News of Science

Young Research Workers Sought for Washington Area Laboratories

The Civil Service Commission has begun a nationwide search for more than 200 of the country's most capable young men and women who have recently received their degrees in engineering, mathematics, and the physical sciences. The applicants, who must pass a newly designed examination, will be offered a starting salary of $5430 and the opportunity to work at research with many of the country's leading scientists in 11 federal laboratories in the area of Washington, D.C. The new program marks a significant departure from standard recruiting procedure in that it offers higher pay, better assignments, and more thorough and imaginative testing of the applicant's research potential. Further, virtually all candidates who meet the requirements of the examination will be considered for appointment.

Origins of the Program

The need for productive and creative research personnel is so great, both throughout the nation and at the 11 laboratories, in particular, that the Civil Service Commission, in conjunction with many government scientists, devised a new approach to the problem of recruiting. While maintaining the old system of recruiting by which an applicant is judged on the basis of his college record, is not required to take an examination, receives in most cases a Civil Service rating of GS-5 with a salary of $4480, and is not assured a research position, the commission has created a new category to give the prospective scientific employee another option. Under this arrangement the candidate can choose to take the new Research Scientist Examination which tests both his knowledge of the appropriate subject matter and his ability at mathematical formulation. Given success in this examination, the candidate will be offered appointment to Civil Service grade GS-7 with a salary of $5430 and can expect assignment to one of the 11 Washington area laboratories, working in the research field of his choice under top-ranking scientists. The new category, with its flexible placement policy, offers the candidate, in addition to the higher salary, a very good possibility of gaining the advantages that lead to what has been called "psychic income"—the opportunity to discover and to do constructive work on important problems, adequate recognition of work well done, a high caliber of supervision, and a reasonable degree of security.

Research Scientist Examination

In its effort to identify and then place applicants of the ability which it is seeking, the Civil Service Commission will use two examinations and a questionnaire. All applicants will be required to take a subject matter examination in either chemistry, physics, or mathematics, or a combined physics-chemistry test which consists of general physics, qualitative and quantitative analysis, and physical chemistry. In addition, all applicants will be required to fill out a background information questionnaire which will be used to help the 11 scientific laboratories decide what type of work might be most suitable and attractive to eligible candidates. The questionnaire will also ask the candidate to indicate the kind of research job and the laboratory in which he would prefer to work. Because of the limited number of applicants being sought and the nature of the recruiting program—finding persons with research potential for research positions—the successful applicant will have an excellent opportunity for assignment to the laboratory and the work he chooses.

The most significant element of the commission's testing program is the mathematical formulation test. This test, which will be required of all applicants, will attempt to identify those persons who have a high degree of potential research ability. Ten previous studies have been drawn upon by the commission's testing experts to devise this examination. In four studies research workers have been examined in conjunction with nonresearch workers. In six other studies research workers of a high degree of creativity and productivity, as identified by their supervisors, have been examined in conjunction with other research workers. Both cases have resulted in the identification of stable and significant differences between the two groups under study. The mathematical formulation test will examine for those differences and by this means attempt to be predictive of a given individual's future research potential. In later years the commission will follow the careers of the researchers selected under this program to check the validity of its predictive techniques.

The test by which the candidate will demonstrate his ability to develop the mathematical formula needed to solve a quantitative problem will consist of 25 questions of a nature indicated by these two examples: (i) A door opening was 3 feet 9 inches higher than it was wide. Which one of the following best expresses the area of the door opening, in square inches, after the opening has been heightened 2 inches and narrowed 3 inches? (x is equal to the original width of the door.)

A) $lc + (x/w)$ B) $l + (w/cx)$
C) $l + (cw/x)$ D) $(l + cw)/x$
E) $(l + cx)/w$

(ii) The length l of a spiral spring supporting a pan is increased c centimeters for x grams of weight placed on the pan. What is the length of the spring if w grams are placed on the pan?

A) $lc + (x/w)$ B) $1 + (w/cx)$
C) $1 + (cw/x)$ D) $(1 + cw)/x$
E) $(1 + cx)/w$

Laboratories

The federal scientific facilities for which research personnel are being sought for career positions in the fields of engineering, chemistry, electronics, mathematics, metallurgy, and physics are currently engaged in a great variety of programs. The facilities and some of their programs are given below. Their locations are shown in Fig. 1.

David Taylor Model Basin. Located 6 miles northwest of Washington, the David Taylor Model Basin is the largest and most completely equipped research establishment of its kind in the world. The primary mission of the Model Basin is to determine from model tests the most suitable shapes and forms to be adopted for United States vessels, including aircraft. The Model Basin has four research laboratories. The hydromechanics laboratory is concerned with the behavior of floating and immersed bodies. It also carries on basic and applied research in fluid flow and underwater sound. The structural mechanics laboratory conducts theoretical and experimental investigations on problems relating to the structural strength of vessels and equipment and their responses to vibration, shock, and underwater explosions.

The aerodynamics laboratory engages in applied research and development testing to determine and improve the aerodynamic characteristics of powered and nonpowered models of rotary and

fixed-wing aircraft, guided missiles, and their components. The applied mathematics laboratory applies high-speed computer techniques to engineering, research, and logistic problems and carries out research in mathematics and in computer design and techniques.

Diamond Ordnance Fuze Laboratories. These Diamond Ordnance Fuze Laboratories are the principal research laboratories for the Department of Defense in the development of unique types of electronic fuzing and related items for application to guided missiles and other nonrotating projectiles. Research programs require the services of electronic scientists, physicists, mathematicians, chemists, and many types of engineers. The laboratories are located adjacent to the National Bureau of Standards in residential Washington.

Current programs include basic and applied research in electronic systems and components, fabrication and testing of prototype devices, developments of engineering specifications required for industrial production.

Engineer Research and Development Laboratories. The U.S. Army Engineer Research and Development Laboratories perform specialized research essential to the defense of the nation. Among current projects is research on optical, mechanical, electronic and analytical methods of determining target coordinates for surface-to-surface missiles, and for photogrammetric mapping. Basic and applied research programs are conducted on principles, techniques, and materials for the detection of buried and submerged mines. In the fields of radiation and illuminations, research at the laboratories covers phenomena, materials, and techniques in the ultraviolet, visible, and infrared portions of the electromagnetic spectrum. Long-range research on the influence of various energy forms such as electromagnetic radiations and particle bombardment upon solids is being carried on to determine the true nature of explosives. An important field of applied research is the investigation of the effects of atomic, biological, and chemical warfare on Corps of Engineers equipment. Applied research is also performed on gas-generating and storage equipment, industrial engines, earth-moving operations and winterization, as well as on all types of fixed and floating bridges.

National Bureau of Standards. The National Bureau of Standards plays a unique role in the nation's scientific community. In fulfilling its primary responsibility—development and maintenance of the national standards of physical measurement—the bureau has become one of the principal federal agencies engaged in basic and applied research in physics, chemistry, mathematics, and engineering. More than 1100 professional scientific staff members perform research on over 1000 technical and scientific projects, such as cryogenic engineering; ionospheric, nuclear, and solid state physics; optics, and thermodynamics: This broad research program, covering almost every area of the physical sciences, including most of the specialties in chemistry, classical and modern physics, pure and applied mathematics, and metallurgy, offers oppportunities for the recent graduate to select the field of work of his greatest interest. The laboratories are located on a 68-acre campus-like site in residential, northwest Washington. Because the basic program of the National Bureau of Standards has international significance in the field of measurement, scientists at the bureau often develop world-wide contacts in the course of their careers.

National Institutes of Health. The National Institutes of Health are in Bethesda, Md. The seven institutes and the clinical center—a 500-bed research facility—comprise the major research branch of the Public Health Service of the Department of Health, Education, and Welfare. During the past few decades, NIH has conducted research in all types of medical and related sciences. The major concern is with the chronic illnesses—cardiovascular diseases, cancer, mental and neurological disorders, and various rheumatic, metabolic, dental, and infectious diseases. Research chemists, physicists, and electronic scientists at NIH participate in research in every field of scientific endeavor. Serving the investigators who plan and conduct research are such auxiliary departments as the centralized instrument shop, animal production colony, and scientific library.

Naval Air Test Center. The Naval Air Test Center located at the mouth of the Patuxent River on Chesapeake Bay consists of 6800 acres of land with facilities for landing all types of naval aircraft. The diversified test facilities of the Naval Air Test Center provide opportunities for original contributions in theoretical and experimental development of test methods, for design of new instrumentation and facilities, and for application of data to requirements for future airplanes and their equipment.

Naval Gun Factory. The U.S. Naval Gun Factory is the world's largest naval armament plant. It is located in Washington, on the banks of the Anacostia River and is Washington's largest industrial organization. This plant undertakes programs related to the development and prototype manufacture of underwater, surface, and air weapon systems.

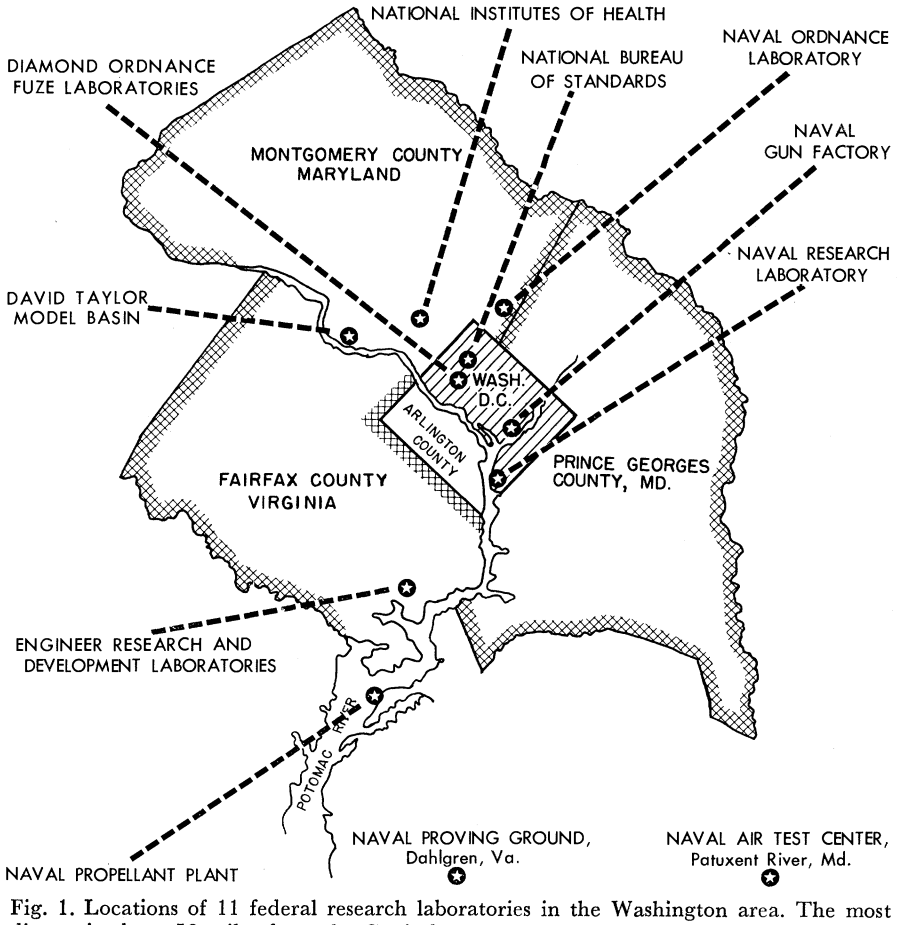

Fig. 1. Locations of 11 federal research laboratories in the Washington area. The most distant is about 50 miles from the Capitol.

These programs embrace the research and development phases through to tactical fleet use. Present programs include applied research, development, and evaluation of missile launching systems, depth bombs, mines, optical equipment, and high performance aircraft weapons. The Naval Gun Factory conducts research development and evaluation programs on engineering materials and on the processing of these materials. The Naval Gun Factory is expanding its research staff in the fields of physics, chemistry, metallurgy, and electrical, electronics, mechanical, and materials engineering. Diversified programs and a progressive management offer excellent opportunities for promotion and recognition in various scientific fields.

Naval Ordnance Laboratory. The Naval Ordnance Laboratory is located about 11 miles north of Washington, in Silver Spring, Md. Here the Navy has established a fully integrated research and development facility capable of pursuing weapon development from the first feasibility study to the state of readiness for combat use. NOL scientists and engineers conduct and supervise research, development, experimental manufacture, evaluation, pilot production, and project assistance both at the laboratory and in leading industrial plants of the nation. This laboratory conducts a one-year professional development program for recent graduates wherein they are given an opportunity to work in research, engineering, and evaluation assignments before a determination is made about the type of physical science or engineering they wish to pursue. The Naval Ordnance Laboratory also has a graduate training program coordinated with the University of Maryland in which an M.S. and Ph.D. degree may be obtained. The majority of the courses are taught at NOL.

Naval Proving Ground. The Naval Proving Ground is engaged in developing new and improved types of naval ordnance through research and development programs in the fields of mathematics, physics, chemistry, metallurgy, and engineering. Efforts are devoted not only to developing ordinary weapons such as guns, projectiles, rockets, and bombs, but also to developing the newest types of weapons which represent the application of the latest advances in science to problems in ordnance. Extensive experimental and testing equipment is developed and used in the numerous laboratories of the proving ground. There is a continuing need for well-qualified persons in the field of mathematics, physics, chemistry, metallurgy, mechanical engineering, electronic science, aeronautical engineering, and electrical engineering. The Naval Proving Ground is situated on the Virginia side to the Potomac River, approximately 50 miles south of Washington and 30 miles from Fredericksburg, Va.

Naval Propellant Plant. The Naval Propellant Plant, located about 20 miles south of Washington, is engaged in research on and development of propellants for guided missiles, rockets and guns, and in the techniques for loading these into rocket motors. The plant is also engaged in the development and use of production techniques for the manufacture of the propellants and for the loading of the rocket motors for most of the Navy's rockets and guided missiles. The Propellant Plant is organized and equipped to study all phases of propellant research and development, including the synthesis of new formulations, the improvements of present propellant compositions and configurations, the production of pilot "lots" of new propellants for developmental and evaluation purposes, and the conduct of surveillance studies on the stability of propellants and propellant formulations.

Naval Research Laboratory. The Naval Research Laboratory, which is located on the banks of the Potomac River in southwest Washington, conducts applied research and development to meet immediate needs of the Navy and engages in fundamental research in anticipation of future needs. A listing of the scientific fields—applications, research, astronomy, astrophysics, chemistry, electricity, mathematics, mechanics, metallurgy, ceramics, nuclear and atomic physics, radio, solid-state physics, and sound—indicates the breadth of this program. Research equipment at NRL is modern, extensive, and is supplemented by complete shop facilities for the construction of scientific apparatus and models.

The President and Scientific Information

The President approved a plan on 7 December that is designed to help meet the critical needs of the nation's scientists and engineers for better access to the rapidly mounting volume of scientific publication.

NSF Information Service

Acting upon the recommendations of his Science Advisory Committee, the President directed that the National Science Foundation take the leadership in bringing about effective coordination of the various scientific information activities within the Federal Government. The President asked that all federal agencies whose programs involve scientific information cooperate with and assist the National Science Foundation in improving the government's own efforts in this area.

The action by the President strengthens and reinforces the provision of the National Defense Education Act of 1958 calling for the establishment of a Science Information Service in the National Science Foundation to "provide, or arrange for the provision of, indexing, abstracting, translation, and other services leading to a more effective dissemination of scientific information, and undertake programs to develop new or improved methods, including mechanized systems for making scientific information available."

The committee urged that fullest use be made of existing information services, both public and private, and that the foundation's Science Information Service supplement rather than supplant present efforts.

Dimensions of Publication

James R. Killian, Jr., special assistant to the President for science and technology and chairman of the Science Advisory Committee, commented on the growing dimensions of world scientific publication and pointed out that it has become a problem requiring action at the national level. Killian said:

"Science and engineering are largely built on the published record of earlier work done throughout the world. There are for example, 55,000 journals appearing annually, containing about 1,200,000 articles of significance for some branch of research and engineering in the physical and life sciences. More than 60,000 different books are published annually in these fields, while approximately 100,000 research reports remain outside the normal channels of publication and cataloging. Within this vast body of world-wide scientific information, published and unpublished, lie the technical data that scientists need in order to do their work. The situation is further complicated by the fact that a large and important proportion of the world's scientific literature appears in languages unknown to the majority of American scientists, such as Russian and Japanese."

In its recommendations, the President's Science Advisory Committee outlines a program calling for the review, coordination, and stimulation, on a nationwide basis, of activities in the areas of primary and secondary publications, scientific data centers, unpublished research information, storage and retrieval, and translation by mechanical means.

New Agency Unnecessary

No new agency will be required to carry out the recommended program. Under its enabling act, the National Science Foundation has devoted special attention to the information needs of scientists and has developed a series of