Mrs. Charles H. Stoll, photographer. The party proposes, after exploring Alaska and the Aleutian Islands, to arrive at Petropavlovsk, Kamchatka, on June 1, on board the ship *Morrissey,* commanded by Captain Bartlett. After Kamchatka the party will proceed to the Gulf of Anadir and then through Bering Strait to the mouth of the Kolymia River.

ACCORDING to *Industrial and Engineering Chemistry,* invitations have been received by the executives of large American chemical companies to attend an international nitrogen conference in the Adriatic, beginning April 30. The invitations were issued by the following, who comprise the largest nitrogen producers of Europe: Comptoir Français de l'Azote, Paris; Montecatini Societa Generale, Milan; Nitram, Ltd., London; Norsk Hydroelektrisk Kvaelstofaktieselskab, Oslo, and Stickstoff-Syndikat, G. M. B. H., Berlin. The scope and objects of the meeting will be to put on record the knowledge which has been gained since the conference held at Biarritz last year in regard to fertilizers in their relation to agriculture and to afford opportunity for discussion. Papers will be presented by J. Bueb, F. C. O. Speyer, L. Bretigniere, H. Warmbold, Sir Frederick Keeble, A. Demolon, Erwin Baur, H. J. Paige, T. H. J. Carroll and J. Galland.

UNIVERSITY AND EDUCATIONAL NOTES

THE cornerstone of the William H. Welch medical library at the Johns Hopkins University School of Medicine has been laid by the president of the university, Dr. Frank J. Goodnow, who placed in the stone a copper box containing correspondence between Dr. Welch, the university and the General Education Board, whose financial help made the library possible.

IMMEDIATE construction of a new chemistry building to cost $350,000 has been authorized by the board of trustees of the University of New Hampshire. The establishment of a department of agricultural economics in charge of M. Gale Eastman has also been authorized.

THE *Journal* of the American Medical Association records the appointment of Dr. Stuart Graves, of Louisville, Ky., as dean of the school of medicine of the University of Alabama to succeed Dr. Clyde Brooks, who has been appointed chairman of a newly created faculty committee on research, for which the last legislature made a special appropriation. The appointment of Dr. Graves is said to be the first step in a program to establish a four-year medical course at the university.

PROFESSOR A. B. COBLE, of the Johns Hopkins University, recently accepted a professorship of mathematics at the University of Illinois, where he had been prior to the present academic year.

DR. WILLIAM W. WATSON, assistant professor of physics at the University of Chicago, has been appointed assistant professor of physics at Yale University.

AT Princeton University, Dr. Herman Weyl, professor of high mathematics at the Eidenossischen Technischen Hochschule in Zurich, Switzerland, has been appointed to the Thomas D. Jones research professorship of mathematical physics. The following three members of the department of mathematics have been promoted from associate professor to full professor: James Waddell Alexander, Solomon Lefschetz and Joseph H. M. Wedderburn.

IN place of the existing department of philosophy and psychology at University College, London, a department of philosophy and a department of psychology have been instituted. Professor C. E. Spearman, now Grote professor of philosophy of mind and logic, will be head of the department of psychology, his title being changed to professor of psychology in the University of London.

DR. WERNER HEISENBERG, of the University of Copenhagen, has been appointed professor of theoretical physics at the University of Leipzig.

DR. DEBEYRE has been appointed successor to the late Professor Lanesse in the chair of histology at the University of Lille.

DISCUSSION AND CORRESPONDENCE

THE APPEARANCE OF INSTABILITY OF CONDENSED SUBSTANCES NEAR THE ABSOLUTE ZERO OF TEMPERATURE

IN a previous article in SCIENCE,[1] the writer called attention to the possibility of condensed substances becoming unstable and exploding under a high pressure at or near the absolute zero of temperature, and mentioned that *white* tin should behave in this manner. The criterion for the existence of such an instability is that if from external evidence it appears that the controllable internal energy of a substance can not lie below a certain value, and this can not be accounted for by integration of the specific heat down to the absolute zero of temperature, the substance

[1] LXVII, 1725, p. 69, 1928.

must become unstable at or near this zero and explode. Thus, for example, the heats of formation of mols of the substances H_2O, CH_4, NH_4 and CO_2 in the gaseous state from the elements C (graphite), H_2, O_2, N_2 are about 57,880, 18,300, 9,500 and 97,000 cal's, respectively, at room temperature. These heat energies are derived from the internal energies of the elements, which, if no instability occurs, are given by the integration of the specific heats down to the absolute zero of temperature with the final state being solid. But the internal energies of the foregoing elements obtained in this way by the writer (May number of the *J. Franklin Inst.*) are 45, 1,100, 2,980, 3,090 cal's, respectively, and are thus not sufficiently large to account for the heats of formation. It was also shown in this paper that the temperature at which instability begins is always above the absolute zero. Thus one of the elements of each of the foregoing compounds becomes unstable at a low temperature. But since the heat of formation of a compound is not likely to be derived from the internal energy of one of its elements only, each of the foregoing elements very probably becomes unstable at a certain temperature. Thus frozen solid masses of these elements in interstellar space are likely to explode when their temperatures have fallen below certain values.

If an external pressure is applied to such a substance to prevent the explosion, and the substance is then allowed to expand doing external work, a state will eventually be reached at which the pressure and the internal energy is zero.[2] The substance is now a modification of the original substance. In the case of *white* tin we have already seen that the modified form is *gray* tin. Such modifications at low temperatures of the elements mentioned should exist, but at present they are not known. The vapors of such elements in interstellar space near the absolute zero of temperature would tend to condense into the stable modifications, but the process would take place almost infinitely slowly.

R. D. KLEEMAN

SCHENECTADY, N. Y.

ETHYLENE IS A RIPENER OF FRUITS AND VEGETABLES

IN an article published in the *Journal of Industrial and Engineering Chemistry* (Vol. 19, p. 1135, 1927), Chace and Church decry the "wide publicity of the alleged ripening effect" of ethylene on certain green fruits. They state that the treatment of green bananas with ethylene in a concentration of 1–5,000 produced no acceleration of color or respiration increase, in opposition to the data which I have reported. It should be noticed that Chace and Church and Denny recommended concentrations less than 1 part of ethylene to 5,000 of air in the coloration of citrus fruits, whereas I have recommended 1 to 1,000 for the ripening of fruits at temperatures above 65° F. Chace and Church report no effect of ethylene upon the ripening of dates, and state there occurred "no material difference in composition between the treated and untreated fruits" of lemon. Denny had previously reported a marked action on the stimulation of respiration in lemons under ethylene treatment to produce coloration. It seems unreasonable that the respiration can increase and still produce no effect on composition of the fruits. The data reported by the authors simply show that these workers in the U. S. Department of Agriculture do not know the proper conditions for ripening fruits with ethylene.

An editorial in the *Scientific American* hastens to state that "the investigations carried out by Messrs. Chace and Church tend to disprove Dr. Harvey's conclusions." The statement that "these investigators have carefully studied the effect of ethylene on citrus fruits, dates, persimmons, bananas, tomatoes, pomegranates and avocadoes and find that while the color of the fruit is affected, none of the changes ordinarily connected with ripening are observable" is unjustified even by the article referred to. The effect of these publications is to bring under suspicion unjustly the process of ripening fruits with ethylene gas, a process which has been successfully used by hundreds of fruit jobbers to produce quicker ripening and a product of superior flavor.

The statement by Chace and Church that the use of ethylene on persimmons "will be of no use to the grower because they could not be shipped after ripening" is not to the point, for every fruit jobber knows the advantage of shipping fruits in the firm condition. The difficulty of ripening such fruits after shipment has been removed by the discovery of this process whereby they may be quickly ripened at destination. We should be able now to import fruits from the tropics which were not available before.

The ripening effect of ethylene on fruits and vegetables can be demonstrated easily by any one who is willing to carry out the simple instructions for the process, namely: the green fruit should be put into a reasonably tight chamber, the temperature should be preferably at 65° F. but may be higher in some cases, and the concentration of ethylene should be established at 1 cu. ft. for each 1,000 cu. ft. of air space. The gas may be renewed each day. The fruit should be so packed into the space that there is free air circulation and an abundant supply of oxygen to care for a rate of respiration which is much increased.

[2] *J. Phys. Chem.*, 31, 1669–1673, 1927.