state & society

Bohr, Mottelson and Rainwater win Nobel physics prize

The 1975 Nobel Prize in physics has been awarded by the Royal Swedish Academy of Sciences to Aage Bohr, Ben Mottelson and James Rainwater for "the discovery of the connection between collective motion and particle motion in atomic nuclei and the development of the theory of the structure of the atomic nucleus based on this connection."

The collective model, developed by the three men, was a unification of the shell model with the liquid-drop model, which had been proposed by Aage Bohr's father, Niels, in 1936. (Niels Bohr, of course, was also a Nobel laureate in physics, in 1922, "for his services in the investigation of the structure of atoms and of the radiation from them.") The elder Bohr, as a young graduate student in 1905, had written a prize-winning paper on the vibration of liquid drops of water. Seventy years later his son is being honored for work growing out of the liquid-drop picture.

The prize of $143 000, to be shared equally by Bohr, Mottelson and Rainwater, is to be awarded on 10 December in Stockholm. Bohr is director of the Niels Bohr Institute. Mottelson is a professor at NORDITA, the Nordic Institute for Theoretical Nuclear Physics, which shares quarters with the Bohr Institute in Copenhagen. Rainwater is professor of physics at Columbia University.

The liquid-drop picture of Niels Bohr, which had been subsequently elaborated by many workers, was very much in vogue in the 1940's. Then in 1949 Maria Goeppert Mayer, and independently J. Hans D. Jensen (collaborating with O. Haxel and H. E. Suess), introduced the shell model. The theory assumed that the nucleons move almost independently of each other under the influence of a common potential. (Mayer and Jensen shared the 1963 Nobel Prize for this work.)

But there were flaws in the shell-model picture for nuclei with quadrupole moments, particularly in the rare-earth region. The theory assumed a spherically symmetric nucleus, even when an odd nucleon was present; its predictions for the quadrupole mo-

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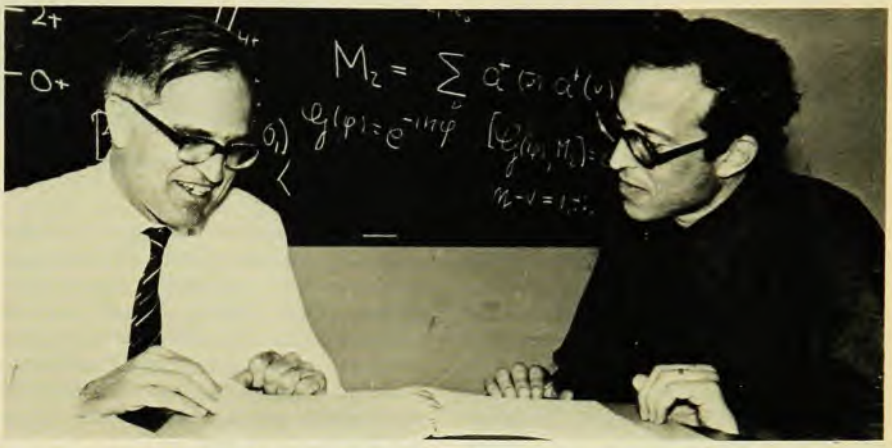

Aage Bohr (left) and Ben Mottelson working in Copenhagen on the nuclear collective model.

RAINWATER

White House science adviser: Teague bill progresses

Imminent revival of the post of White House science adviser appears likely as both House and Senate consider legislation that would reestablish an apparatus for science and technology in the Executive Office. Backed by the President, the "National Science and Technology Policy Act of 1975" bill unanimously reported out of Congressman Olin Teague's House Committee on Science and Technology restores the office of science adviser, articulates national policy goals for science, and creates a committee to examine further the relation between the federal government and scientific research. The bill passed in the House early in November with relatively minor amendments.

The House committee's bill calls on the President to appoint, subject to Senate approval, a Director for the proposed Office of Science and Technology Policy; the holder of this office would in fact be the new White House science adviser. His duties, outlined in the bill, include consulting with the President on those areas of national concern involving scientific and technical considerations, evaluating the quality of existing governmental efforts, developing criteria for the determination of scientific and technical research activities meriting federal support, and identifying those emerging regions where science can be employed effectively for future needs. With its specific mention of national security as an area in which the director is to advise the President—others are the economy, health, foreign relations, the environment, and technological recovery and use of resources—the bill resuscitates the science adviser's role in matters of military technology, excluded from his advisory functions in the reorganization plan that eliminated the former Office of Science and Technology in July 1973.

Prior to the disbanding of OST, six full-time White House science advisers served the Executive in the course of the Eisenhower, Kennedy, Johnson and

Nixon administrations. Since that dissolution, National Science Foundation head H. Guyford Stever has acted as part-time adviser to the President on matters of scientific or technical import. That the White House finds it desirable to maintain an apparatus for scientific expertise within the Executive branch was indicated when, on 10 June 1975, President Ford submitted his own proposal for resurrection of the full-time advisory post to Teague's committee, which had already been engaged in plans for the restoration of the office. The President has indicated to the committee that he endorses the present bill's provisions.

Agreeing that the science-advisory position is a vital one, all six former holders of the White House post—James Killian Jr, George Kistiakowsky, Jerome Wiesner, Donald Hornig, Lee DuBridge, and Edward David Jr—emphasized that the science adviser must serve the President rather than play spokesman for the American scientific community. Present at this fall's Second Franklin Conference in Philadelphia, the six also noted that the new appointee must have direct access to the chief executive if he is to be effective in his advisory role.

In addition to the revival of the White House science-advisory post, the Teague bill sets forth a national science and technology policy that prescribes the responsibility of the federal government pertaining to scientific and technical endeavors. According to Teague, "experience tells us that great achievements are possible through the orderly employment of science and technology for public purposes, but we also know that we can't do everything . . . we must set goals and then build priorities around them." These priorities, if the bill becomes law, will be among topics considered by a Federal Science and Technology Survey Committee. The committee, composed of distinguished representatives from the public and industrial sectors as well as from the academic community, would conduct a two-year study of federal organization and funding of scientific research and consider a possible restructuring that would bring science-oriented federal agencies within a single cabinet-level department. —FCB

AIP Corporate Associates treat physics, technology

The theme of this year's annual meeting of the AIP Corporate Associates was "The adequacy of today's physics for tomorrow's technology." The meeting, sponsored by the American Institute of Physics and held 2–3 October at the National Academy of Sciences in Washington, D.C., brought together the heads of physics institutions—the Corporate Associates representatives, physics-department chairmen, government project officers and society officers. In addition to formal talks given by a sociologist, an economist, two graduate students and several physicists, the 176 participants got together in five informal discussion groups.

J T SCOTT

Daniel Bell (left) and Eli Ginzberg spoke at the annual AIP Corporate Associates meeting.

Sociologist Daniel Bell of Harvard University described the parameters of a postindustrial society, which in many ways characterizes our present world. At the same time, however, we live also in an agrarian society and an industrial society, but the amount of emphasis on this type of society has diminished. Many of the major industries can be thought of as 19th-century industries (steel, automobiles, electricity, telephone and aviation) because they were created by talented tinkerers. By way of contrast, the guiding principle of the postindustrial society is the codification of human knowledge, and industry is science-based.

In an agrarian society the strategic resource is raw materials; in an industrial society it is money capital, and in a postindustrial society it is knowledge. We exchange information through data processing, record keeping, market research and so on, and knowledge is the foundation of most economic exchanges. Bell argues that the key political problems in postindustrial society are elements of science policy.

The design of society has changed from the pre-industrial society, where it is a game against nature to an industrial society, where it is a game against fabricated nature, to a postindustrial society, where it is a game between persons. In our present society there is a multiplication of interactions between persons and the extension of scale resulting from that. This change of scale will be the central issue in the 21st century, Bell feels, and we must design new institutions to cope with a future in which the whole globe is part of an interactive network.

Economist Eli Ginzberg of Columbia University, who specializes in manpower and has been a consultant to seven presidents, believes the manpower situation in physics is unique because physicists live almost entirely off government money. Even when they are employed in industry, they frequently are indirectly funded by the government. Ginzberg believes there is little likelihood in the near future, either with this Administration or a possible successor, that the Federal government will become interested in new efforts to expand employment of trained manpower of any sort, including physicists. A few jobs will open up here and there, he says, "but nothing of a spectacular nature."

Ginzberg notes that about 500 physicists are "hidden out in government laboratories under special financing with no chance of permanent absorption. The kindest thing you could do is a one-by-one placement job because a person in his early thirties shouldn't be hanging in limbo for the next thirty years. . . Some of them will be much better off not being physicists." For example, he feels that with their expertise in making first approximations, some physicists would do well in investment banking. Ginzberg urges those in academia to change their teaching emphases so as to enhance the employability of their students.

The future. Three speakers at the meeting discussed "The Future of Industrial Technology." J. E. Goldman (Xerox Corporation) dealt with the need for research in industry (see page 23 of this issue). Lewis M. Branscomb (IBM Corporation) spoke about trends in computer technology (see the January 1976 issue of PHYSICS TODAY).

R. E. Goodson (Purdue University), formerly chief scientist at the Department of Transportation, said that most current means of transportation have been supported by the government, through direct support of research, in subsidies, or by supplying the basic