THE University of Michigan Observatory has received a gift of $15,000, the income from which will be used for astronomical publications or research fellowships at the discretion of the director. The donors, Mrs. O. B. Wheeler and family, have made this gift as a memorial to Orlando B. Wheeler, formerly a member of the staff of the University of Michigan Observatory and subsequently engaged in the scientific researches of the U. S. Lake Survey.

DR. GEORGE VAILLANT, of the American Museum of Natural History, has returned from a preliminary archeological survey of Middle America, supported by Mr. Clarence L. Hay. He has obtained a permit from the Mexican government for excavations in the Valley of Mexico for next winter, political conditions permitting. At the invitation of the Carnegie Institution, Dr. Vaillant carried out a small excavation at their site of Uaxactun, Petan, Guatemala, that yielded important information on the early history of the Maya. He was enabled, through the courtesy of the Mexican government, to bring back a small synoptic collection of the "Archaic" cultures of the Valley of Mexico. He also visited a number of sites on the highlands of Mexico and Guatemala, as well as in British Honduras and the Petan district of Guatemala.

Nature reports that owing to the regulations governing the introduction of scientific films into Great Britain, the paper by Professor Rathjens on his explorations in Arabia had to be withdrawn from the program of the recent International Congress of Orientalists at Oxford. The Chancellor of the Exchequer has conceded that scientific films may be brought into England free of duty on a certificate from the Royal Society to the customs authorities that the film illustrates a scientific investigation. Notwithstanding the fact that Professor Rathjens on August 9, and the secretary of the congress on August 10, had made application to the commissioners of customs for the admission of the film, and application was addressed to the Royal Society for the desired certificate, the customs authorities were prepared to admit the film only on a deposit of the duty, £31, 10s., "to be refunded in the event of the film being certified by the Royal Society."

UNIVERSITY AND EDUCATIONAL NOTES

AN offer of approximately $3,500,000 has been made by the International Education Board to the University of Cambridge to provide for the development of physical and biological studies and for a new library.

GIFTS amounting to $500,000 and bequests of $1,830,000 to Columbia University have been announced. The bequests are payments on legacies made by the estates of F. Augustus Schermerhorn, Stephen Whitney Phoenix and Mary B. Pell. Mrs. Nathan J. Miller, of New York, gave $250,000 to endow a chair for the study of Jewish literature and history.

DR. M. C. TANQUARY has accepted an appointment as professor of entomology in charge of apiculture at the University of Minnesota.

DR. MILTON METFESSEL, for three years National Research fellow in psychology, has been appointed associate professor of psychology and phonetics in the State University of Iowa.

DR. ADRIANCE SHERWOOD FOSTER has been appointed assistant professor of botany at the University of Oklahoma. Dr. Foster has been working as a National Research fellow in plant anatomy at the University of Leeds, England.

DR. M. G. PETERMAN, of the Milwaukee Children's Hospital, has accepted the appointment of professor of pediatrics and head of the department of pediatrics at Marquette University School of Medicine, Milwaukee.

DR. FRED W. STEWART, recently assistant in pathology in the Rockefeller Institute, has become associate pathologist in the Cornell Medical College in New York and assistant pathologist at the Memorial Hospital for Cancer and Allied Diseases.

AT Swarthmore College, Dr. H. J. M. Creighton has been promoted to a professorship and made head of the department of chemistry. Dr. Duncan Graham Foster, of St. Stephen's College, has been appointed associate professor of chemistry. Dr. John H. Pitman has been promoted to an associate professorship of mathematics and astronomy.

DR. ERNEST CARROLL FAUST, director of the laboratory of parasitology of the Peking Union Medical College, Peking, China, since 1919, has taken up his new work as professor of parasitology in the department of tropical medicine of Tulane University, New Orleans. Dr. John F. Kessel, formerly associate in the Peking laboratory, is now associate professor of zoology in the University of California at Los Angeles.

DISCUSSION AND CORRESPONDENCE

DOES PURE IRON HAVE ALLOTROPIC TRANSFORMATIONS?

EXTENSIVE work on iron and iron-alloys led the writer to announce the following hypothesis before

the joint meeting of the Pittsburgh sections of the American Electrochemical Society and the American Institute of Mining and Metallurgical Engineers in January, 1925, but so far not otherwise published:

α-iron (body-centered cube) is the characteristic form of the iron crystal and can exist at all temperatures below the freezing-point.

α-iron can hold impurities such as carbon, oxygen, etc., in solution, the parasitic atoms occupying the interstitial spaces in the iron lattice, and the amount held in solution depending upon the temperature. If the amount exceeds the solubility for the particular temperature, the impurities may be precipitated, or they may cause the iron to change its modification to the γ state (face-centered cube) in which form it can hold a larger amount of impurities in solution.

The bases for this hypothesis are discussed in a paper now being prepared for publication, but they may be stated here briefly:

(1) All iron so far experimented with contains impurities to a greater or less extent, particularly carbon and oxygen. Electrolytic iron, extensively used for transformation point determinations, contains oxygen to the extent of about 0.4 per cent., and all such determinations are consequently made with iron more or less saturated with oxygen in solution. The lower the carbon content the higher is probably the oxygen content.

(2) The addition of silicon (a substitution atom in the lattice and a strong deoxidizer) to the extent of 1.5 to 2 per cent., eliminates the transformations from α- to γ-iron. This is a well-established fact. We have now found that the lower the carbon content the lower is the amount of silicon necessary to eliminate the transformations. Extrapolating to zero carbon content (or $C < 0.001$ per cent.) it seems logical to suppose that the amount of silicon necessary to eliminate the transformations should be zero in the absence of oxygen, *i.e.*, for pure Fe we should have no allotropic transformations.

Equilibrium diagrams based on the above hypothesis have been drawn and are not contradicted by present experimental evidence or by theoretical reasoning. Efforts are being made to produce samples of iron very low in carbon and oxygen that can be used in confirming or invalidating this hypothesis, and cooperation by others is invited, especially by those having first-class facilities at their disposal.

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WEATHER PREDICTION AND WEATHER CONTROL

THE recent disastrous hurricane will have made many men willing to listen to a discussion of the possibilities of weather control, and as an introductory to such discussion it is worth while, perhaps, to discuss the possibilities of greatly improved and extended weather forecasts.

Stated mathematically, the forecast problem is approximately as follows: Consider the data *a, b, c, d,* etc., which represent the state of the weather over an extended area at a given instant; these data would consist of, let us say, 10,000 separate quantities (temperatures, air pressures, velocities of wind, directions of wind and humidities; at various points on the ground and at various elevations). Consider the similar quantities *x, y, z,* etc., which represent the state of the weather after *t* hours, where *t* is of course specified. The first approximation to the actual behavior of the atmosphere is to assume that *x, y, z,* etc., are *linear* functions of *a, b, c,* etc., and *t,* and the constant coefficients are supposed to have been found for the various seasons of the year. Then the problem would be to solve the 10,000 simultaneous linear equations for the 10,000 unknowns, *x, y, z,* etc. This solution would be utterly impracticable unless Lord Kelvin's machine for solving simultaneous linear equations could be made to be practicable for 10,000 simultaneous equations, which is extremely doubtful. The "constant coefficient" could be determined by observing *x, y, z,* etc., at time *t.*

The above suggestion[1] is exactly equivalent to the laborious calculation which has recently been made by Louis F. Richardson,[2] who assumed certain linear differential equations as expressing the laws of motion of the atmosphere and found *x, y, z,* etc., by integrating these differential equations over time *t* starting from the given state *a, b, c, d,* etc. This was a labor of several months where *t* was only one day (24 hours)! That is to say, it took three or four months to calculate the weather one day in advance! Weather forecast by straightforward calculations seems to be impracticable—and it must be remembered that the straightforward calculation is based on assumed linearity.

A third method of forecast would be to let the weather be its own integrating machine! Suppose a very elaborate study of the weather over the United States were to enable us to classify general weather conditions as 1,000 type-series, each series being a succession of states extending over 20 days (the numbers 1,000 and 20 are taken for the sake of illustra-

[1] Made to the writer by Professor Norbert Wiener.

[2] "Weather Prediction by Numerical Process," Cambridge University Press, 1922.