magma rich in alkalis, and closely related to the nepheline-syenites. Hans Rusch discusses 'The Last Stage of the Ice Age in Central Scandinavia.' He offers a new theory of the origin of the glacial lakes north of Christiana, whose beaches occur in the upper parts of the valleys to the south of the divide. In an extended article Buckley continues his valuable discussion of the 'Properties of Building Stones' which was begun in the number for February–March, 1900. Editorial, Reviews, and a list of Recent Publications close this valuable number with its varied table of contents.

J. H. S.

Terrestrial Magnetism and Atmospheric Electricity for June contains the following articles:

'The Magnetic Observatory at De Bilt, near Utrecht,' M. Snellen; 'Magnetic Intensity Variometers,' M. Eschenhagen; 'Einige Bemerkungen zur Messung der Horizontal-intensität des Erdmagnetismus Mittels des magnetischen Theodoliten,' J. Liznar; 'A Possible Cause of the Earth's Magnetism and a Theory of its Variations,' William Sutherland; 'Biographical Sketch of Dr. William Gilbert' (with portrait); 'Some recent Contributions to Terrestrial Magnetism,' L. A. Bauer.

SOCIETIES AND ACADEMIES.

THE TEXAS ACADEMY OF SCIENCE.

The Annual Meeting of the Texas Academy of Science was held in the Chemical Lecture Room of the University of Texas on the morning of June 18, 1900, President Simonds in the chair.

The program offered was as follows:

1. 'The Nature of Justice,' by Professor S. E. Mezes, University of Texas.
2. 'The Development of the Present Texas Railway System,' by R. A. Thompson, M.A., Engineer to the State Railroad Commission, Austin.
3. 'Mind and Brain,' by Dr. Edmund Montgomery, Hemstead, Texas.
4. 'The Relation of the Work of the Sanitary Engineer to the Public Health,' by J. C. Nagle, M.C.E., A. and M., College of Texas.

The follpwing papers were read by title:

1. 'Note on the Marte and Bluff Meteorites,' by Professor O. C. Charlton, Baylor University, Waco.
2. 'My Experience with a Siphon Pipe-Line,' by John K. Prather, B.S., Waco.
3. 'Fossils of the Fort Worth Limestone near Waco,' by John K. Prather, B.S., Waco.
4. 'Research Work done in Organic Chemistry at the University of Texas,' by J. R. Bailey, Ph.D., and Messrs. S. F. Acree, M.S., Louis Knox, Louis Kirk, and Omerod Palm.

In his paper on the 'Nature of Justice,' Dr. Mezes undertook to base the conception of justice on the systems of legal justice of the most advanced nations, in so far as these systems are in agreement; the ground for this position being that the conclusions are thus made to rest on a study of the best instances of justice that can be investigated. It was pointed out that there are three subdivisions to justice. The first subdivision defines and forbids the doing of wrong, either to private individuals or to the public; the legal basis here is the law of torts and the criminal law. The second defining the benefits that each individual receives from others and from society, points out those to whom return should be made for these benefits, and requires that such return be made; here the legal basis is the law of contract, and the little systematized law of the obligations that arise out of relations. The third subdivision deals with the proper procedure towards those charged with injustice, and the just treatment of the unjust, but how should they be treated and who should take them in hand; here the basis is the law of procedure, and portions of the law under the heads previously mentioned. Otherwise stated, under the first head the line is drawn separating liberty from license; under the second specification is made of the individual's debts and of the payment that honesty demands; under the third provision is made for readjusting the balance that injustice has disturbed. In conclusion the speaker pointed out that justice requires each man to consider his capacities, the deserts of others, their needs, and all the other relationships in which he finds himself, and then to do his part as the particular social member that he is.

Mr. Thompson discussed the development of the present railway system of Texas and illustrated by map and diagram the progress of construction from the inception of the first line to the present time. The first railway charter was granted in 1836. The first road to begin construction was the Buffalo Bayou, Brazos and

Colorado R. R. in 1852 near Harrisburg. It is now known as the Galveston, Harrisburg and San Antonio Railway. Construction on the Houston and Texas Central R. R. began in 1853; on the Galveston, Houston and Henderson in 1854; and on the Texas and Pacific in 1856. By 1860, 284 miles of railway were in operation in Texas; by 1870, 583 miles; by 1880, 2581 miles; by 1890, 8486 miles; and by 1900, 9869 miles. Texas has donated to the railways of the State 34,179,055 acres of public land, or 53,405 square miles, or one-fifth of its total area. This territory would form a State as large as Arkansas.

Of the States of the Union Texas is third in railway mileage. Were it as well developed in proportion to area as Illinois it would have 50,759 miles; if as well as Pennsylvania, it would have 57,900 miles of railway.

The effect upon the mileage of the State resulting from the donation of land to the railways was also shown.

Professor Nagle's paper dealt with a few of the more important questions which present themselves to the sanitary engineer and their relation to public health. Statistics regarding the death rate from preventable diseases were given, special attention being devoted to typhoid epidemics as affected by impure water supplies. Methods of water purification were described and their relative values discussed and the necessity of preventing water waste emphasized. Methods of sewage treatment and garbage disposal were similarly treated, and figures given to show the degree of purification attainable.

It was pointed out that during the past fifty years the medium age of man has been increased about 25 per cent. and this was attributed to the marvelous discoveries in bacteriology. That the sanitary engineer has provided means to greatly diminish the death rate due to bacteriological diseases there can be no question. The remarkable vitality of certain forms of bacterial life under what appear to be unfavorable conditions was illustrated by reference to actual examples as were also the effects attained by changes in water supplies and the treatment of sewage.

The speaker took the position that the engineer should not only execute such works as may be entrusted to him but should endeaver in every legitimate way to mould public opinion in such matters, and furthermore, that when the fact is recognized that the assistance of the engineer is often-times as necessary as that of the physician, then will a more sanitary condition exist, especially in the cities and towns of the south and west.

The following officers were elected for the ensuing year: President of the Academy, Henry Winston Harper, M.D., F.C.S., Professor of Chemistry in the University of Texas; Vice-President, O. C. Charlton, Professor of Science in Baylor University, Waco; Secretary, Frederic W. Simonds, Ph.D., Professor of Geology in the University of Texas; Treasurer, R. A. Thompson, M.A., C.E., Engineer to the Texas Railroad Commission, Austin; Librarian, Wm. L. Bray, Ph.D., Professor of Botany in the University of Texas; other Members of the Council: H. L. Hilgartner, M.D., Austin; J. C. Nagle, M.A., M.C.E., Professor of Engineering in the Agricultural and Mechanical College of Texas, and T. U. Taylor, M.C.E., Professor of Applied Mathematics in the University of Texas.

F. W. S.

DISCUSSION AND CORRESPONDENCE.

EPITROPISM, APOTROPISM AND THE TROPAXIS.

IN an article published in SCIENCE for July 13, 1900, entitled 'The Structure and Signification of Certain Botanical Terms,' I mentioned epitropism, apotropism and tropaxis as among terms of that kind which I had long personally used but never before published. The following notes illustrate the manner in which I originally used them in my college lectures and, in rewriting them, I have found it convenient to retain in part their original didactic style. It is not my present purpose to compare my method of treating this subject with the methods of other writers, and I shall therefore not refer to them.

The archetype, or elemental form, of every highly organized plant, especially every phenogam, is a simple erect shaft, which becomes the main shaft of the mature plant. As the main shaft increases in growth from the plantlet secondary shafts spring from it, those from