width, made up of sedimentary rocks of early Paleozoic age; these rocks and their relations to the mountains behind them formed the major study of the expedition.

The rocks in places are rich in the fossilized remains of small sea animals which serve to date the strata, and the collecting of these fossils engaged the special attention of Messrs. Dunbar, Leith and Morris, while Mr. Ingerson studied the great masses of igneous rocks that were thrust up through the older rocks at Bonne Bay and around the Bay of Islands as a result of disturbances deep within the earth's crust. At Cow Head the party studied the extraordinary Cow Head conglomerates, with blocks of all sizes up to 600 feet in length, the largest of the kind known anywhere. From Labrador they brought back to Peabody Museum specimens of the reefs made by the "Archaeocyathinae."

THE LANGMUIR AWARD OF THE AMERICAN CHEMICAL SOCIETY

DR. FRANK HAROLD SPEDDING, instructor in chemistry at the University of California, was presented with the Langmuir Medal of the American Chemical Society for his research on the structure of the atom, at the eighty-sixth meeting of the society, held in Chicago from September 10 to 15. Dr. Spedding addressed the Division of Physical and Inorganic Chemistry on "Energy Levels in Solids."

The prize was established by Dr. A. C. Langmuir, brother of Dr. Irving Langmuir. It provides for "recognition of the accomplishment in North America of outstanding research in pure chemistry by a young man or woman, preferably working in a college or university." To be eligible for the award, "a candidate shall not have passed his thirty-first birthday." "Outstanding research" is construed to mean work of unusual merit for an individual standing on the threshold of his career. Dr. Charles L. Reese, president-elect of the American Chemical Society, was chairman of the committee on the Langmuir Award. Other members were Professor Arthur E. Hill, New York University; Professor Hobart H. Willard, University of Michigan; President James Bryant Conant, Harvard University; Professor Harold C. Urey, Columbia University; Professor Homer B. Adkins, University of Wisconsin, and Dr. John Johnston, director of research for the United States Steel Corporation.

The committee has issued the following account of the work for which the award has been made:

Beginning his research in collaboration with Dr. Simon Freed and continuing alone, and with other collaborators, Dr. Spedding has, by extensive experimental and theoretical investigation, opened a wide new field of spectroscopy, which is of the utmost importance in the understanding of the chemical and magnetic properties of the rare earths.

In this extremely difficult study of the many lines in the absorption spectrum of crystals at temperatures ranging from room temperature to the temperature of boiling hydrogen, the first important result was that obtained with samarium. It had already been supposed, from the magnetic behavior of samarium, that it exists in more than one state, the relative amounts varying with the temperature.

This was confirmed, and from a study of the intensities of the absorption lines at different temperatures, it was possible to calculate the relative amounts in the different states and their difference in energy.

The next important subject dealt with in these researches was the study of intermolecular electric fields, concerning which much information has been obtained by studying the shift in the spectral lines caused by the substitution of one salt of gadolinium for another. This information was further advanced by a study of crystals with different types of symmetry.

It was next attempted to study the absorption spectrum of crystals of the rare earths salts in a magnetic field, and it was found possible to obtain what is known as a Zeeman effect, and a Paschenback effect, which has been of the greatest service in classifying the spectral lines, and interpreting the exact spectroscopic definitions of the normal and excited states of the elements of the rare earths.

A study of aqueous solutions of salts of the earths was then carried on, in which evidence was obtained of the orientation in the coordination zone of hydrated ions in solution. The study of the spectrum of light reflected from powdered crystals was then undertaken and led to several curious and at first mysterious phenomena, which have since been fully explained.

The result of all these investigations carried on by Dr. Spedding and his collaborators is that the interpretation of the spectroscopic terms in solid crystals is now reaching the same degree of completeness as that obtained in the study of gaseous spectra.

It is well known that the study of the spectra of gaseous substances gives very definite and detailed information concerning the structure of the atom in the gaseous state. It has, however, been very difficult to get any definite information regarding the solid state. For this reason the spectra of rare earth compounds obtained by Dr. Spedding are of great importance. The sharpness and amount of detail in these spectra are really quite extraordinary and the information that they are capable of giving is therefore extensive.

The important contribution of Dr. Spedding has been, however, to the interpretation of such spectra. It is quite true that spectra of certain solids like this have been known in more or less extensive form for a number of years, but it is only recently that any progress has been made in their interpretation and in this work of interpretation Dr. Spedding has played a leading part.

OBITUARY

DR. ARTHUR POWELL DAVIS, consulting civil engineer, living at Oakland, California, past president of the Society of Civil Engineers and director of the