ignore the water altogether. Consequently the identity of freezing-point depression and solubility laws is seldom made apparent to the student; he is taught the same fact twice under two different names.

When hydrogen chloride HCl is dissolved in water H_2O, two substances which do not conduct the electric current separately give a solution which is an excellent conductor. We "explain" this by assuming that the hydrogen chloride HCl is split up, or ionized, into positively charged H^+ and negatively charged Cl^-, and that the migration of those ions towards the electrodes accounts for the conductance. Why, in a mixture of HCl and HOH, two substances with perfectly similar characteristics, should one be active and the other quite inert? Simply because we are so familiar with water (or think we are) that we do not trouble to take it into consideration. Suppose we lived in a world in which another liquid, say sulphuric acid, was the familiar reference liquid, and suppose that in this world an ingenious chemist discovered a hitherto unknown substance, water. He would put a little of it into the practically non-conducting solvent, 100 per cent. H_2SO_4, and would decide that the solution was an excellent conductor. This would apparently justify the announcement in the scientific press that the new compound HOH was highly ionized in a solution—a typical strong electrolyte—a very polar substance—almost completely broken up into H^+ and OH^-. Yet the chemists of another world, in which acetic acid was the reference liquid, would agree that water was a weak electrolyte, and those of a third world, in which ethyl alcohol was supreme, would call it a non-electrolyte.

Evidently, to develop a consistent theory of conducting solutions, we have again to insist on the equality of solvent and solute. We can not obtain a true conception of ionization, either by the classical theory of Arrhenius or by the more recent theory of Debye, unless we consider the two components of a conducting solution impartially. A theory of ionization has been presented by Werner, indeed, which goes to the opposite extreme, regarding water as the *only* substance which ionizes directly in aqueous solution. This theory is just as good as the currently accepted view, and leads to the same mathematical conclusions.

That the study of systems in a non-aqueous environment will certainly develop results of great significance in chemistry has been shown by the excellent work of Franklin and his coworkers on reactions in liquid ammonia. That the closer study of water itself will open up new avenues of advance has been clearly indicated by the remarkable work of Baker on systems from which the last minute traces of water have been removed. Instead of being a substance which can be neglected, water is perhaps the most reactive of all substances. When we cease to abuse it and recognize its proper importance, a new and more general chemistry of solutions will be born.

JAMES KENDALL

NEW YORK UNIVERSITY

FRANK W. VERY

WITH the death of Frank Washington Very on November 23, 1927, there ended the earthly career of an active investigator in the fields of astrophysics, meteorology and aerodynamics. Born in Salem, Mass., in 1852, the son of Washington and Martha (Leach) Very, he specialized in chemistry at the Massachusetts Institute of Technology and received his degree of bachelor of science there in 1873. He entered the field of astronomy and became first assistant at the Allegheny Observatory, 1878–1895, under the direction of Dr. S. P. Langley; was professor of astronomy at Western University, Pennsylvania, 1890–1895, and director of Ladd Observatory of Brown University, 1896–1897. Afterward he was engaged in researches on astrophysics and other allied sciences at Westwood, Mass. In 1893 he married Portia Mary Vickers, of Glenshaw, Pa., and there survive five children, Arthur, Ronald, Mrs. E. R. Brown, Mrs. A. C. Bartlett and Miss Marjorie Very. Very was a pioneer in several fields of science and loved the work of the pioneer.

He was a man of great originality and had an intense enthusiasm in the pursuit of knowledge. His activities in science covered a wide range of subjects. He assisted Langley for ten years in his epoch-making work in astronomy and in the aerodynamic studies on which Langley based his model flying machine weighing 25 pounds which successfully flew over the waters of the Potomac. He assisted Frank W. Bigelow in the preparation of his books on the thermodynamics of the atmosphere and cooperated with Percival Lowell in his studies of the atmospheres of the planets. In 1900 he was at work with radio experts in devising a system of signals for our weather bureau by means of which information from vessels at sea might be received by radio then in its early stages. He also assisted Dr. Williams in the study of the application of X-rays to medical practice. At the same time he was carrying on a large amount of original work on his own account. Probably his greatest contributions to science were his studies of the moon's surface temperature and his studies of the absorption of heat by our atmosphere, each of which filled a large volume when published. The last was published as "Bulletin G" by the United States Weather Bureau in 1900. By ingenious methods he

applied the bolometer, invented by Langley, to the problem of lunar temperatures and showed that at lunar midday the moon's surface, unprotected by an atmosphere, rose to a temperature exceeding that of boiling water, while at night the temperature fell far below the freezing point.

This was the pioneer effort in the measurement of the surface temperatures of the moon and planets which have since been carried on so successfully by Slipher, Coblentz and others. Our knowledge of the absorption of solar heat by our atmosphere, in spite of the large amount of work on its investigation, is still largely undeveloped, so that Very's work stands to point the way to others.

Very was of a philosophical temperament and he was never so happy as when speculating on the great problems of the universe. His conclusions were frequently out of the ordinary beat and there were sometimes developed sharp differences with his fellow investigators, but he amiably took these differences as part of what was to be expected in life and went on uninterruptedly with his tasks.

He was profoundly impressed by the contributions of Swedenborg to philosophy, science and religion and during the last years of his life was engaged in explaining these contributions in the language of modern science.

His task in life was to enlarge the boundaries of human knowledge and to show that there was no conflict between science and religion. He worked with these ideals ever in view.

H. H. CLAYTON

CANTON, MASS.

SCIENTIFIC EVENTS

BUILDING PROGRAM OF THE U. S. DEPARTMENT OF AGRICULTURE

THE plans for the building program for the U. S. Department of Agriculture in Washington were announced by the Treasury Department on November 16, according to a statement in the *Official Record* of the department. They indicate that when the whole program is completed the Department of Agriculture will be housed in one of the largest office structures in the world. Bids were opened on December 8 for the excavation work for the building, which will connect the present east and west wings. This unit will be the first to be built under the plans. The Department of Justice is arranging for condemnation proceedings for the acquisition by the government of the first of three squares of private property which eventually will be occupied by the structure. These three squares are those between B and C Streets and between Fourteenth and Twelfth Streets, S. W.

The plans call for an extensible building, one that may be added to indefinitely according to requirements for space in the future. The unit that is to be built first, the one filling in between the present east and west wings, will complete the façade on the Mall. B Street will not be closed. On the south side of B Street, immediately and symmetrically behind the marble structure in the Mall, will be a five-story unit more than 1,000 feet long over all from east to west. Behind this unit other units will be built as time goes on as the need for more space requires. The extensible building will follow a gridiron scheme with an axis perpendicular to the center of the administration unit in the Mall.

The extensible building will run from Fourteenth Street to Twelfth Street. Eventually Linworth Place and Thirteenth Street between B and C Streets will be closed and the space occupied by the buildings and its courts.

Although the extensible building will be less monumental in nature than the administration building in the Mall, it will have a north façade along B Street of impressive dignity.

The new central unit connecting the present wings is to cost not more than $2,000,000, and the congress has appropriated $400,000 toward this particular part of the program. For the total cost of site and construction of the extensible building south of B Street congress has authorized a total expenditure of $5,750,000 and has already appropriated $1,200,000 of this amount.

The new unit which is to join the wings is to be about 176 by 170 feet on the ground and that unit of the extensible building which will be built first will be 241 feet by 483 feet on the ground.

GUIDE-LECTURE TOURS AT THE FIELD MUSEUM

BEGINNING on December 1 a new system of guide-lecture tours was instituted at the Field Museum of Natural History, according to an announcement by D. C. Davies, director of the museum.

These tours, a service for which no charge is made, are designed to aid visitors with a limited amount of time at their disposal to find easily and enjoy the best exhibits among the institution's large collections from all ages and all parts of the world, and to assist persons interested in particular subjects to get the most out of the exhibits illustrating those special subjects.

Under the new plan there will be every Thursday, starting at 11 a. m. and 3 p. m., two general tours touching the important exhibits of all four departments of museum exhibits—anthropology, botany,