occupy 21 22-drawer steel card cabinets. The basic sets of punched cards correspond in number to the 63,000 coded compounds and 218,000 lines of biology data (on the 100,000 biology code sheets); rearrangement of these into subsidiary files to facilitate searching accounts for the balance of the 1.5 million cards. A file is also retained of all original reports of test results from the screening program.

The Chemical-Biological Coordination Center has achieved much in the 11 years of its existence. Briefly, it has developed and tested a practical, functioning pattern for a center for chemical-biological information. But that accomplishment has embraced many things. Chemical and biological codes have been developed and their utility has been thoroughly tested on a large and diverse body of data. Coding and checking procedures have been worked out in practice. Machine-handling techniques have been successfully demonstrated in actual correlation studies. And the practical business of coding, filing, and handling of chemical-biological data on a large scale has been reduced to an everyday routine.

The Academy–Research Council is indebted to the hundreds of scientists who have taken part in the development of the center, and to the devoted staff that has carried out its actual operations; their vision has been great, their service to science notable. The experience and accomplishments, the shortcomings and difficulties, of the center demonstrate important lessons for similar undertakings that will inevitably be necessary in the future if science is to learn how to manage its own output.

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AEC Industrial Hygiene Awards

Prospective applicants have *until 1 Mar.* to file requests for appointments in the 1957–58 Atomic Energy Commission special fellowship program in industrial hygiene. This program, which leads to the master's degree in industrial hygiene, is administered for the commission by the Oak Ridge Institute of Nuclear Studies. Fellows enroll for an academic year of graduate training in the subject at the Harvard University School of Public Health or at the University of Pittsburgh Graduate School of Public Health.

Basic fellowship stipend is $2500, with an additional $350 allowed for spouse and each dependent child. Awards include payment of normal tuition and fees required by the university; a travel allowance of 6 cents per mile for the fellow from the place of application to his assigned university; and financial assistance to attend the annual meeting of the American Industrial Hygiene Association. One or more years of graduate experience may qualify a fellow for an additional $200 in the basic stipend.

Requirements include a bachelor's degree in engineering or a basic science, acceptability for graduate work at the university he selects, and U.S. citizenship. Applicants must be under 35 years of age. Additional information and application blanks may be obtained by writing to the Fellowship Office, Oak Ridge Institute of Nuclear Studies, P.O. Box 117, Oak Ridge, Tenn.

Research Funds

A review of the flow in 1953 of research and development funds was recently completed by the National Science Foundation. The review analyzed both the sources of the funds and their expenditure, the flow totaling $5.4 billion, which is 1.5 percent of the gross national product.

The sources of the funds were these: the Federal Government, $2.8 billion, or 52 percent; industry-oriented organizations, $2.4 billion, or 44 percent; colleges and universities, $130 million, or 3 percent; and other institutions, such as privately endowed foundations, $50 million, or 1 percent. The contribution by colleges and universities does not include such items as salaries for principal investigators.

The funds were spent in research and development as follows: the Federal Government, 18 percent; industry-oriented organizations, 72 percent; colleges and universities, 9 percent; and other institutions, 1 percent.

Thus, in 1953, the Federal Government used about one-third of its $2.8 billion for conducting its own research, with the remainder dispersed through contracts and grants to other organizations. Industry spent virtually all of its $2.4 billion, with a very small amount going to colleges and universities. And the colleges and universities spent a sum equal to 3 times their contribution.

Insect Physiology

The *Journal of Insect Physiology* will begin publication in March. This is an international journal which plans to bring together in one place the best contributions on insect physiology from all parts of the world. The journal is to be published by Pergamon Press in London. Manuscripts should be sent to one of the following editors: Prof. V. G. Dethier, Department of Biology, Johns Hopkins University, Baltimore, Md., U.S.A.; Dr. H. E. Hinton, Department of Zoology, University of Bristol, Bristol, England; or Prof. M. Lüscher, Zoologisches Institut der Universität Bern, Bern, Switzerland.

Instrument Stations in the Deep Sea

Heretofore it has been difficult to moor instrument stations in the deep sea, and their effectiveness was limited even for the few days that they continued to function. However, during recent operations in the Pacific, a group from the Scripps Institution of Oceanography succeeded in mooring instrument stations in depths of from 3200 to 4700 meters. They were installed for the purpose of obtaining synoptic data over a large area. The moorings employed taut wire and a primary float below the level of wave action. (Earlier installations of similar stations had been set at about 700 fathoms.)

The stations were equipped with recorders, vertical instrument strings, power supply, lights, and radar targets. Sixteen of these units were maintained for a period of more than 4 months in the region of the northeast trades. Highest wind velocities during the period were about 37 knots. Natural attrition accounted for the loss of surface components of two stations, but parts of several of the moorings were recovered at the end of the period and were in excellent condition. Therefore, it would appear that the basic problems of kinking, chafing, and electrolysis have been solved.

The maximal horizontal excursion of the instrument station in the extremes of weather and current during the test period is unknown, but it was not more than the limits of accurate navigation—that is, ± 1 mile. Calculations indicate a total excursion of the submerged float to have been ± 300 meters under the extreme conditions.

Installation of a mooring required about 45 minutes after arrival on station, exchange of the instrument platform took about 15 minutes on subsequent visits. Cost of the moorings, exclusive of the surface platform and instrumentation, was about $700 each.

It is believed that this development, which was supported by the Office of Naval Research, will find important application in exploration of the deep ocean. A discussion of the method and a detailed description of the technique are in preparation and will be available upon request from the director of the Scripps Institution of Oceanography.

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