, 1945, **102**, 315–320) J. H. Taylor discusses the formulation of Newton's Law of Gravitation in a paragraph beginning in the first column of page 319 and extending into the second. Although the type of discussion leading up to the formulation of an empirical law which Dr. Taylor outlines has often been used and will continue to be useful in the future, it certainly is very far from that followed by Newton in his *System of the world*. Newton himself credits the inverse square law to Hooke, Halley, and Wren; but he, in the words of Agnes Clerke (*Encyclopedia Britannica*, 14th ed., Vol. 2, p. 585), "was the only man of his generation who both recognized the law and had power to demonstrate its validity," by combining results obtained by astronomers with the dynamical principles developed by himself. One may call attention to Richard Stevenson's *Newton's lunar theory exhibited analytically* (Cambridge, 1834), in which is set forth a demonstration in modern notation. It seems to me that this or Newton's treatment in his *System of the world* would have served Dr. Taylor even better than his own discussions in exhibiting a contrast between mechanics and economics.

EDWIN B. WILSON

Written from *University of Glasgow*

Prior Use of the Rutherford Unit

Referring to the letter of S. C. Lind (*Science*, 1946, **103**, 761) regarding the suggestion of E. U. Condon and F. L. Curtiss (*Science*, 1946, **103**, 712) that the term "rutherford" be given to a unit expressing the strength of radioactive sources, allow me to point out that in a paper entitled "The sub-microscopic structure of matter" (*Colloid chemistry, theoretical and applied.* Vol. I. New York: Chemical Catalog Co., 1926), a table appears on pages 14–15 containing a chart, showing sizes of various material units at various magnifications. In this, the term "Rutherford Unit" is defined as "1,000,000 μμ, or 100,000 Angström Units." An explanatory footnote states:

> In dealing with the extremely minute sizes involved in describing nuclear diameters, it is convenient to use a term of measurement one million times smaller than 1 μμ. This I have termed a "Rutherford Unit" (R.U.), and therefore 1 R.U. $= \frac{1}{100{,}000}$ A.U. $= \frac{1}{1{,}000{,}000}$ μμ.

Since one of the greatest of Lord Rutherford's many achievements was the demonstration of the nuclear atom, it still seems to me that it is most appropriate that his name be connected with the atomic nucleus. The nucleus is the source of the tremendous energy released by what is erroneously called the "atomic" bomb, and the nucleus and its internal structure are under intensive study involving sizes conveniently expressed in R.U. as above defined, with the exception that in present-day notation μμ is written mμ.

JEROME ALEXANDER

50 East 41st Street, New York City

An Improved Synthesis of N-Methyl-L-glucosaminic Acid

The recent discovery that N-methyl-L-glucosamine (F. A. Kuehl, Jr., E. H. Flynn, F. W. Holly, R. Mozingo, and K. Folkner. *J. Amer. chem. Soc.*, 1946, 68, 536), exists as a component of streptomycin calls attention to the fact that there is no satisfactory method for its preparation. Following Fischer and Leuchs' (*Ber.*, 1902, 35, 3787; 1903, 36, 24) classical syntheses of the enantiomorphous forms of glucosaminic acid, Votoček and Lukeš (*Coll. Czech. Chem. Commun.*, 1935, 7, 424; *Chem. Listy*, 1935, 29, 308) prepared N-methyl-D-glucosaminic acid by treating an aqueous solution of D-arabinose with methylamine and hydrogen cyanide. They allowed this mixture to stand for a period of three weeks, removed the resultant tar, and then hydrolyzed successively with acid and base to produce, after acidification, an unspecified yield of the amino acid. Folkers and co-workers have stated that the same general method was applied to L-arabinose to yield the enantiomorphous N-methyl-L-glucosaminic acid. We have found that, by operating in anhydrous ethanol instead of in water, the reaction is greatly improved, and both the N-methylamine derivative and the cyanohydrin are readily isolable in crystalline form. Treatment of a suspension of L-arabinose in absolute ethanol with dry methylamine yielded L-arabinosyl-N-methylamine—m. p. 118–120°, $[\alpha]^{20}$ D +43° (initial) → +51° (60 min., water). Treatment of this compound, or of a mixture