

CURRENT EVENTS

SESSION IN HONOR OF THE CENTENARY OF THE BIRTH OF S. A. ARRHENIUS

On May 21, 1959, the Academy of Sciences of the USSR, the Division of Chemical Sciences, the Institute of Electrochemistry, the Institute of Electrochemistry, the Institute of Physical Chemistry, the Institute of the History of Science and Technology, and the Society for Cultural Relations between the Soviet Union and Sweden held a session in honor of the centenary of the birth of the eminent Swedish scientist Svante August Arrhenius. In his introductory address, Academician N. N. Semenov said: "S. Arrhenius belongs to that select group of great scientists who, at the end of the last and the beginning of the present century, laid the foundations of modern science. Such scientists are the pride of their own people, and at the same time belong to all mankind. The cultural relations between our peoples, which have blossomed forth so abundantly in recent years, have deep historical roots in the distant past. Foremost Russian people have always been interested in Swedish science and literature.

"The name of Arrhenius is associated with the creation of the theory of electrolytic dissociation and with the introduction of the concept of activation energy into the theory of chemical reactions. In their time, these were indeed revolutionary ideas, and their introduction into science made it possible to understand many areas that were previously not understood and showed the way to the discovery of new areas. Even today, Arrhenius's teaching concerning uni- and bi-molecular reactions and their specific activation energies forms the basis of chemical kinetics.

"For the creation of fundamental new ideas that initiated the remarkable progress of science we are indebted to such great scientists as Mendeleev, Butlerov, Pavlov, Einstein, Curie, Thomson, Rutherford, Bohr, Arrhenius, van't Hoff, Boltzmann, Helmholtz, Gibbs, and Langmuir. The rate of progress in science and technology has now reached unprecedented levels, and a real scientific and technical basis has been laid for the achievement of general material welfare and security. This highly humanistic function is an inspiration for scientists.

"Our people, led by the Central Committee of the Communist Party of the Soviet Union, is striving for the general welfare and the maximum satisfaction of all material and spiritual needs. We should like to enter into competition with the peoples of other countries in the raising of prosperity on the basis of mastery of the forces of nature. The main obstacle is the threat of war, the threat of applying the conquests of science not for the people's good, but against the people's interest. Soviet people deeply respect and value the peaceful policy of neutrality conducted by S. Arrhenius's fatherland Sweden, the Swedish people, and its government."

Academician A. N. Frumkin gave an address on "S. Arrhenius and Modern Electrochemistry". He discussed the theory of electrolytic dissociation as the basis for the understanding of the whole behavior of solutions, the necessity for taking account of the part played by the solvent in the explanation of the existence of dilute solutions of electrolytes and the role of physical and chemical factors in the dissolution of electrolytes. A. N. Frumkin states that in Arrhenius's time the center of the attention of scientists was the study of dilute solutions, and later it was the study of the crystal lattices of solids, their structures, and their defects. The main attention is now given to the macromolecular compounds, proteins; but for the understanding of proteins in living organisms a knowledge of their interaction with electrolytes is essential.

Yu. I. Solov'ev, Doctor of Chemical Sciences, discussed the main features of the life and scientific activity of S. Arrhenius. He gave a biography of the scientist and described the outstanding investigations which led to his creation of the theories of electrolytic dissociation and activation energy, and also to the working out of various problems of moment in astrophysics, cosmology, and biochemistry. On the basis of new archival material obtained by Yu. I. Solov'ev from the S. Arrhenius Archives in Stockholm, it was shown that Arrhenius had close scientific

relations with Russian scientists (I. A. Kablukov, V. A. Kistyakovskii, P. N. Lebedev, P. P. Lazarev, and many others). The paper gave a picture of S. Arrhenius's charming personality: he was not only a great scientist, but also a remarkable man and citizen.

FROM THE COMMISSION ON CHEMICAL THERMODYNAMICS
OF THE DIVISION OF CHEMICAL SCIENCES OF THE ACADEMY
OF SCIENCES OF THE USSR*

The Commission on Chemical Thermodynamics of the Division of Chemical Sciences of the Academy of Sciences of the USSR points out that in the results of thermal measurements made by different authors (the material under consideration consists both of original experimental investigations and also of tables of various kinds, empirical relationships, and other material in which data from the literature are used) there is no agreement on the units of measurement. In the great majority of cases authors express their results in calories, though there is rarely any indication of what calorie is used as unit of measurement and what relation it has to the absolute joule.

The cause of this lack of agreement probably lies in the fact that, while Order No. 56 of the Committee on Measures and Measuring Apparatus of April 13, 1948, stated that the unit of measurement of any kind of energy must be the absolute joule, OST/VKS⁶²⁵⁹ still remained in force, and this named the twenty-degree calorie as the standard unit for the measurement of thermal quantities in the USSR. This State Standard was replaced only in 1957 with the introduction of GOST 8550-57, which stated that the unit for the measurement of thermal quantities must be the absolute joule and the calorie can remain only as a secondary unit for use outside the system. The definition of the calorie consists only in its relation to the absolute joule. The nonagreement in units of measurement referred to above introduces great inconvenience in the comparison of the results of different authors and is the cause of many misunderstandings.

To remove this nonagreement and to unify the units, the Commission recommends that all authors be guided by the following principles in their publications. In all published results the unit of measurement must be the absolute joule. The expression of results in calories is permissible, but it is imperative that in each publication the relation of the calorie adopted in that particular work to the absolute joule should be stated. As regards the relation of the calorie to the absolute joule, the Commission considers that, depending on the character and purpose of the measurements, one of two values must be adopted for this relation: a) 1 cal = 4.1868 abs. joules, adopted by GOST 8550-57 and coinciding with the values adopted for the "international calorie" for tables of the properties of steam by the Fifth International Conference on the Properties of Water and Steam (London, 1956); b) 1 cal = 4.1840 abs. joules, which is a recalculation to absolute joules of the constant adopted in 1934 (1 cal = 4.1833 international joules) by the Thermodynamic Commission. The relation 1 cal = 4.1840 abs. joules is now in wide use in many countries of the world for the expression of the results of investigations on thermochemistry and chemical thermodynamics.

The Commission must point out that, since the main unit of measurement, the absolute joule, has been established precisely, the choice of one or other coefficient for the relation of the extra-system unit, the calorie, to the fundamental unit, the absolute joule, is no longer of fundamental importance and must be based only on considerations of practical convenience. From this point of view, the second relation (1 cal = 4.1840 absolute joules) is to be preferred for the expression of the results of investigations on chemical thermodynamics for the following reasons: a) in numerous published investigations, monographs, reference books, and other publications this relation is already in use, though sometimes without clear indication that this is so; b) when the relation 1 cal = 4.1840 absolute joules is used, the results can be compared with the results of the great majority of foreign investigations without recalculation.

* Adopted at a Session of the Commission on Chemical Thermodynamics, April 20, 1959.