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MEDALS OF THE NATIONAL ACADEMY OF SCIENCES[1,2]

MEDAL PRESENTATIONS: REMARKS BY THE PRESIDENT

ANNUALLY at this time presentation of medals and awards is made by the academy. These are bestowed by formal vote of the academy acting on the recommendations of special committees charged with the responsibility of administering the several trust funds.

Normally the occasion of the bestowal is at a dinner to which the academy invites a number of distinguished men and women to be guests. This year, because of the exigencies of war, the dinner is necessarily confined to the members and the medalists. Although, therefore, the setting for the presentations this evening lacks the brilliance of former occasions, I can assure our medalists that it lacks nothing in the esteem in which the academy holds them and their work.

To-night we have five medals to bestow. Two of them are governed by the same trust fund and under its terms are in recognition of distinguished work published in specific years. With some of the medals go monetary awards and diplomas. The medalists will be presented by the chairman or a representative of the trust fund committee which made the nomination to the academy.

The medals will be awarded in the order of establishment of the trust funds.

The first award is that of the Henry Draper Gold Medal to Ira Sprague Bowen, and the citation is: "in recognition of his contributions to astronomical physics; more especially his researches on the spectra and chemical composition of the gaseous nebulae." Dr. S. A. Mitchell will present the medalist.

The Draper Fund was established on April 13, 1883, by deed of gift from Mary Anna Palmer Draper ($10,000 and die), and the deed of establishment provides interest and income to be used for the medal to

[1] Meeting at Washington, D. C., April 26 and 27.
[2] The presentation of medals was made at the annual dinner, April 26.

be ". . . awarded and presented from time to time, but not oftener than once in two years, by the said National Academy of Sciences to any person in the United States of America or elsewhere—for original investigations in astronomical physics, the results of which shall be made known to the public. . . ." This is the twenty-sixth award of the medal.

The second award is that of the Alexander Agassiz Gold Medal and an accompanying honorarium of $300 to Columbus O'Donnell Iselin, II, and the citation is: "for his studies of the Gulf Stream system, for his leadership in the development of a general program of the physical oceanography of the North Atlantic, and for his distinguished direction of the activities of the Woods Hole Oceanographic Institution, both in peace and in time of war." Dr. Barbour will present the medalist.

The Murray Fund, which established the Agassiz Medal, was established on April 22, 1911, by letter and deed of gift from Sir John Murray of $6,000. In his letter Sir John Murray said, "I enclose you a cheque for $6,000 (£1,233) which sum I trust the National Academy will accept from me, for the purpose of founding an Alexander Agassiz gold medal, to be awarded for original contribution in the science of oceanography to scientific men in any part of the world, whenever and as often as the President and the Council may deem desirable." This presentation is the nineteenth award.

The Daniel Giraud Elliot Medal and award of $200 is to be given for the year 1935 to Edwin H. Colbert, who will be presented by Dr. Gregory, and for the year 1936 to Robert Cushman Murphy, who will be presented by Dr. Harrison. The Daniel Giraud Elliot Fund was established on April 17, 1917, by gift of $8,000 from Miss Margaret Henderson Elliot to carry out a testamentary provision in the will of her father, Daniel Giraud Elliot; the deed of gift stipulates: "One such medal and diploma shall be given each year . . . with any unexpended balance of income for the year . . . to the author of such paper, essay, or other work upon some branch of zoology or paleontology published during the year . . . etc." Award is made to Dr. Colbert in recognition of the high merits of his work, "Siwalik Mammals in the American Museum of Natural History," published in the *Transactions* of the American Philosophical Society in 1935. This presentation is the eighteenth award. The nineteenth award is made to Dr. Murphy in recognition of the high merits of his work, "Oceanic Birds of South America," published in two volumes in 1936.

The final award is that of the John J. Carty Medal and award for the advancement of science, for which the honorarium is $4,000 for this year to Edwin Grant Conklin. The citation is: "Zoologist, Cytologist and Embryologist; Philosopher, Teacher and Scientist; Student of life and of growth from lowliest beginnings to highest consummation." The medalist, who is the fourth to receive the award, will be presented by Dr. O. E. Buckley. The Carty Fund was established on November 13, 1930, by deed of gift from the American Telephone and Telegraph Company ($25,000) in recognition of the distinguished achievements of John J. Carty. The deed of gift stipulates a gold medal and monetary award ". . . for specific accomplishment in some field of science or for general service in the advancement of fundamental and for applied science." The award is to be bestowed without limitation as to race, nationality or creed of the individual sought to be honored, and the method of selecting a candidate is to be wholly at the discretion of the academy.

The medal and award are to be presented not oftener than once in two years and the award is to be substantially the net accumulated income from the fund since the time of the last award, after deducting a nominal cost of administration and the cost of the gold medal and one or more bronze replicas.

In addition to the fund, the dies for the medal and the cost of the first medal were presented to the academy by the eleven officers of the American Telephone and Telegraph Company associated with General Carty in the executive management of the Bell System.

My participation in the presentation of this particular medal to this particular recipient gives me great personal satisfaction. Both the man in whose honor the medal was established and to-night's recipient attained great eminence in science and, as men, each was a great admirer of the other, and in the thinking of each was something derived from his friend. For many years, I have been an admirer of both men.

For more than a quarter of a century, General Carty was my leader and my friend. From him I learned more of science and the ways of men than from all others together. It was my pleasure to have part in establishing the medal and award in his honor. The terms of the deed of gift are in consonance with both his catholicity of view as to all fields of science and all manner of men. It reflects likewise his unbounded confidence in the wisdom of the academy in administrating a trust through the years.

Carty was alive when the medal was established and the first draft of the deed of gift was submitted to him. He objected to it because it contained what he thought was a reflection of his known views. He insisted that the academy be given complete freedom in the years ahead to exercise its judgment unhampered in any way by the views or beliefs of a preceding generation.

I strongly suspect that in this he was influenced by his contacts with Dr. Conklin. I know that he would have derived great satisfaction in this award to his friend.

FRANK B. JEWETT

PRESENTATION OF THE HENRY DRAPER MEDAL FOR 1942 TO IRA SPRAGUE BOWEN[3]

MORE than three quarters of a century ago, Huggins, a former Draper medalist, found that the spectra of certain nebulae were composed of sharp isolated bright lines, thus proving that their luminous material is a glowing rarefied gas. Some of the lines were recognized as those of hydrogen, and later others were identified as due to helium and ionized carbon, oxygen and nitrogen, but nearly half of the nebular radiations, including the two strong green lines, could not be matched in any terrestrial source. These mysterious radiations were believed to indicate the presence in the gaseous nebulae of an unknown element "nebulium" and for more than sixty years the nature of "nebulium" remained one of the outstanding problems of physical astronomy with which the ablest spectroscopist had struggled and had failed. It was solved not by an astronomer but by a physicist, Professor Ira Sprague Bowen, of the California Institute of Technology.

Dr. Bowen's dramatic discovery of the nature of "nebulium" was the result of his brilliant analysis based as modern atomic theory, in which two factors contributed to his success. The first of these was the recognition by him that under the condition of extremely low density obtaining in the gaseous nebulae, radiation of energy could take place through transitions between metastable states. For these the mean life of the excited state is so long that even in the most rarefied laboratory sources, the energy is transferred to another atom by collision and no radiation occurs. The second contributing factor was that his laboratory investigations in spectroscopy carried on in collaboration with Millikan furnished the data which enabled him to determine the energy states for certain of the lighter elements known to be present in the nebulae. He found that the two strong green radiations and one in the blue could be accounted for by transitions between metastable states in doubly ionized oxygen. The familiar pair in the ultraviolet and a line in the red had a like origin in ionized oxygen while the strong red pair was due to similar transitions in ionized nitrogen. Thus "nebulium," the mystery of half a century, turned out to be the two elements forming the chief constituents of the air we breathe.

This initial success with the origin of the chief nebular lines was followed immediately by his identification of a number of fainter ones which had been recorded in the spectra of these objects. Later when opportunity offered, Dr. Bowen went to the Lick Observatory as Morrison research associate where he undertook a search for still fainter radiations emitted by the nebulae. Largely as the results of ingenious methods introduced by him in the observing technique, he was able to record the faintest lines obtainable with the very efficient equipment selected for this problem. The investigation was signally successful and not only revealed the presence in the nebulae of several elements, in particular iron, magnesium, potassium and calcium, which had not been known to exist in them, but indicated that the chemical composition of the gaseous nebulae does not differ greatly from that of the sun and the stars, a result of great cosmological importance.

The researches of Professor Bowen have not only greatly enriched our knowledge of the chemical constitution of the nebulae, but they have provided the answers to many enigmas concerning the physical processes involved in the emission of their light. He has given us most conclusive explanations of the presence or absence of certain radiations in their spectra and in particular the behavior of different lines emitted in the gaseous envelopes of very high temperature stars, bringing to these problems that brilliant and logical analysis characteristic of all his work. His spectroscopic investigations in the laboratory, moreover, have furnished the data not alone for his own researches on the nebulae but have been utilized by others in the solution of the many spectroscopic problems in the broader field of astrophysics. We are, therefore, indebted to him for some of the most important contributions to astronomical physics in recent times.

In recognition of these remarkable achievements your committee has unanimously recommended the award of the Draper Medal for 1942 to Professor Ira Sprague Bowen. The academy may justly be proud to count him among its members and to honor him by the bestowal of this award.

J. H. MOORE

[3] Read by Dr. S. A. Mitchell, in the absence of Dr. Moore.

PRESENTATION OF THE AGASSIZ MEDAL FOR THE YEAR 1942, WITH ACCOMPANYING HONORARIUM OF $300, TO COLUMBUS O'DONNELL ISELIN, II.

I AM going to be a bit reminiscent this evening and recall that over forty years ago when I went up the steps of the Agassiz Museum for the first time, a tall stooped figure had just preceded me, the smart brougham from which he had emerged was in the act of driving off. I followed that figure up the stairway and saw it enter a door marked "A. Agassiz" in bold