George Ellery Hale Centennial Symposium

27 December 1968 • Dallas, Texas

Like buried treasures, the outposts of the universe have beckoned to the adventurous from immemorial times. Princes and potentates, political or industrial, equally with men of science, have felt the lure of uncharted seas of space, and through their provision of instrumental means the sphere of exploration has rapidly widened. If the cost of gathering celestial treasure exceeds that of searching for the buried chests of a Morgan or a Flint, the expectation of rich return is surely greater and the route no less attractive. . . . Each expedition into remoter space has made new discoveries and brought back permanent additions to our knowledge of the heavens. . . . While much progress has been made, the greatest possibilities still lie in the future.

George Ellery Hale made this impassioned plea in a popular magazine [*Harper's*] in 1928. Forty years later the words seem out of style but the theme is still familiar. Scientists exploring the outer regions of the universe or the inner regions of the nucleus continue to feel the need for ever more powerful and expensive instruments to help answer the questions raised by results obtained with the largest existing instruments. From the 1890's to his death in 1938, Hale demonstrated his outstanding ability to conceive, plan, finance, and build a new type of research institution linking astronomical telescopes of unprecedented size with modern physics laboratories.

Hale's extraordinary influence on the growth of astrophysics and on science and scientific institutions in general is very much in evidence in 1968, the centenary of his birth. As inventor of the spectroheliograph (1889) and discoverer of magnetic fields in sunspots (1908) he contributed to our understanding of the physical nature of that "typical star," our sun. As founder of the Yerkes, Mount Wilson, and Palomar observatories with those great telescopes that have made astronomical history—the 40-inch refractor, the 60-inch, 100-inch, and 200-inch reflectors —Hale made possible the tremendous advances in our comprehension of the nature, evolution, and extent of the universe.

As builder of a headquarters in Washington for the National Academy of Sciences, and initiator of the National Research Council and the International Research Council (parent body of the International Astronomical Union and forerunner of the International Council of Scientific Unions) his influence on scientific organization, both nationally and internationally, was profound. As a strong believer in the value of a broad education in science and in the importance of the humanities, his role in the development of institutions such as the present California Institute of Technology and the Henry Huntington Library and Art Gallery was far-reaching.

How best to commemorate the centennial of the birth of such a man whose life and work are so relevant to contemporary science? Of the many possible approaches, it has seemed most appropriate to conduct a symposium that would provide an interpretive review of major 20th century developments which emphasize three dominant themes relating to Hale's career: the evolution of large astronomical instruments and optical systems; the growth of astrophysics as a research field; and the changing role of scientific institutions. Several of the speakers have played key roles in these developments and can be thought of as Hale's scientific heirs. Their talks will be a fitting tribute to Hale, not by chronicling his achievements in sequential fashion, but rather by reviewing the recent past of fields he influenced, in order to provide perspective on the present and future.

C. Donald Shane, who first used the large Lick Observatory telescope more than 50 years ago and who was director from 1945 to 1958, has played a leading role during the past decade in cooperative projects to build and utilize new astronomical facilities. He will discuss the evolution of large astronomical telescopes during the past 75 years.

Ira S. Bowen was involved in the planning of the 200-inch Hale telescope and related optical systems in the mid-1930's and was the director of the Mount Wilson and Palomar observatories from 1946 to 1964, a period during which Hale's dream of the 200-inch became a reality and produced the results he had prophesied in 1928. Bowen will review the development of the auxiliary instrumentation that has made the large telescopes such versatile and powerful tools for research.

Daniel J. Kevles is a historian of science at the California Institute of Technology. He has explored the social history of American science in the 20th century, including day-to-day human relationships involved in many aspects of Hale's organizational innovations. He will provide a perspective on Hale's role in the development of modern scientific institutions and will evaluate Hale's vision of the role of academic and governmental institutions in advancing science.

Bengt Strömgren, whose outstanding contibutions to astrophysics helped to fulfill the hopes Hale had for this field, was director of the Yerkes Observatory in the 1950's, a half century after it was founded by Hale. He will survey the development of astrophysics as a research field in the 20th century.

Robert Howard's research at Mount Wilson and Palomar observatories is concerned with magnetic fields of the sun and sunspots, the field in which Hale made pioneering contributions. Howard's review of the field will trace its course from the time of Hale's initial efforts to today's computer-assisted research.

A novel aspect of the program will be a brief slide and film presentation highlighting Hale's life and work.

In connection with the symposium a unique exhibition of original documents, letters, newspaper clippings, photographs, diaries, and published articles will present glimpses of Hale's motivations, his personal style, and his effect on his times. The exhibition was prepared by the staff of the American Institute of Physics' Center for History and Philosophy of Physics and will be on display during the entire AAAS meeting in Dallas.

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