Uses of Biomedical Research

The aim of these hearings is really "undirected basic research," Senator Fred R. Harris (D-Okla.) said with Cheshire-cat grin following a frown.

Senator Harris took testimony from a panel of 20 scientists last week at hearings of the Senate Subcommittee on Government Research concerning how the Government should conduct basic research in biomedical fields.

He has a long-standing interest in seeing Congress take firmer control of national research policy. In these hearings he wants to set goals for biomedical research that will make the public as interested in health benefits as in landing a man on the moon.

The National Aeronautics and Space Administration and the Department of Defense have established programs designed to achieve specific goals, based on prior planning studies during which the problems have been thoroughly investigated.

In contrast, Sen. Harris stresses, the need for the same kind of long-range planning has not been "acutely felt" in the fields of health and life sciences.

The scientists who testified included Dr. Rene Dubos of Rockefeller University, Dr. Joshua Lederberg of Stanford University School of Medicine and Dr. Hudson Hoagland, director of the Worcester Foundation for Experimental Biology.

Most witnesses agreed that Federal programs ought to last longer than a year, which is the usual funding period. Some suggested that this goal would be accomplished by establishing five-year plans that would undergo Congressional review yearly.

Senator Harris noted during the hearings that the Congress is now beginning to recognize that, where specifying long-term goals is at least as appropriate and necessary in health fields as it is for the space and defense programs.

The Senator's subcommittee is responsible for review of all Government operations, a broad mandate of which Senator Harris is taking advantage.

Meson Factory On Order

Prospects for a high-intensity linear accelerator for the study of mesons at Los Alamos, N.Mex., got a big boost last week when President Johnson sent a supplementary budget request for $50.3 million to Congress to build the facility. Appropriations for the project in the past four years have totaled $4.7 million.

The Los Alamos facility is designed along the general principles of many accelerators, in which protons are pushed to very high energies and then smashed into other protons. In this facility, however, the primary interest will not be in the proton collisions themselves, but in their by-product: a stream of smaller particles called mesons, which are created when high-energy protons collide.

In the new accelerator, the mesons created by proton collisions will then be directed to other targets, where their interactions with various atomic particles will be studied.

In order to get enough mesons to experiment with, the original proton beam has to be of very high intensity, on the order of 10^{16} protons per second. Although the energy of the accelerated protons is less than in the largest accelerators—Los Alamos is planned for less than one billion electron volts, compared with 33 Bev at the Brookhaven, N.Y., synchroton—the number of protons accelerated is about 10,000 times as great.

The Los Alamos meson factory holds out great potential for medicine as well as basic research in physics. Biological scientists in recent years have used mesons of a particular type—called pi mesons—to destroy tumor cells. However, the beams available up to now were too weak to be used in human therapy. The new facility with its much higher beam intensity could lead to important applications in this field.

Pi mesons also are most interesting to physicists, since they have been cast in the theoretical role of the glue which holds together the protons and neutrons in the nucleus of an atom. Without this binder, the protons, which are electrically charged, should repel each other and fly apart. What keeps them together is a nuclear force, stronger than electricity at the very close distances involved in the nucleus of the atom. Physicists have concluded that the evanescent pi meson has a role to play in the operation of nuclear forces, but they know distressingly little about either the role or the forces.

And Fusion Too

In the same message to Congress, President Johnson asked for $8.5 million to build a center for advanced research into controlled thermonuclear fusion. Progress in the last year has enlivened the fusion field after some years in the doldrums.

Toward Dental Science

A sophisticated new approach to the mounting problem of oral diseases is reflected in a program of Federal support for the development of interdisciplinary dental research institutes announced last week by Surgeon General William H. Stewart.

The first of an anticipated 10 or 11 planning grants was made to the University of Washington, Seattle, for a Research Center in Oral Biology.

The purpose of establishing such centers is to organize and coordinate interdisciplinary research and thereby create a "critical mass" of scientists who will reinforce each other's research and provide resources for training students to go into research in oral diseases.

The impact of dental research institutes will be twofold:

- First of all, they are expected to lead to significant advances in the prevention of oral disease which is not adequately dealt with at the present time. Only a small number of the persons who need dental attention get it. There are about 800 million cavities in need of filling in the United States, and there are not enough dentists to do the job. If the population were to get the dental care it needs, the $3 billion annual bill would jump to an estimated $20 to $25 billion for the first year.
- Secondly, multidisciplinary research efforts will wipe out the somewhat limited image of dentists as construction engineers and bring them into their own in the biological and preventive medical sciences.

Originators of the program of National Institutes of Health expect most of the new dental research institutes to develop in university centers where they could build on existing institutional strengths. Planners also expect a majority of the staff members of these new institutes to be members of the academic departments and non-dental graduate schools of the university and will be able to bring relevant approaches and knowledge in biochemistry, genetics, immunology etc. to bear on problems of "diseases of the oral cavity."

A lure to competent men of science is the provision in the report of the Dental Research Institutes and Special Programs Advisory Committee at NIH that calls for freedom of investigators to move in and out of the dental research program. The institutes thus require a setting that "would allow a scientist to enter it when his own interests appropriately bring him there, and to return to the institutional base when his interests shift." The organized dental research unit, therefore, is not envisioned as a self-sufficient thing, but one associated with the stable scientific base of the university.