BOARD OF U. S. CIVIL SERVICE EXAMINERS
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS
LANGLEY FIELD, VIRGINIA

announces a nation-wide examination for probational appointment for

AERONAUTICAL RESEARCH INTERN
IN SCIENCE AND ENGINEERING

Grade GS-5 (formerly known as P-1)
$3100 a Year

For research-minded graduating students with training in

ENGINEERING
AERONAUTICAL MECHANICAL
CHEMICAL CIVIL CERAMIC
ELECTRICAL METALLURGICAL

PHYSICS
CHEMISTRY
METALLURGY

Positions are to be filled at the three NACA laboratories:
Langley Aeronautical Laboratory, Langley Field, Virginia
Ames Aeronautical Laboratory, Moffett Field, California
Lewis Flight Propulsion Laboratory, Cleveland, Ohio

NOTE: Applications should be sent only to the Langley Laboratory, although appointments from this examination are to be made at all three laboratories; for details, see "How to Apply" on page 7 of this announcement.

CLOSING DATE: Applications must be on file with the office of the Board of U. S. Civil Service Examiners, National Advisory Committee for Aeronautics, Langley Field, Virginia, not later than February 28, 1950.
GENERAL DESCRIPTION OF WORK

NOTE: The work of the National Advisory Committee for Aeronautics (NACA), briefly described below, is primarily basic or fundamental research rather than the design or construction of aircraft or propulsion systems. This research work requires mastery of the fundamentals of physical science and mathematics, scientific curiosity, and intellectual honesty. Do not file your application for this examination unless you are strongly interested in doing such research.

Positions in the NACA to be filled from this examination involve assisting in, and supervised advanced study in preparation for, theoretical and experimental investigations to determine the nature, magnitude, and interrelationships of the physical phenomena encountered in advancing the frontiers of the aeronautical sciences; the formulation of simplified or refined formulas and methods to be used by the aircraft industry and others in design and development work on specific aircraft; and the preparation of reports making these results available for general application in the design of future aircraft.

Some examples of areas of basic aeronautical research investigated in the NACA are listed below:

1. Aerodynamic factors underlying flying characteristics and performance at the frontiers of flight, including supersonic flight.

2. Materials, loads, stresses, and optimum configurations relating to airframes, structures, and landing systems to be used in future aircraft.

3. Thermodynamic, aerodynamic, and combustion phenomena; control systems, high temperature materials, fuels; and studies of optimum arrangement of components, as related to future aircraft propulsion systems.

4. Fundamental development studies required in producing special instrumentation for isolating, controlling, measuring, and recording the phenomena in aeronautical research.

In order to carry out this research, the NACA has equipment ranked among the finest and most complete in the world, including many subsonic and supersonic wind tunnels, equipment for investigating propulsion systems including jet and rocket propulsion systems, and numerous types of other laboratory equipment and facilities. Much of the equipment is unique to the NACA.

Appointees from this examination are, in general, given assignments of research and supervised study that will progressively bring them up to the frontiers of present knowledge, in such a way that they will become prepared to use available experimental and theoretical tools in making advances beyond the present frontiers. Research work in the NACA is, in effect, a continuation of university postgraduate training and research.

NACA employees can take, in their spare time, courses offered in the locality by leading universities for credit toward advanced degrees, or can take evening courses at nearby leading universities.

Differences between NACA Laboratories

The Lewis Flight Propulsion Laboratory specializes in the problems of such areas as propulsion systems, fuels, compressors and turbines, and high-temperature materials. The Langley Aeronautical Laboratory and the Ames Aeronautical Laboratory both study problems of aerodynamics, but Langley also specializes in problems of aircraft structures. All three laboratories have problems in such areas as research instrumentation, aeronautical theory (applied mathematics), internal aerodynamic flow, and thermodynamics.

These differences among the laboratories are the basis for differences in location of available positions for appointments from this examination. Candidates with degrees in chemistry, for example, will be appointed only at the Lewis Laboratory.

Competitors who have decided geographical preferences should take careful note of the locations of the laboratories where the various kinds of work are available, and should indicate the locations where they are willing to work (item 15-E on Application Form 57; see special note under "How to Apply" on page 7). If you are not willing to accept appointment at a location where the kinds of work for which you are qualified exist, do not file an application for this examination.
GENERAL REQUIREMENTS

Written Test

Candidates for all positions covered by this announcement will be required to take a test of spatial visualization, of ability to evaluate scientific hypotheses, and of mathematical formulation. Candidates with degrees in chemistry and chemical engineering will take a subject matter test in the field of chemistry. Candidates with degrees in other engineering branches will take a subject matter test in the fundamentals of physics, and candidates with degrees in physics will take the same test and also additional questions in more advanced physics. Candidates with degrees in metallurgy or metallurgical engineering will take a combined examination in the fields of physics and chemistry. All candidates with degrees in engineering will be required to take, in addition, a test of ability to read accurately a table of figures. (See sample questions of mathematical formulation, spatial visualization, chemistry, and physics on Form AN 3546, accompanying this announcement.)

Time Required.- About four hours will be required for the written examination.

Time and Place of Written Examination.- The examination will be held in the places listed on page 8 of this announcement. Applicants should indicate on their application cards where they wish to be examined. All competitors will be notified of the exact time and place to report for the written examination.

Basis for Rating.- Competitors will be rated on the written test on a scale of 100. The standards and weights used in rating the various parts of the examination will depend on the position and option for which the applicant is being rated and on the abilities needed for job success. On the written examination as a whole, nonpreference competitors must attain a rating of at least 70; competitors entitled to 5-point preference, a rating of at least 65, excluding preference credit; and competitors entitled to 10-point preference, a rating of at least 60, excluding preference credit.

Education

Since only highly technical research positions are included in this examination, all applicants must have successfully completed a full four-year course, in an accredited college or university, leading to a bachelor's degree with major study in physics, chemistry, metallurgy, or an appropriate branch of engineering, as indicated below:

Physics.- Study leading to a bachelor's degree with major study in physics must have included courses in physics consisting of lectures, recitations, and appropriate practical laboratory work totaling at least 24 semester hours. The courses must have included a fundamental course in general physics and, in addition, courses in any two of the following: (a) electricity and magnetism; (b) heat; (c) light; (d) mechanics; (e) modern physics; (f) sound. All of these courses must have been taught in the Department of Physics or must be acceptable to that Department as courses in physics toward meeting the institution's requirements for a major in physics.

Chemistry.- Study leading to a bachelor's degree with major study in chemistry must have included courses in chemistry consisting of lectures, recitations, and appropriate practical laboratory work totaling at least 30 semester hours. The courses must have included analytical chemistry, both qualitative and quantitative, and, in addition, any two of the following: (a) advanced inorganic chemistry; (b) organic chemistry; (c) physical chemistry.

Metallurgy.- Study leading to a bachelor's degree in metallurgy must have included courses in metallurgical subjects consisting of lectures, recitations, and appropriate laboratory work totaling at least 20 semester hours. The courses must have included at least three of the following: (a) physical metallurgy; (b) metallurgy of iron and steel; (c) metallurgy of nonferrous metals; (d) metallography; (e) electrometallurgy; (f) process metallurgy.

Engineering.- Study leading to a bachelor's degree in engineering must have been in a professional engineering curriculum with major work in one of the following branches of engineering: Aeronautical, Ceramic, Chemical, Civil, Electrical, Mechanical, or Metallurgical. Other branches of engineering are not included in this examination, such as Agricultural, Architectural, Administrative, Industrial, Mining, Naval Architecture, and General Engineering.
All applicants, whether in engineering or science, must be prepared to furnish a list of courses, showing in semester hours the credit allowed for each course, the approximate date of completion of each course, and the name of the institution in which each course was taken. A registrar's transcript, or photostatic copy thereof, is required to furnish this information.

Students

Applications will be accepted from undergraduate students who are otherwise qualified and who expect to complete all the courses required for graduation by June 30, 1950. Courses which applicants will complete within the above specified period will be accepted and should be indicated in the list of courses (to be submitted later) as courses to be completed. Such students who are qualified in all other respects may receive provisional appointments prior to completion of the required courses but may not enter on duty until they have successfully completed all the required college courses.

Age

Applicants must not have passed their 35th birthday on the closing date for acceptance of applications. These age limits do not apply to persons entitled to veteran preference. Age limits will be waived for certain war service indefinite employees. (See "Age Waiver" on page 6.)

Citizenship

Applicants must be citizens or owe allegiance to the United States.

Physical Abilities

Applicants must be physically able to perform the duties of the position, which are described elsewhere in this announcement. Good distant vision in one eye, and ability to read without strain printed material the size of typewritten characters, are required, glasses permitted. The duties of most positions require the ability of applicants to distinguish basic or shades of colors. However, there may be a few positions which do not require this ability and applicants with defective color vision will receive consideration for appointment. Ability to hear the conversational voice, with or without a hearing aid, is required for most positions; however, some positions may be suitable for the deaf. In most instances, an amputation of leg or foot will not disqualify an applicant for appointment, although it may be necessary that this condition be compensated by use of satisfactory prosthesis.

Any physical condition which would cause the applicant to be a hazard to himself, or others, or which would prevent efficient performance of the duties of the position, will disqualify him for appointment.

A physical examination will be made by a Federal medical officer before appointment. Persons who are offered appointment must pay their own expenses in reporting for duty. If, upon reporting at the place of assignment, they are found ineligible because of physical defects, they cannot be appointed and no part of their expenses in returning home can be paid by the Government.

POSITIONS TO BE FILLED FROM THIS EXAMINATION

Listed below in the left-hand column are the science majors and branches of engineering included in this examination. The right-hand column is explained in a following paragraph.

<table>
<thead>
<tr>
<th>Major or Branch</th>
<th>Appropriate Areas of NACA Research Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS</td>
<td>2, 3, 4, 9, 10, 11</td>
</tr>
<tr>
<td>CHEMISTRY</td>
<td>7, 8, 9</td>
</tr>
<tr>
<td>METALLURGY</td>
<td>5</td>
</tr>
<tr>
<td>ENGINEERING</td>
<td></td>
</tr>
<tr>
<td>Aeronautical</td>
<td>1, 2, 3, 4, 8</td>
</tr>
<tr>
<td>Civil</td>
<td>3</td>
</tr>
</tbody>
</table>
The research work of the NACA currently falls into certain areas, or options, listed in the left-hand column below. For each of these areas of research, one or more science majors or branches of engineering may be appropriate, as indicated in the right-hand column below. In the middle column are indicated the NACA laboratories where each area of research exists; the locations of the three laboratories are given on page 1 of this examination announcement. It will be noted that the numbers of the research areas, or options, from 1 to 12, are those listed in the right-hand column of the table above, thus providing a convenient cross reference.

<table>
<thead>
<tr>
<th>OPTIONS</th>
<th>(Area of NACA Research)</th>
<th>Laboratory</th>
<th>Required Science Major or Branch of Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aerodynamics</td>
<td></td>
<td>Langley</td>
<td>Aero. E. or Mech. E.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ames</td>
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<td></td>
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<td>Lewis</td>
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<tr>
<td></td>
<td></td>
<td>Lewis</td>
<td></td>
</tr>
<tr>
<td>3. Aircraft Structures</td>
<td></td>
<td>Langley</td>
<td>Aero. E., Civil E., Mech. E., or Physics</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>4. Engine Structures</td>
<td></td>
<td>Lewis</td>
<td>Aero. E., Mech. E., or Physics</td>
</tr>
<tr>
<td>5. Metallic Materials</td>
<td>(high-temperature, for engines)</td>
<td>Lewis</td>
<td>Metallurgy or Met. E.</td>
</tr>
<tr>
<td>6. Ceramic Materials</td>
<td>(high-temperature, for engines)</td>
<td>Lewis</td>
<td>Ceramic E.</td>
</tr>
<tr>
<td>7. Fuels</td>
<td></td>
<td>Lewis</td>
<td>Chemistry or Chem. E.</td>
</tr>
<tr>
<td>9. Solid State Physics</td>
<td></td>
<td>Lewis</td>
<td>Physics or Chemistry</td>
</tr>
<tr>
<td>10. Mechanical Research Instrumentation</td>
<td></td>
<td>Langley</td>
<td>Mech. E. or Physics</td>
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<tr>
<td></td>
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<td>Ames</td>
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<td></td>
<td></td>
<td>Lewis</td>
<td></td>
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<tr>
<td>11. Electronic Research Instrumentation</td>
<td></td>
<td>Langley</td>
<td>Elec. E. or Physics</td>
</tr>
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<td></td>
<td></td>
<td>Ames</td>
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<td></td>
<td></td>
<td>Lewis</td>
<td></td>
</tr>
<tr>
<td>12. Aeronautical Theory</td>
<td>(Applied Mathematics)</td>
<td>Langley</td>
<td><em>(excess higher mathematics; see explanation below)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ames</td>
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<td></td>
<td></td>
<td>Lewis</td>
<td></td>
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</tbody>
</table>

*Option 12 Aeronautical Theory (Applied Mathematics) - The register for this option will include only those competitors who have successfully completed 6 semester hours of higher mathematics over and above differential and integral calculus. This 6 semester hours must have included at least one course of 3 semester hours in differential equations.
GENERAL INFORMATION FOR ALL APPLICANTS

Registers and Certification

Registers or lists of eligible competitors will be established and maintained in terms of the twelve options listed in the table above. Each of the three NACA Laboratories will maintain its own registers for each option applicable to that Laboratory. At the time of certification for filling a specific vacancy in any one of the twelve areas of research, or options, the names of those highest on the appropriate register will be certified for filling the position. Upon appointment after selection from the appropriate register the appointee will be given a title corresponding to the area of research in which he is to work.

Appointments

Appointments for entry into the service in these positions will be made subject to investigation of the appointee, and will be probational unless otherwise limited. Probational appointments become permanent upon satisfactory completion of a probationary period of 1 year.

Fingerprinting

Fingerprints will be taken of all persons appointed from this examination.

Positions to be Filled

The positions covered by this announcement, and other positions requiring similar qualifications, will be filled from these registers unless it is in the interest of the service to fill any position by reinstatement, transfer, or promotion.

Verification of Qualifications

Applicants may be required to present proof of qualifications claimed, but should not submit such proof unless it is requested. Exaggeration or misstatement will be cause for disqualification or later removal from the service.

Salary and Work Week

Salary is based on the standard Federal work week of 40 hours. Additional compensation is provided for any authorized overtime worked in excess of the 40-hour week. The basic entrance salary is $3100 per annum. Periodic pay increases of $125 per annum up to the maximum of $3850 are provided by law following the completion of each 52 weeks of service for employees whose services meet prescribed standards of efficiency.

Appointments are generally made at the basic entrance salary rate of the grade. However, under some circumstances, an eligible who is already a Federal employee may, at the discretion of the employing agency, enter a position from this examination at a higher rate within the grade which is not more than his previous salary.

Retirement Deductions

The basic salary of $3100 for these positions is subject to a deduction of 6 percent for retirement benefits.

Sex

The appointing authority requesting certification has the legal right to specify the sex desired.

Age Waiver for Certain War Service Indefinite Employees

Age limits are waived for war-service indefinite employees who, on the closing date of this examination are serving in positions which would be filled from the eligible register resulting from this examination, and who could normally be expected to have completed 15 years of Federal service by their 70th birthday. These age limits will also be waived for war-service indefinite employees who on the closing date of this examination are serving in positions which would be filled...
from the eligible register resulting from this examination and who could not be expected to have completed 15 years of Federal service by their 70th birthday. However, the names of eligible war-service indefinite employees in the latter group will be entered on supplemental lists which will be used only after all other eligibles have been given appropriate consideration. An eligible on the supplemental list may be accorded a competitive status only in the position he held on the closing date, or one of lower grade for which the list is appropriate.

Veteran Preference

Preference benefits based upon honorable separation from the armed forces are given under certain conditions in competitive examination for original appointment:

1. Five points are added to the earned ratings of the applicant who establishes claim to preference based on his or her own active service in the armed forces of the United States during any war or in any creditable campaign or expedition.

2. Ten points are added to the earned ratings of applicants who establish a claim to preference as: (a) a disabled veteran, (b) the wife of a disabled veteran who is disqualified for appointment because of his service-connected disability, (c) the widow (who has not remarried) of a deceased ex-service man who served in the armed forces of the United States on active duty during any war or in any creditable campaign or expedition, or (d) the widowed, divorced, or separated mother of certain deceased or disabled ex-service sons or daughters.

Applicants who wish to claim veteran preference should be prepared to furnish documentary proof of honorable separation from the armed forces if and when it is requested. Failure to submit such evidence may result in loss of opportunity for appointment.

No Fee Charged.

Appointments to Federal positions which are subject to the Civil Service Rules are made through the Civil Service Commission. It is not necessary to secure the services of a private employment agency in order to obtain Federal employment.

HOW TO APPLY

What to File

Each applicant must file a card Form 5000-AB. The exact title of the examination, as given at the head of this announcement, and the place where you wish to be examined must be stated on the card Form 5000-AB. Where this card form requires you to list "options," you must insert your science major or branch of engineering, for this will determine which written tests you will take.

Where to Get Form

Card Form 5000-AB may be obtained from the Board of U. S. Civil Service Examiners, NACA, Langley Field, Virginia; from the U. S. Civil Service Commission in Washington, D. C., or any of its Regional Offices; or from any first- or second-class post office where this announcement is posted.

Where and When to File

The card Form 5000-AB must be addressed to the Board of U. S. Civil Service Examiners, NACA, Langley Field, Virginia. It must be received at the Board by February 28, 1950.

Time and Place of Written Examination

You will be notified later as to the time and place of the written examination. The cities where the examination will be held are listed below. A request for examination at a place not included in the list cannot be granted.

SPECIAL NOTE

As explained elsewhere in this announcement, certain positions and options are appropriate for one or two or three of the NACA Laboratories (Langley, Ames, and Lewis; locations given on page 1). If you wish to be considered for more than one location, you will be asked to bring to the written examination one Application Form 57 and one copy of your list of college courses (registrar's transcript) for each location; this will be fully explained in the notice you will receive later.
PLACES WHERE EXAMINATIONS ARE HELD

The examination described in this announcement will be given at the places named below.

A resident of any State or Territory may be examined in any city named in the list. A request for examination at a place not included in the list cannot be granted.

Alabama: Anniston, Birmingham, Decatur, Dothan, Daphne, Florence, Gadsden, Huntsville, Mobile, Montgomery, Opelika, Selma, Tuscaloosa, Tuskegee Institute.

Alaska: Anchorage, Cordova, Fairbanks, Juneau, Ketchikan, Sitka.


Delaware: Dover, Wilmington.


Florida: Daytona Beach, Fort Myers, Gainesville, Jacksonville, Key West, Lake City, Lakeland, Miami, Orlando, Pensacola, St. Petersburg, Tallahassee, Tampa, West Palm Beach.

Georgia: Albany, Americus, Athens, Atlanta, Augusta, Brunswick, Columbus, Dublin, Frazier, Gainesville, Macon, Rome, Savannah, Thomasville, Valdosta, Waycross.

Hawaii: Honolulu.

Idaho: Boise, Coeur d'Alene, Grangeville, Idaho Falls, Lewiston, Moscow, Pocatello, Sandpoint, St. Anthony, Twin Falls, Weiser.


Indiana: Angola, Bloomington, Evansville, Fort Wayne, Hammond, Indianapolis, Jeffersonville, Lafayette, Marion, Muncie, Richmond, South Bend, Terre Haute, Valparaiso, Vincennes.

Iowa: Atlantic, Burlington, Cedar Rapids, Chariton, Clinton, Creston, Davenport, Decorah, Denison, Des Moines, Dubuque, Fort Dodge, Iowa City, Jefferson, Keokuk, Lake City, Monticello, Mt. Pleasant, Ottumwa, Shenandoah, Sioux City, Spencer, Waterloo.

Kansas: Concordia, Dodge City, Emporia, Fort Scott, Garden City, Goodland, Great Bend, Hays, Junction City, Kansas City, Lawrence, Lewesworth, Liberal, Manhattan, Norton, Parsons, Pittsburg, Pratt, Salina, Topeka, Wichita.


Maryland: Baltimore, Cumberland, Eastern, Hagerstown, Salisbury.


Michigan: Alpena, Ann Arbor, Battle Creek, Big Rapids, Ludington, Chesugan, Escanaba, Flint, Grand Rapids, Houghton, Ironwood, Jackson, Kalamazoo, Lansing, Manistee, Marquette, Muskegon, Port Huron, Saginaw, Saint Joseph, Sanford, Traverse City.


Mississippi: Biloxi, Brookhaven, Clarksdale, Columbus, Corinth, Greenville, Hernando, Gulfport, Hattiesburg, Jackson, Laurel, Meridian, Natchez, Oxford, Starkville, Tupelo, Vicksburg, West Point.


Nebraska: Alliance, Beatrice, Broken Bow, Chadron, Columbus, Fremont, Grand Island, Hastings, Kearney, Lincoln, McCook, Nebraska City, Norfolk, North Platte, Omaha, O'Neill, Scottsbluff, Sidney, Valentine, Superior, Yankton.

New Hampshire: Berlin, Claremont, Concord, Durham, Hanover, Keene, Laconia, Manchester, Plymouth, Portsmouth.

New Jersey: Atlantic City, Asbury Park, Camden, Elizabeth, Hackensack, Newark, New Brunswick, Paterson, Red Bank, Trenton.

New Mexico: Albuquerque, Clayton, Clovis, Deming, Gallup, Grant, Las Vegas, Raton, Roswell, Santa Fe, Silver City, Tucumcari.


North Dakota: Bismarck, Devils Lake, Dickinson, Fargo, Garrison, Grand Forks, Harvey, Jamestown, Kenmare, Minot, New Rockford, Oakes, Valley City, Wahpeton.

Ohio: Akron, Ashtabula, Athens, Canton, Chillicothe, Cincinnati, Cleveland, Columbus, Dayton, Lima, Mansfield, Marion, Portsmouth, Youngstown, Zanesville.


Puerto Rico: Mayaguez, Ponce, San Juan.

Rhode Island: Narragansett, Newport, Providence, West Warwick.


Tennessee: Athens, Bristol, Chattanooga, Clarksville, Columbia, Cookeville, Decaturville, Dyersburg, Jackson, Memphis, Nashville, Oak Ridge (for project, dwellers only), Paris, Union City.


Utah: Cedar City, Logan, Ogden, Provo, Salt Lake City.

Vermont: Brattleboro, Burlington, Middlebury, Montpelier, Newport, Rutland, St. Albans, St. Johnsbury.


Washington: Aberdeen, Bellingham, Chehalis, Everett, Longview, Olympia, Pasco, Port Angeles, Port Townsend, Pullman, Raymond, Seattle, Spokane, Vancouver, Wenatchee, Yakima.

West Virginia: Bluefield, Charleston, Clarksburg, Elkton, Grafton, Huntington, Martinsburg, Morgantown, Parkersburg, Wheeling.
