

## Nobel Chemistry Prize

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tion-dependent properties (such as chain dimensions, dipole moments and optical polarizability tensors) over all configurations of virtually any macromolecular chain of specified chemical structure.

His career has carried him through a number of industrial and academic positions including stays at Dupont (1934–38), the University of Cincinnati (1938–40), Esso Laboratory (1940–43), Goodyear (1943–48), Cornell University (1948–56), Mellon Institute (1956–61) and Stanford University (1961 to the present). He has written two books: the enduring *Principles of Polymer Chemistry* (1953) and *Statistical Mechanics of Chain Molecules* (1969).

In looking over the significance of Flory's career, polymer chemist Eugene Helfand (Bell Laboratories) commented to us, "Beyond the breadth of his research, Flory's impact is attributable to the fact that he challenged the central problems, provided practical solutions and verified them with the right experiments." —RAS

## Nobel Physics Prize

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one sec of arc—a figure comparable to that of larger optical telescopes on good mountain sites.

In all these multiple-element telescopes Ryle has made perhaps his strongest contributions to the art with his elegant improvements in the electronics of receiver technique. One example is "phase-switching," a trick of interferometer circuitry that considerably improves sensitivity and stability.

Ryle's observing program has included studies of the structures of radio sources and the establishment of accurate positions for comparison with visible objects. His "Third Cambridge Catalogue" of some four hundred sources, published in 1959, has given us the familiar "3C" numbering system by which most of these objects are still known. A fourth and a fifth catalogue have followed since.

The program of detailed counting made possible by this cataloging activity enabled Ryle to pursue his cosmological interests; from the distribution of these objects in space he believes he has evidence to support the "big-bang" theory of the creation of the Universe over the rival "steady-state" theory. Although this question is still not resolved to everyone's satisfaction, there is no doubt that Ryle's statistical work on radio sources has stimulated the progress of the argument.

A Fellow of the Royal Society since 1952, Ryle was appointed the first professor of radioastronomy at Cambridge

in 1959. He received his knighthood in 1966 and became Astronomer Royal in 1972. In his spare time he is a keen sailor and boatbuilder.

Hewish, now aged 50 and like Ryle a Fellow of the Royal Society, is a Fellow of Churchill College and has been a professor of radioastronomy since 1971. He first joined Ryle in the early days of the Cambridge radio observatory, (renamed the Mullard Radio Astronomy Observatory in 1957) where he assisted in the development of antenna arrays and made some observations of radio emission from the solar corona. Then he became interested in interplanetary scintillation of radio sources—a "twinkling" effect due to spatial and temporal irregularities in the interplanetary medium. This work had two aims: one, the study of the interplanetary medium itself, and the other, the detection of small angular-diameter radio sources. Only objects smaller than 1 sec of arc can scintillate in this way, and some information on their angular structure can be inferred.

In August 1967 Hewish started a thorough survey of the sky with a new fast-response antenna, specially designed for detecting scintillating sources. With this fixed horizontal array, built very cheaply with student labor and covering four and a half acres, Hewish planned to survey the entire sky once each week. But at the end of that month he and his student, Jocelyn Bell, noticed unexpected scintillations in a region (away from the Sun) where a strong effect was not anticipated. The extreme regularity of these "scintillations" became apparent for the first time on 28 November when an improved recording system showed pulses above the noise level; after ruling out all likely sources of interference the Cambridge group realized they had something very unusual on their hands. A search of the records revealed three more of these "pulsars," as they quickly became known, and by late 1968 the world of radioastronomers was in a ferment as yet more were discovered at other laboratories.

Theories of what pulsars might be abounded, of course, in those early days.

### Election results

There were three winners among the five scientist-candidates whom we reported on in October (page 77). Incumbents George Brown Jr (D-Cal.), James Martin (R-N.C.) and Mike McCormack (D-Wash.) retained their seats. The two first-time scientist-candidates, Democrats George Seielstad (Cal.) and Lloyd Wood (Ohio) were not able to unseat Republican incumbents W. M. Ketchum and W. H. Harsha respectively.

Even the possibility of communication from distant civilizations was admitted—Hewish's designation of the first four pulsars, on the original data sheets, as "LGM 1," "LGM 2" and so on (for "Little Green Men") was intended as a wry reference to this remote possibility.

But soon the theoretical speculations settled down to two kinds of models—pulsating white dwarfs and rotating neutron stars. Now, six years later, neutron-star models appear to have everyone's support. In May of 1968 Hewish foresaw this possibility in a conversation with PHYSICS TODAY. "We are keeping an open mind," he said, "but we don't discount neutron stars." Noting that theoreticians "have a fair amount to play with," he added that "this is a good time to be a theoretician." Certainly pulsars have turned out to be not only very exciting for astronomers but also, as neutron stars, a very fundamental discovery for all physicists. —JTS

## in brief

The application deadline for National Science Foundation energy-related graduate traineeships is 6 January, with awards scheduled to be made in late April. Information is available from Fellowship and Traineeship Section, Division of Higher Education in Science, NSF, Washington, D.C. 20550.

Postdoctoral research associateships and visiting fellowships to the Joint Institute for Laboratory Astrophysics for 1975–76 are available. Applications for research associateships may be submitted at any time, although mid-February is most advantageous; visiting fellowship applications are due before 16 January. Contact G. Dunn, Visiting Scientists Program, JILA, University of Colorado, Boulder, Colo. 80302 for information and applications.

The AAAS is sponsoring a Mass Media Intern Program for advanced graduate students in the social and natural sciences for Summer, 1975. The deadline for applications is 1 February. For further information, contact W. Weisman-Dermer, Communications Office, AAAS, 1776 Mass. Av, NW, Washington, D.C. 20036.

Approximately 250 National Research Council postdoctoral research associateships of \$15 000 or more in federal labs and research centers will be available in the physical, earth and biological sciences for 1975. Applications are due 15 January. Details are available from Associateship Office, JH 606-P, National Research Council, 2101 Constitution Ave, NW, Washington, D.C. 20418. □