

diseases. While a definite program has not yet been developed under the foundation, it is said that the first efforts would be made against Bright's disease and heart disease.

ANNOUNCEMENT has been made by the University of Chicago board of trustees of the following subscriptions for the endowment of the Frank Billings Medical Clinic: From Mr. Samuel Insull, \$25,000; Mrs. C. K. G. Billings, \$10,000; Mr. Charles A. Monroe, \$5,000; Miss Margaretta E. Otis, \$5,000; Mr. John W. Fowler, \$3,000; Mrs. Howard H. Spaulding, \$3,000; Mr. John T. Llewellyn, \$2,000; Mrs. Theodore Sheldon, \$2,000; Mr. Walter S. Brewster, \$1,000; Mr. William S. Hay, \$1,000; Mr. George M. Reynolds, \$1,000; Mr. George E. Scott, \$1,000; Mr. and Mrs. William H. Rahmann, \$600; Mr. Charles E. Field, \$200; Mr. Thomas Meighan, \$100, and Mr. R. H. Ritchie, \$100. A total of \$328,723 has already been received for the fund.

THE research ship *William Scoresby*, after being refitted, has left Portsmouth, England, on another cruise to the Antarctic. She returned from a similar expedition a few months ago. The first port of call will be St. Vincent, and the ship will then proceed by way of Rio de Janeiro and the Falkland Islands to the Antarctic. Commander De La Motte is in charge of the ship, and the trip is expected to last twelve months. The *William Scoresby*, which was built to work in conjunction with Shackleton's *Discovery*, is 180 feet long, of about 700 tons and is equipped with the latest scientific apparatus.

THE late Harry W. Loos has bequeathed a fund amounting to approximately \$3,500,000 to Kansas City to be devoted to such charitable, hospital, educational, scientific, literary or research purposes as may be in the public interest.

UNIVERSITY AND EDUCATIONAL NOTES

GEORGE WASHINGTON UNIVERSITY announces receipt of the Isabella King endowment of \$30,000 for the establishment of a fellowship or fellowships for special research in biology. The income from this endowment will be available in 1928-29.

DARTMOUTH COLLEGE has received a gift of \$300,000 for a new fine arts building from Frank P. Carpenter.

THE National School of Medicine and Pharmacy, Port au Prince, Haiti, recently dedicated its new building. On the first floor are five classrooms, an assembly room, a dental department, a store room and an office for the dean. There are five laboratories on

the second floor for the medical sciences. The Rockefeller Foundation made an appropriation of \$30,000 for equipment and of another \$30,000 for fellowships for men who are to be trained for positions on the faculty of the medical school. These fellowships have been awarded and the physicians are to study in Paris, Strasbourg, Ann Arbor, Boston, New Haven, Chicago, then return to Haiti to become members of the faculty.

AN offer by the joint committee of the Paviers' Company and of the Institution of Municipal and County Engineers to establish a part-time chair of highway engineering in the University of London for post-graduate students has been accepted.

DR. FRANK J. GOODNOW, president of the Johns Hopkins University, has offered his resignation to the board of trustees, to be effective not later than July 1, 1929.

DR. WILMER KRUSEN, director of the department of health and recently elected president of the Philadelphia College of Pharmacy and Science, formally assumed his new duties as president of the school on January 3.

DR. JOSEPH S. CHAMBERLAIN, professor of organic and agricultural chemistry, has been appointed head of the department of chemistry of the Massachusetts Agricultural College. Dr. J. B. Lindsey, formerly head of the department, resigned from this position and is continuing his work as head of the department of plant and animal chemistry of the experiment station, in which work he has been engaged for the past thirty-seven years.

DR. FRANK B. MALLORY, pathologist of the Boston City Hospital, has been appointed professor of pathology at the Harvard Medical School.

DR. E. DAVID FRIEDMAN has been appointed professor of neurology and head of the department at the University and Bellevue Hospital Medical College.

DISCUSSION AND CORRESPONDENCE

THE PROPOSED TRANSFER OF GEODETIC WORK OF THE U. S. COAST AND GEODETIC SURVEY

IN connection with House Resolution 7480, introduced in the House of Representatives by Mr. Sinnott on December 15, 1927, my attention has been called to a circular letter containing unfavorable comments upon this measure, and several scientists interested in our work have written me requesting more specific information. These comments state that the proposed transfer could be justified only on one or more of three suppositions:

First: "That the Coast and Geodetic Survey is not doing the work properly." There is no basis for this supposition. Foreign geodesists allude to the Coast and Geodetic Survey as the foremost geodetic institution in the world, and I concur most heartily in this opinion.

Second: "That the Geological Survey can do the work better." Of course the Geological Survey can not do it better, for we all believe that the work of the Coast Survey is of the very highest quality, but I do believe that the Geological Survey can do it just as well if we can continue to have the cordial cooperation that we have received from the Coast and Geodetic Survey in the past. The circular letter states that the Geological Survey has never done any first order triangulation and traverse and has done no first order leveling for many years. This statement is unfortunate. The facts are that we have done first order triangulation and leveling, but have not done any in recent years because we have felt that it would be a duplication of effort, inasmuch as the Coast Survey was already engaged on similar work. Until recent years the Coast Survey planned a great deal of its first order work to meet our mapping needs, but since the world war it has confined its activities very largely to the program of covering the entire country with these first order arcs or circuits without much attention to the mapping program, except as we have transferred money for specific jobs. Up to recently I think this program has been a wise one, but the adjustment of the western arc of triangulation and a large part of the basic level network have been made and my associates feel that a large part of the first order control work to be executed in the future should be planned to meet the immediate needs of the topographic mapping program.

Third: "That a better theoretical organization can be secured by the transfer." The circular letter states that the Coast and Geodetic Survey is the only purely surveying bureau in the government, while the Geological Survey primarily is concerned with geological investigations. An analysis of our topographic mapping operations during the past seven years will show that only a small percentage of the topographic work has been executed to meet the immediate needs of our geologic program, but that our topographic mapping has been planned rather to meet the general engineering and scientific needs of the country. The circular states that the interior geodetic work has been planned to meet the requirements of the Geological Survey. This is not an entirely correct statement, but if it is true that the primary reason for conducting the interior geodetic work is to provide adequate control for topographic mapping, I am confident that it can be coor-

dated and performed more expeditiously and economically if it can be administered by the same organization that is charged with the topographic mapping.

I have been informed that the real reason for the circulation of the unfavorable comments is that a number of scientists are concerned with the effect of the proposed transfer upon the results now being secured in the study of earth movements in California, through the cooperation now existing between the Coast and Geodetic Survey and the scientific organizations interested in seismology in California. If the authorization and appropriation for precise triangulation and leveling and seismological observations in regions subject to earthquakes were transferred to the Geological Survey, we should hope to continue to cooperate just as the Coast Survey is now doing. In fact, during the next two years of the program we would probably arrange to have the work continued by personnel detailed from the Coast Survey, as is provided in the bill.

The bill was initiated by the Secretary of Commerce, who several years ago had stated that he would transfer the geodetic work of the Coast Survey to the Geological Survey as soon as he had authority by law. At the hearings before the joint committee on reorganization of the executive departments, both the Secretary of Commerce and the Secretary of the Interior indorsed this proposed transfer.

The present bill was drafted jointly by the two departments and was transmitted to congress with a letter of indorsement signed by the two secretaries. This letter brought out the fact that the primary function of the Coast and Geodetic Survey is to produce nautical charts, while one of the primary functions of the Geological Survey is to produce the standard topographic map of the United States. Geodetic surveys for the control of our coast lines were started by the Coast Survey in the early days of that organization, and later when the need for similar control in the interior of the country was manifest, the Coast Survey extended its geodetic work into the interior. Geodetic control is essential for topographic mapping, and the principal purpose of the geodetic work of the Coast Survey in the interior has been to furnish the control needed by the Geological Survey for its mapping activities. The letter stated that this divided responsibility for the production of the topographic map is fundamentally unsound, and that one agency should be charged with every step in the project.

The proposed bill meets with my hearty approval for the following reasons: The topographic work of the Geological Survey has been planned with the fundamental idea of making as much progress as possible toward the ultimate completion of the mapping program. The interior geodetic work of the Coast Sur-

vey has been largely confined to the extension of control to cover the entire country with large arcs or circuits of precise work. Much of this work is being extended over areas already topographically mapped, and such work as the Coast Survey has done in recent years for immediate use in mapping has been actually paid for by transfer of funds from the Geological Survey. While much duplication of effort of the two bureaus has been eliminated through the cordial cooperation that exists, still there is considerable divergence of policies and plans and there is not that degree of coordination which must exist in order that a comprehensive program may be prepared and executed in the most effective way.

Publication of geographic positions and spirit level elevations should be standardized in one organization. The geodetic work should be planned to meet the immediate needs of the mapping program, and often the same geodetic field party should do the precise work and follow immediately with the secondary control now executed by the Geological Survey. A substantial saving of overhead expense in field and office operation and in the procurement and use of equipment would be effected if the transfer were made.

GEO. OTIS SMITH,
Director

UNSTABILITY AT THE ABSOLUTE ZERO OF TEMPERATURE

It has been shown by the writer (*J. Phy. Chem.*, 31, 747-756 (1927)) that a substance or mixture in the condensed state under its vapor pressure at the absolute zero of temperature T has zero controllable internal energy and entropy. With this as basis the writer has calculated the internal energies of a large number of the elements, which are given in a paper just published (*J. Phy. Chem.*, 31, 1669-1673, 1927). The largest and smallest values obtained were 1,535 and 1,037 cal./mol. for lead and iron respectively. Since G. N. Lewis has already calculated the entropies of these elements, it was possible to calculate also their free energies, the largest and smallest values being -2,791 and -750 for lead and chromium respectively.

An interesting point presented itself in these investigations. If a substance is lowered in temperature to the absolute zero it may not finally be in a condensed and vaporous phase at zero pressure. A further change at $T=0$ will therefore have to take place before its internal energy is zero. Now it has also been shown by the writer (*J. Phy. Chem.*, 31, 940, (1927)) that the adiabatic of zero entropy corresponds to $T=0$. It follows from this that a change in internal energy at $T=0$ appears as external work. Hence under these conditions a substance will become

unstabled at $T=0$ and exert a pressure. On allowing the substance to expand doing external work it will finally end in the condensed state under zero vapor pressure, when its internal energy is zero. It was shown in the paper mentioned that white tin should behave in this manner at $T=0$, and develop while expanding to become stable an average pressure of about 3,000 atmos. Thus certain substances may act like an explosive at or near the absolute zero of temperature.

This result has an interesting astronomical aspect. Dark bodies in interstellar space which are losing more heat than they receive eventually sink in temperature to near the absolute zero, and then may possibly get unstable and explode. This may conceivably happen to our moon some day if it radiates more heat than it receives, and has compounds in its composition possessing this property.

R. D. KLEEMAN

SCHENECTADY, N. Y.

THE THEORY OF "VISIBLE RADIATION FROM AN EXCITED NERVE FIBER"

IN a recent article in *SCIENCE*,¹ Mrs. Christine Ladd-Franklin gave an exposition of the phenomenon of the reddish-blue arcs and of her interpretation in terms of visible radiation from the excited nerve fiber. A foot-note in this article gives a reference to a paper of mine, and in the same foot-note Mrs. Ladd-Franklin describes an observation of her own and gives her interpretation. To the casual reader it might easily appear that the observation and opinion are quoted from my article. To avoid any such misinterpretation I wish to go on record as disagreeing absolutely with Mrs. Ladd-Franklin's interpretation of the reddish-blue arcs and the other phenomena which she cites. I do not believe that the evidence compels us to assume visible radiation from excited nerve fibers. The explanation set forth by Amberson² and others, based on secondary excitation by the action currents of the nerve fibers, seems quite adequate and requires less violent efforts of the imagination.

Mrs. Ladd-Franklin's point concerning the "place coefficient" of the sensation is sound, and we must agree that the secondary excitation is in rod, cone, bipolar cell or ganglia—not in the nerve fiber; but her argument against electrical excitation of one of these elements is unconvincing. Electric stimuli applied to the eye externally may give the sensation of light without a residual image, and this we may

¹ Christine Ladd-Franklin, 1927. *SCIENCE*, lxi, 239.

² Amberson, W. R., 1924. *Am. Journ. Physiol.*, lxi, 354.