the Fresno region, where the ground water originally stood forty feet below the surface, while now it is at a few feet, and sometimes *at* and above the soil surface. It is historically certain that the rise of the ground water came about there, as at many other points, not from direct over-irrigation, but by the enormous leakage of water from ditches with porous, sandy bottoms and banks. From these I have frequently traced the water slope sideways until the auger reached a depth of ten or more feet; and the gradual rise of the water level in neighboring wells, whose sides remained dry save within reach of the capillary rise of the water, proved plainly that the water was ascending from the original level by hydrostatic adjustment, not by penetration from above; where as a matter of fact irrigation often had not even begun.

The extraordinary accumulation of alkali salts at the surface that has occurred in the Fresno and some other regions of the San Joaquin valley, are clearly due originally to the leaching upward of the entire mass of alkali in the sub-strata. The investigations of the California Station have shown that in the arid region few uplands normally contain less than from 2,000 to 2,500 pounds of soluble salts per acre in four feet depth; and much more has been found in the silty sub-strata of the Salton basin in southern California, even to 22 feet depth. When all the salts thus contained in 40 feet of material are leached to the surface in addition to the accumulation already existing there, the overwhelming invasion we find where these leaky ditches exist cannot surprise us. E. W. HILGARD.

REPRINTS OF SCIENTIFIC PAPERS.

TO THE EDITOR OF SCIENCE: Will you allow me space for a word concerning a point of professional courtesy? It arose in connection with a personal experience. The incident is wholly trivial, namely, the failure of the publishers, or editor, of the *New York Teachers' Monographs* to furnish the reprints promised of an article which appeared in the October number.

It is the custom of writers on technical science to exchange copies of their published monographs. The brochure is sent frequently with an explicit—and always with at least the implied—request for a similar courtesy in return, upon the appearance of anything of the receiver's own in print. The relation thus becomes one of simple duty, which may not be considered or disregarded at will. To each of his correspondents one owes a debt which is discharged only when copies of his own published work have been sent in exchange.

But the matter goes deeper. The contributor to technical scientific periodicals is rarely, if ever, paid for his writings. These publications, in many instances founded and supported by associations of scientific students, are not primarily commercial enterprises, but vehicles of communication among scholars having common interests and aims. They are means by which is made possible the publication of monographic literature, the printing of which, in the majority of cases, would be too heavy a burden for the individual writer. It is part of the meaning of these technical journals' existence that the process of thus communicating scientific thought shall be facilitated as greatly as possible.

This function has been very widely and generously recognized by the publishers of our reputable scientific periodicals in America. It is expressed in the custom of presenting to each substantial contributor a larger or smaller number of separately bound reprints of his article for distribution. Upon the free exchange of monographs which thus becomes possible the scholar depends in no small degree for the equipment of his working library; for this literature, which represents the points of immediate growth in special lines of thought, finds its way only slowly and incompletely into permanent print. It is, therefore, a matter of serious and general importance that these relations between contributor and publisher should be cordially maintained, and the flagrant infraction of them should not remain unknown. ROBERT MACDOUGALL.

NEW YORK UNIVERSITY.

THE SACRAMENTO FORESTS OF NEW MEXICO.

TO THE EDITOR OF SCIENCE: In a communication to your paper dated November 8, 1901,

upon the Sacramento forests of New Mexico, the typist made me say that trees 25 feet in diameter were quite common. It was my intention to say 'trees from two to five feet,' etc.

ROBERT T. HILL.

SHORTER ARTICLES.

NOTE ON THE EMBRYO OF NYMPHÆA.

ALTHOUGH the mature embryo of *Nymphæa* Sm. has been frequently figured and described during the last half century as typically dicotyledonous, the interesting paper of Mr. Lyon on *Nelumbo (Minnesota Bot. Studies,* Ser. II., Part 5, p. 645–55, Pl. 48–50) made a further investigation desirable. Having already considerable material in hand with a view to a careful study of the genus (which is approaching completion), I have examined the mature and germinating embryos of several species, and studied the development in three members of widely differing sub-genera, viz., *N. odorata* Ait., *N. cærulea* Sav., and *N. Lotus* L. The course of events seems identical in all of these. A suspensor of three to five cells in linear series is formed, upon which a 'spherical embryo' of some hundreds of cells develops as described by Mr. Lyon for *Nelumbo.* This is embedded in a soft mass of endosperm at the micropylar end of the ovule; three fourths of the length of the seed is occupied with perisperm. The spherical embryo, however, unlike that of *Nelumbo,* gives rise to two opposite and symmetrical outgrowths near its lower end. These become the two equal cotyledons. The intervening apical portion of the sphere becomes the plumule, with the rudiments of two unequally developed leaves. The basal portion of the sphere becomes the radicle. At maturity the embryo exhibits two thick, concave, hemispherical cotyledons, applied against each other all round by their edges; while the central concavity is occupied by the plumule. The endosperm is now reduced to a single layer of cells and a line of thin crushed walls between these and the cotyledons. A large amount of oil is stored in the embryo and endosperm, with a little starch and some proteid. The perisperm is densely packed with starch.

It seems necessary, in view of these facts, to modify Mr. Lyon's classification of Nymphæaceæ among the Helobiæ. If we are to consider the development of *Nelumbo* as strictly monocotyledonous, then it must be separated as a distinct order, as some writers have already placed it. However, we would prefer to interpret the peculiar embryogeny of *Nelumbo* as a modified form of dicotyledony. The symmetry of the early embryonic vascular system supports this view; and the decurrence of the cotyledons around the radicle is paralleled in *Tropæolum.* Further, a complete fusion of the cotyledons along one edge has been noted in *Nuphar lutea* by Hegelmaier, as quoted by Henslow, and a much more pronounced 'pseudo-monocotyledony' is seen in *Trapa natans, Ranunculus ficaria,* etc. A number of striking examples and suggestions in this connection are followed up by Henslow in his paper on 'A Theoretical Origin of Endogens from Exogens' in *Journ. Linn. Soc.,* London, 29; 485–528, and in his 'Origin of Plant Structures,' pp. 136–79. Mr. Lyon's observations have numerous interesting bearings on Henslow's theory.

HENRY S. CONARD.

UNIVERSITY OF PENNSYLVANIA.

WILLIAM LE ROY BROUN.

DR. WILLIAM LE ROY BROUN (M.A., LL.D.), president of the Alabama Polytechnic Institute, died suddenly on January 23. He was one of the foremost educators of the country, and, from time to time, had been prominently associated with the leading educational institutions in the South.

In recent years he was conspicuous for the great work he accomplished as a pioneer in the field of technical education. Since 1884 he had been president of the Alabama Polytechnic Institute, and under his wise and progressive guidance this institution had been developed into a highly successful and widely known college of applied science. His death will be an immense loss to the cause of Southern, indeed of national, education.

He was a native of Virginia, born in Lou-