
**NATIONAL ROSTER
OF
SCIENTIFIC AND SPECIALIZED PERSONNEL**

**JUNE 1942
NATIONAL RESOURCES PLANNING BOARD**

NATIONAL ROSTER
OF
SCIENTIFIC AND SPECIALIZED PERSONNEL

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REPORT OF THE
NATIONAL ROSTER OF SCIENTIFIC AND SPECIALIZED PERSONNEL
TO THE
NATIONAL RESOURCES PLANNING BOARD

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NATIONAL ROSTER OF SCIENTIFIC AND SPECIALIZED PERSONNEL

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FOREWORD

The organization of the National Roster of Scientific and Specialized Personnel was a significant step in the development of wartime personnel policy in the U. S. A. Of all our scarce resources special training is the most important. Specialists can overcome almost any other known scarcity. They are the persons who maximize resources—raw materials, machines, and facilities, the energies of workers, the organization of power and transportation facilities, the tools of mathematics, the physical and social sciences, and the arts of management and administration.

The recognition of the need for a central clearinghouse not only for the names of specialists but also for the development of policies concerning the use of specialists took place in the summer of 1940. The National Resources Planning Board assumed an organizing responsibility and has retained an advisory role as the work of the Roster has grown and developed. However, the real success of the Roster has come from the recognition given to it by the many agencies of the Federal Government which use its lists and the wisdom of its operating personnel.

The service rendered by the Roster is hard to measure. But it is known that by November 28, 1942, 1,590 requests for specialized personnel had been received from Government agencies, war industry, and agriculture, and 136,593 names had been certified in response to these requests. There is no way of knowing how much valuable work has continued uninterrupted as a result of the way in which the Roster has functioned.

The work of the Committee on Wartime Requirements for Specialized Personnel of which Mr. Owen D. Young was Chairman during the winter of 1941-1942 further emphasized the problems which had to be faced if specialized personnel was to be adequately used under the heavy demands of wartime.

The inclusion of the Roster in the administration of the War Manpower Commission recognized the need for integrating the policies of the Roster with the general manpower policies of the Government. It was further recognized that the policies affecting this group should receive special consideration, as do other special groups, such as hard rock miners and certain agricultural employees.

The description of the Roster's work given here was prepared by Dr. Leonard Carmichael, James C. O'Brien, and the staff of the Roster, as a record of the organization and work of the Roster from its inception through June 1942. It is intended primarily for those who are concerned with the administration of this type of technical problem and those who are interested in the use of the wealth of information contained in the Roster's files for planning the use of specialized personnel.

The collaboration and continuing interest of the cooperating councils and many professional and scientific associations and societies has made the Roster a great cooperative enterprise. For this reason among others it has been an effective Government agency.

THOMAS C. BLAISDELL, Jr.,
Assistant Director.

APPENDICES

APPENDIX A¹

Orientation

On July 28, 1941, final plans began to be formulated whereby the National Roster of Scientific and Specialized Personnel might make specific evaluations of the men of military age registered with the National Roster. This project was to be concerned with their most effective utilization in national war activities, either as civilians or in some branch of the service. Data were to be supplied both to the National Headquarters of the Selective Service System and to the War Department. Preliminary plans had already been worked out by Dr. Leonard Carmichael and Mr. James C. O'Brien, and at an earlier date they had conferred with Mr. Frederic A. Delano and Mr. Thomas C. Blaisdell, Jr., of the National Resources Planning Board; with Gen. Lewis B. Hershey and Lt. Col. Carlton S. Dargusch of the Selective Service System; and with Lt. Col. (then Maj.) C. B. Ferenbaugh of the War Department.

Background data

The first step in setting up the project was to secure information from various sources as to actual needs, or possible needs, for technically trained men in the near future. Conferences were held with representatives of the Defense Unit of the Bureau of Labor Statistics; the Office of the Coordinator and Director of Training of the United States Civil Service Commission; the National Headquarters of the Selective Service System; both the Personnel Procedures Section of the Adjutant General's Office and the Personnel Division of the General Staff of the War Department; and the Shore Establishment Division of the Secretary's Office of the Navy Department. In addition, data were secured from the certification files of the National Roster concerning calls for technically trained individuals and also from the report of Mr. William E. Workmaster dated February 27, 1941.

As a result, it became apparent that there were certain fields represented in the National Roster where the demand for technically trained persons was not very great, but that in other fields individuals with technical skills were very much needed, so much so in fact that in certain areas there was either an actual or an anticipated shortage of experts. As an instance of the fields in which the demand for individuals in war work is not very great, botany and anatomy are con-

venient examples. This is not to say that botanists and anatomists are not important individuals in the field of science; it simply means that there are not many demands for individuals in botany or anatomy, and almost no indications of possible shortages of well-trained individuals in these fields. On the other hand, real needs exist for individuals in such fields as the following:

- Mathematics.
- Naval Architecture and Marine Engineering.
- Aeronautical Engineering.
- Chemical Engineering.
- Civil Engineering.
- Electrical Engineering.
- Mechanical Engineering.
- Mining and Metallurgical Engineering and Mineral Technology.
- Accounting.
- Bacteriology.
- Economics.
- Psychology.
- Statistics.
- Physics and Astronomy.
- Radio Engineering.
- Personnel Administration.

The order of the above list does not indicate order of importance. In fact, one of the most important problems of the work has been that of "priorities," that is, the question of which of the above fields should be dealt with first.

In order for the activities to function smoothly, only one field of specialization could be circularized at a time. However, as will be apparent in a later portion of this report, it is possible to move quickly from one field of specialization to another by circularizing another field just as soon as one is finished, and in the meantime to begin the sorting and evaluating procedures on the previous fields. The plan, then, was to handle the cases in the fields listed above first of all, and then eventually to deal with *every field* of specialization coded in the National Roster.

Forms and Questionnaires

The next step involved the formulation of appropriate form letters and questionnaires. These were worked out, edited, and rewritten many times; and they were checked and approved by the officials of the National Roster of Scientific and Specialized Per-

¹ Prepared by Dr. STUART HENDERSON BRITT, special consultant of the Roster.

sonnel, and with representatives of the following agencies:

National Headquarters of the Selective Service System.
Personnel Procedures Section of the War Department.
Personnel Division of the General Staff of the War Department.
Secretary's Office of the Navy Department.
Division of Statistical Standards, Bureau of the Budget.

Copies of each form and questionnaire² may be listed as follows:

(1) Form Letter 1, to be sent to every man registered with the National Roster who was *born on or after July 1, 1913, and on or before July 1, 1920.*

(2) Green questionnaire to be sent with Form Letter 1, in order to secure the following information: The man's status with respect to Selective Service; a list of those individuals who have the most complete knowledge of his technical skills; the name and address of his employer, if any; and a statement of the exact nature of his present duties, especially insofar as they may relate to national defense.

(3) A mimeographed form, sent with Form Letter 1 (1) and the green questionnaire (2). This mimeographed form is sent in order to prevent registrants from sending us information more than once.

(4) Form Letter 2, to be sent to every man who returns the green questionnaire, except the following:

Reserve officers.

Any individuals now in active service with any branch of the Army or Navy.

Men classified as I-C (member of land or naval forces of the United States).

Men classified as IV-A (man who has completed service).

This form letter instructs the man to notify the National Roster if he is about to be inducted into the Army, and tells him briefly of the plan whereby information concerning his technical skills may be sent to the National Headquarters of the Selective Service System, or to the War Department, or to both.

(5) Confidential letter of inquiry to the reference. In those instances in which an evaluation is to be made, this letter is sent to every individual listed on the green questionnaire as one who has knowledge of the man's technical skills.

(6) Salmon-colored questionnaire, asking for confidential statements from the reference concerning the man. This questionnaire accompanies the Form Letter (5) to the reference.

(7) Confidential letter of inquiry to the employer. In those instances in which an evaluation is to be made, this letter is sent to the employer, if any, listed by the man on his green questionnaire.

(8) A yellow form for confidential statements of the employer. This accompanies the form letter to the employer (7).

(9) A form for recommendation of an individual to the National Headquarters of the Selective Service System as one "who possesses certain special qualifications by reason of which he may now or later become a necessary man in civilian occupation." Instead of using the name of the National Roster, this form is set up on the letterhead of the Selective Service System, with the name of Lewis B. Hershey, Director, appearing at the bottom.

(10) A statement to the War Department concerning any man whose probable date of induction into the Army is known. Information is sent to the Personnel Procedures Section of the War Department on this form, indicating the man's educational training, occupational experience, if any, plus other pertinent data concerning his technical skills and qualifications.

To clarify the statements made under (5) and (7) above—"In those instances in which an evaluation is made"—we are concerned primarily with investigations and evaluations of men in the following classifications:

Not yet classified by their Selective Service Local Board.

Class I-A (available; fit for general military service).

Class I-B (available; fit for only limited military service).

Class II-A (deferred for limited time; necessary man).

Class IV-E (conscientious objector available only for civilian work of national importance).

As indicated above (4), the questionnaires of men in Class I-C (member of land or naval forces of the United States) and Class IV-A (man who has completed service) are simply filed with the Roster questionnaire, and no further action is taken. For men in all other classes, Form Letter 2 is sent (4), but no evaluations are made.

Operating Procedures

The actual machinery for operations may be briefly described as follows:

After due consideration of possible occupational needs and after consultation with other representatives of the National Roster, an order is sent the machine room for the complete tabulation of all men within the field chosen who were born on or after July 1, 1913, and on or before July 1, 1920. The tabulations of the machine room show name, address, what check lists have been filled out, and the principal fields of specialization within the scope of the check lists. The following are then sent in one envelope to every individual listed on the machine tabulation: Form Letter 1 (1), the green questionnaire (2), the mimeographed sheet (3), and a return envelope. On each green questionnaire is stamped the field number and the log number of the man; and the return envelope is stamped with

² Copies of these forms and questionnaires may be inspected at the offices of the Roster or the National Resources Planning Board where they are on file.

his field number preceded by a "7" (used as a symbol on all mail to indicate that it should be routed to this office). The envelopes are counted before being mailed so that there is a record of the number of men circularized in each field.

As soon as the green questionnaires are returned by the individuals, they are sorted according to field of specialization. They are then sorted into three groups within the field of specialization:

1. Those cases where no action is necessary because the man is connected with some branch of the service. (Compare (4) above.)

2. Those cases where an evaluation is necessary because the man is in Class II-B, III-A, or IV (with the exception of IV-E).²

3. Those cases where an evaluation is necessary because the man is not yet classified, or is in I-A, I-B, II-A, or IV-E.

In the first instance—men now connected with some branch of the service—the green form is sent to our files to be combined with the Roster questionnaire, and no further action is taken. In both the second and third groups every individual receives Form Letter 2. In addition, for every individual in the third group, the form letters and questionnaires are sent to his references, and also the form letter and questionnaire to his employer, if any.

Each step in this process is marked in the appropriate space at the top of the green questionnaire with an accompanying date. In all instances where the man falls in the second group, the green questionnaire is returned to the Roster files as soon as Form Letter 2 has been sent. However, in the case of the men in the third group the green questionnaire is sent to the file room with instructions to combine the green questionnaire with the Roster questionnaire and to return both to the Roster office for further evaluation.

As the salmon-colored forms from the references and the yellow forms from the employer come in, they are also combined with the Roster questionnaire and the green questionnaire, ready for evaluation. In every instance where a man indicates, either on his green questionnaire or by telegram or letter, that he is about to be inducted into the Army in the very near future; that is, within the very next few weeks—a special evaluation is immediately begun of his case. In certain instances information is sent to the National Headquarters of the Selective Service System on Form 9; and in all cases where a man is likely to be inducted soon, appropriate information concerning him is sent to the Personnel Procedures Section of the Adjutant General's

Office of the War Department on Form 10. A weekly check is made of all cases ready for evaluation so that, in those instances where the probable time of a man's induction is approaching, a special evaluation may be made of his case. The rest of the questionnaires and other information concerning the men in each field are placed to one side to await evaluation of experts in that particular field.

Evaluations

For each field of specialization represented in the Roster, a letter is sent to the President and to the Secretary of the national society (or societies) in that field several weeks before our green questionnaires go out to men of military age in that field. Copies of the type of letter to these societies are attached herewith as exhibits (11) and (12). In these letters the President and Secretary of the particular society are informed of the general plan; and are asked to name experts in their field who are within easy traveling distance of Washington, D. C., are capable of judging the competence of other men, are over 28 years of age, and would probably be willing to meet in Washington with other experts in their field to evaluate the papers of the men of military age. After nominations have been received, a selection is made of at least three individuals, and they are asked if they would be willing to meet together in Washington, D. C., as a consultative committee (exhibit 13). No compensation is given, but travel and subsistence expenses are paid. Just as soon as the number of questionnaires in a particular field has decreased to a point where only a few are coming in a day, the three members of the evaluating committee are invited to meet together in our offices at the National Roster. Here the entire project is explained to them in all its details, both as to the aspects which concern Selective Service and those which relate to the War Department; and available data as to needs or shortages in their fields are presented.

The committee then begins its evaluation. Available to them are the following for each man: His Roster questionnaire, one or more check lists, his green questionnaire, and as many questionnaires of references and employer (if any) as have been returned. The evaluators are asked to divide the cases into two groups:

1. Those in which the National Headquarters of the Selective Service System should be notified that this man "possesses certain special qualifications by reason of which he may now or later become a necessary man in civilian occupation."

2. Those in which no such recommendation should be sent to Selective Service.

Following these judgments of the evaluators, Form 9 is sent to the National Headquarters of the Selective

² There are also special cases of undeliverable envelopes, and of men erroneously listed as in the age limits stated above.

Service System for all men in the first group. In both groups, Form 10 is filled out and sent to the Adjutant General's Office of the War Department in any instance where a man's probable date of induction is indicated. Information is not sent to the War Department in those cases where probable induction date is unknown, but registrants have been instructed in Form Letter 2 to notify the National Roster of Scientific and Specialized Personnel if they are about to be inducted, and at that time we can write the War Department concerning their technical training and skills.

As soon as recommendations have been sent to the War Department and to the Selective Service System, the Roster questionnaire and all the other data are combined and returned to the permanent files of the Roster.

Illustrative of the above procedures, approximately 810 green questionnaires were sent out to male mathematicians of military age late in September. At the meeting of the 3 expert mathematicians in the middle of October, sets of papers on 324 men were presented to them for evaluation. Of these, 168 were selected by them as papers of individuals who should have information sent to Selective Service concerning their special qualifications, and the remaining 156 as papers of men about whom there should not be any recommendation to Selective Service.

Information for Selective Service and for the War Department

Concerning the Roster's recommendations to Selective Service, six copies are made in each case of Form 9. Three of these copies are retained in the Roster files: One kept in the "Appropriate Action Taken File" of this office, one filed with all other Selective Service forms of the same sort, and one returned to the permanent files of the Roster with the questionnaire. For the three copies which go to the National Headquarters of the Selective Service System, one copy is retained in their files, and two are sent to the appropriate State Director of Selective Service, who in turn retains one copy in his files and sends the other along to the appropriate Local Board. However, the National Headquarters of the Selective Service System has reserved the right to withhold action on any case deemed advisable, although their office is supposed to notify the Roster in such instances.

In connection with the data sent to the Adjutant General's Office of the War Department concerning the technical training of a man who probably will be inducted, the Adjutant General's Office notifies Roster officials very promptly in each individual case as to exactly what action, if any, has been taken. Most frequently this means the Roster is sent a carbon copy of the letter from the Adjutant General's Office to the

Commanding Officer of the Corps Area in which the man is likely to be inducted. In other instances, special letters are received from the Adjutant General's Office concerning the disposal of the case, indicating whether the man is believed to have sufficient technical competence to be of special value to the Army in his field of specialization.

Obviously there is no guarantee that can be given in advance that the information supplied by the National Roster either to Selective Service or to the War Department will result in any special privilege. As for Selective Service, each Local Board has the right to deal with its own cases. As for the Army, the special technical skills of any inductee may be needed by the Army at the time of his induction, or there may be personality factors or other elements which result in his assignment to duties other than those relating to his field of specialization. However, the data supplied by the National Roster have, in general, been of direct assistance to both of the above agencies with respect to classification problems; and we have every reason to believe that the information supplied by the Roster is of very practical use to them.

Individual Cases

In every instance in which a man registered with the National Roster communicates with the Roster, either by letter or by telegram, concerning his possible induction into the Army, he is advised that an evaluation is being made. It is also indicated that, regardless of his eventual classification by his Selective Service Local Board, appropriate data concerning his technical training or qualifications has been or will be sent to the War Department. In general, it has seemed advisable not to tell him directly that the National Headquarters of the Selective Service System either will or will not be advised concerning his case, although there are some exceptions to this general policy. Also, a great deal of correspondence is involved with references, or other interested persons, such as employers and representatives of various scientific societies.

This office is also handling a large number of letters daily from individuals not yet registered with the National Roster but who are of military age and, apparently, because they have heard of our project with relation to Selective Service, now wish to receive a copy of the green questionnaire. In all such cases, the individual is properly registered with the National Roster at the same time that information is secured concerning his status under Selective Service. In addition, in every instance in which a technically trained man of military age informs the Roster that he is about to be inducted into the Army, all appropriate papers are immediately sent him and the process of

evaluation begun just as soon as possible. Even though the field of specialization has not as yet been reached in mailing, it seems essential that each individual case of this sort should receive attention. As the project becomes more widely publicized, the number of such individual cases is increasing. Together with the cases in fields already reached where the date for induction is very soon, this means that a rather large number of special cases must be handled quickly. So far as possible, this is done with the aid of expert evaluators in the field represented; but where the time is so short that this is not feasible, the evaluation is made by members of the executive staff of the National Roster.

This matter is in part related to the information now presented to registrants at Selective Service Local Boards throughout the country. As a direct result of an information bulletin prepared in this office of the Roster, a Memorandum was sent out by the National Headquarters of the Selective Service System to all State Directors on September 29, 1941, in which the purpose and functions of the Roster are described and the suggestion is made that scientifically and technically trained men register with the Roster. This Memorandum instructs all Local Boards to post it on their bulletin boards (exhibit 14). A supplementary Memorandum (exhibit 15) was sent out by the National Headquarters of the Selective Service System on October 17, 1941; this Memorandum refers to the earlier one, and deals specifically with the form sent out on individual cases (exhibit 9).

Men in the Service

In addition to the phases of work dealing with potential inductees, certain aspects of the project relate directly to men already connected with some branch of the service. In this connection, there are three types of problems which are dealt with directly.

First of all, in every instance in which a man who is registered with the National Roster writes with respect to his present assignment to duties, appropriate information concerning him is sent to the Adjutant General's Office in the case of the War Department,

and to the Shore Establishment Division of the Secretary's Office in the case of the Navy Department. The man is also advised by the Roster that information concerning him is being sent to the War or Navy Department, as the case may be; and that department later notifies the Roster what action, if any, has been taken in the case. In certain instances this office then writes to the man again, passing on to him information supplied by the War Department or Navy Department.

In many instances, however, on the basis of available information, it seems expedient not to write the War Department or Navy Department concerning the man; and in such cases he is advised to take up his problem himself through appropriate military channels. In no instance is the National Roster concerned with classification problems in either the Army or Navy unless the man himself writes for advice or assistance. This is mentioned specifically because there have been cases where parents, rather than the men themselves, have written to the National Roster asking for assistance in securing a change of duties of their sons.

In the second place, although the general plan has been to take no action in the case of reserve officers, there have been one or two instances where an employer of a reserve officer has asked the Roster's advice because of the apparent need for the reserve officer as a civilian in work relating to national defense. Since this office is directly concerned with the most effective utilization of men in the national defense program, these cases have been taken up directly with various divisions of the War Department and the Navy Department.

In the third place, contacts are now being made with the Reemployment Division of the National Headquarters of the Selective Service System. Here the attempt will be made to see that men released from the Army will be informed of the purpose and functions of the National Roster of Scientific and Specialized Personnel. It is hoped that the scientifically and technically trained men who are not already registered with the National Roster will thus be informed of its existence, and will be encouraged to register with the Roster in their fields of specialization.

APPENDIX B

The Office of Scientific Personnel has made extensive use of the facilities of the National Roster of Scientific and Specialized Personnel, and has depended in large measure on its files to secure information concerning the men best qualified to give important scientific aid to the governmental agencies cooperating in the war program. Working in close cooperation with the Roster, the Office of Scientific Personnel has selected and secured over 600 men for commissions in the Army

and Navy, in addition to locating men for work in the National Defense Research Committee laboratories and other defense agencies employing scientists.

Dr. Henry A. Barton and Dr. J. C. Morris, chairman and director respectively of the Office of Scientific Personnel, have been appointed to serve as consultants to the National Roster. In this capacity they have been of particular assistance in the fields of physics and radio engineering, in which there are acute shortages.

The Office of Scientific Personnel has cooperated with the Roster in securing lists of names to be included in the fields of physics and astronomy. It is at present handling the recircularization of men trained in these fields for the Roster, and is checking the list of those presently enrolled with the Roster in an effort to make it as accurate, complete, and up to date as possible.

The Roster has called on the Office of Scientific Personnel for suggestions in connection with the working out of suitable procedures by which to inform the local Selective Service Boards of the importance of the civilian duties of a number of men registered in the Roster, and to inform the Army of special qualifications of men chosen for Selective Service. In this connection the Office of Scientific Personnel is assisting Dr. Britt of the National Roster in making recommendations con-

cerning all physicists and radio engineers subject to call for Selective Service.

Where the need for men has been particularly acute, the Office of Scientific Personnel has augmented the information contained in the standard questionnaire by obtaining confidential evaluations of the ability and personal characteristics of the men registered in such fields. This has been done with respect to acoustics, electronics, radio engineering, and optical instruments, and will be extended to other fields as the need arises.

The Office of Scientific Personnel is presently conducting for the Roster a circularization of the physics departments of the American universities and colleges to determine the availability of all physicists expected to secure degrees during 1942.

APPENDIX C
STATISTICAL SURVEY OF THE LEARNED WORLD

Number of Persons Engaged in Scientific and Professional Occupations Arranged by Countries

WESTERN HEMISPHERE

TABLE 1.—Fields 1 to 14

Field No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Accounting	Agricultural sciences, n. e. c.	Anatomy	Animal sciences except veterinary science	Anthropology	Architecture	Astronomy	Bacteriology (includes pathology)	Botany	Chemistry	Dentistry	Economics	Entomology	Forestry
North America:														
United States	191,600		600	17,500	996	22,000	630	2,300	1,300	60,000	77,213	14,436	2,300	14,800
British Honduras										7	4			
British West Indies											177			
Canada		1,300			14	1,298	900			3,318	4,037		190	510
Costa Rica		67		21		11					55			
Cuba					6	443					1,050			
Dominican Republic	38		3			12		1	4	13	148	9		1
Guatemala		5			9						85			
Haiti					4	150					60			
Honduras	972	46				3		12	1	12	96	5		
Mexico		21			74						900			
Nicaragua		5		35		6					45			
Panama		15				83				12	77			
Puerto Rico	992				4	61				375	143			618
Salvador		6		3		2					120		1	
South America:														
Argentina	2,511	209			20	729		1,100		505	4,100		20	
Bolivia		2			2	13				4	50			
Brazil		2,190			14	50				100	10,000			
Chile	2,000	10	2		5	500		20	10	75	800	15		5
Colombia		79		2	9	183				40	650		2	
Ecuador		45			4	60			1		300			
Paraguay		18			1						65			
Peru		30			27	127				18	450			
Uruguay				72	1	350			7	9	725	20	1	7
Venezuela		21		8	4	20					125			

Footnotes: See "Sources of Data," below.

WESTERN HEMISPHERE—Continued

TABLE 2.—Fields 15 to 28

Field No.	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	Aero-nautical engineering	Auto-motive engineering	Chemical engineering	Civil engineering	Electrical engineering	Heating, ventilating, and refrigerating engineering	Mechanical engineering	Mining and metallurgical engineering	Marine and naval architectural engineering	Radio engineering	Safety engineering	Testing materials	Traffic and transit	Other, or all branches of engineering
North America:														
United States.....	\$4,000	\$6,500	\$3,400	102,000	157,800	\$3,300	\$4,300	\$15,000	\$1,500	\$2,570	\$1,114	\$2,000	\$316	-----
British Honduras.....	-----	-----	-----	9	5	-----	6	-----	-----	-----	-----	-----	-----	-----
Canada.....	-----	-----	-----	7,524	3,937	-----	2,859	2,478	1,000	-----	100	-----	-----	-----
Cuba.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	375
Dominican Republic.....	-----	2	10	75	5	-----	8	15	-----	-----	-----	-----	-----	-----
Guatemala.....	-----	-----	-----	89	17	-----	21	-----	-----	-----	-----	-----	-----	17
Honduras.....	-----	-----	-----	55	2	-----	2	1	-----	-----	-----	-----	-----	210
Mexico.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	280
Panama.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	233
Puerto Rico.....	-----	-----	181	576	56	-----	313	-----	-----	-----	-----	-----	-----	-----
South America:														
Argentina.....	-----	-----	-----	1,542	-----	-----	-----	-----	-----	-----	-----	-----	-----	84
Bolivia.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	33
Chile.....	-----	-----	30	100	150	-----	300	400	-----	-----	-----	-----	-----	-----
Peru.....	-----	-----	-----	185	25	-----	25	35	2	-----	-----	-----	-----	33

Footnotes: See "Sources of Data," below.

TABLE 3.—Fields 29 to 42

Field No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	Genetics	Geology and geophysics	Geography	History and political science	Horticulture (including agronomy and plant pathology)	Journalism	Law	Landscape architecture	Library science	Mathematics	Medicine	Medical specialties	Meteorology	Nursing
North America:														
United States.....	\$1,020	\$4,770	\$755	\$6,760	\$3,600	\$51,800	\$160,600	\$1,500	\$29,600	\$5,500	\$175,300	\$19,400	\$1,300	\$300,000
British Honduras.....	-----	-----	-----	-----	-----	-----	22	-----	-----	-----	22	-----	-----	-----
British West Indies.....	-----	-----	-----	-----	-----	-----	448	-----	-----	-----	372	-----	-----	-----
Canada.....	-----	-----	-----	-----	417	3,343	-----	-----	374	-----	10,021	-----	-----	-----
Costa Rica.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	170	-----	-----	-----
Cuba.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	3,100	450	-----	-----
Dominican Republic.....	-----	4	3	12	29	96	523	-----	19	15	418	-----	-----	-----
Guatemala.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	500	-----	-----	-----
Haiti.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	225	-----	-----	-----
Honduras.....	-----	-----	1	4	5	22	352	-----	-----	-----	190	-----	-----	77
Mexico.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	10,000	-----	-----	-----
Nicaragua.....	-----	-----	-----	-----	4	-----	-----	-----	-----	-----	240	-----	-----	-----
Panama.....	-----	4	-----	-----	58	-----	275	-----	-----	-----	175	-----	-----	-----
Puerto Rico.....	-----	-----	-----	-----	31	101	610	-----	56	-----	583	-----	-----	1,761
Salvador.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	200	-----	-----	-----
South America:														
Argentina.....	-----	-----	-----	-----	248	136	5,584	-----	1,265	-----	11,900	1,160	-----	-----
Bolivia.....	-----	-----	-----	-----	4	-----	176	-----	-----	-----	180	-----	-----	-----
Brazil.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	25,000	220	-----	-----
Chile.....	-----	20	8	25	75	75	2,500	-----	15	3	2,061	-----	-----	-----
Colombia.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,000	-----	-----	-----
Ecuador.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	600	-----	-----	-----
Paraguay.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	150	-----	-----	-----
Peru.....	-----	-----	-----	-----	151	-----	550	-----	-----	-----	1,200	-----	-----	-----
Uruguay.....	4	1	-----	-----	120	-----	-----	-----	-----	-----	1,500	80	-----	-----
Venezuela.....	-----	-----	-----	-----	28	-----	-----	-----	-----	-----	1,200	-----	-----	-----

Footnotes: See "Sources of Data," below.

WESTERN HEMISPHERE—Continued

TABLE 4.—Fields 43 to 54

Field No.	43	44	45	46	47	48	49	50	51	52	53	54
	Nutri- tion	Personnel adminis- tration	Phar- macy	Physics	Physi- ology	Psychol- ogy	Social welfare	Social science n. e. c.	Statist- ics	Veteri- nary science	Zoology (biology, if aster- isked)	Miscel- laneous
North America:												
United States.....	400	*3,800	*106,000	*6,800	*650	*3,400	131,000		44,800	112,000	*2,300	
British West Indies.....										24		
Canada.....			4,000	982	200		1,177		37	1,046		
Costa Rica.....			212						7			
Cuba.....			2,500						22			
Dominican Republic.....		2	218	1	6	5	1	4	3	6	1	
Guatemala.....			400						12	3		
Haiti.....			96						5			
Honduras.....			142				2	4	3	3		
Mexico.....			10,000						23			
Nicaragua.....			150						13			
Panama.....			154						6	3		
Puerto Rico.....			250					518		26		
Salvador.....			150						5			
South America:												
Argentina.....			10,000		300				35	371		
Bolivia.....			75						14			
Brazil.....			6,150						45			
Chile.....	5	10	1,850	4	3	3	40	5	25	40	10	
Colombia.....			1,000						42			
Ecuador.....			500						18	12		
Paraguay.....			100						9			
Peru.....			800						10	7		
Uruguay.....			1,000						14		*98	
Venezuela.....			1,000						15	2	7	

Footnotes: See "Sources of Data," below.

EASTERN HEMISPHERE

TABLE 5.—Fields 1 to 14

Field No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Account- ing	Agricul- tural sci- ences, n. e. c.	Anat- omy	Animal sciences except veteri- nary science	Anthro- pology	Arch- itecture	Astron- omy	Bacteri- ology (includes pathol- ogy)	Botany	Chemis- try	Dentist- ry	Econom- ics	Ento- mology	Forestry
Europe:														
Belgium.....						1,000							227	
Bulgaria.....					14	500			72		15		52	
Denmark.....					51	1,200	500		318	200		676	125	
Eire.....	673				41	560				145	1,115			
France.....		10,050			157	8,000			600	950				
Germany.....			319		320	36,000		300	900	14,000	12,120		400	5,000
Great Britain.....	13,944	10,500			720	16,637	1,000			15,000	14,722	5,000	700	1,350
Hungary.....					5	725				568				
Italy.....		735			70	6,000			206	300		432		
Latvia.....						97			75	305		370	382	191
Norway.....						110					1,061			
Romania.....					53	344					131			
Soviet Russia.....		31,700			17	5,000						1,107		
Sweden.....					112	625			430	550			250	2,148
Switzerland.....					51	1,500				830	1,188			5,600
Yugoslavia.....					35	181					353			
Asia, Africa, etc.:														
British Malaya.....	784				4	90				8				
Ceylon.....	75					8				23	43			
China.....					35									
Dutch East Indies.....											133			
India.....					16	220					4,022			
Japan.....					400		910			4,332	17,984			
Thailand.....					1	21								
Australia.....	4,241				24	1,555		85	231	1,987	3,139			
Egypt.....					9	207					593			
Union of South Africa.....					82	730					724			

EASTERN HEMISPHERE—Continued

TABLE 6.—Fields 15 to 28

Field No.	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	Aero- nautical engi- neering	Auto- motive engi- neering	Chemical engi- neering	Civil engi- neering	Electrical engi- neering	Heating, ventilating, and refrigerating engi- neering	Mechanical engi- neering	Mining and metallurgical engi- neering	Marine and naval architectural engi- neering	Radio engi- neering	Safety engi- neering	Testing materials	Traffic and transit	Other, or all branches of engi- neering
Europe:														
Bulgaria.....														220
France.....				580										
Germany.....	1,000		5,796	5,272	30,723	1,500	44,518							
Great Britain.....	1,478	2,900	878	11,548	17,058	1,000	12,295	3,050	2,500					
Hungary.....														2,000
Italy.....					820									7,975
Latvia.....							367							270
Norway.....					166									3,150
Romania.....														106
Soviet Russia.....														35,000
Switzerland.....														1,000
Turkey.....														95
Yugoslavia.....				432			154							1,500
Asia, Africa, etc.:														
British Malaya.....		18	4	43	50		47	22	9					119
Ceylon.....														19
India.....														12,500
Japan.....	1,478		7,628		9,400		17,796	3,776						21,390
Thailand.....														44
Australia.....				1,832										746

TABLE 7.—Fields 29 to 42

Field No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	Genetics	Geology and geo- physics	Geogra- phy	History and pol- itical science	Horti- culture (includ- ing agron- omy and plant pathol- ogy)	Jour- nalism	Law	Land- scape archi- tecture	Libray science	Mathe- matics	Medi- cine	Medi- cal special- ties	Meteor- ology	Nursing
Europe:														
Belgium.....		294	800							200		644		
Bulgaria.....		65					376				330			
Denmark.....		350			450					117	800	674		
Eire.....						786	1,759		259		1,953			5,534
France.....					1,800									
Germany.....		1,450	1,000			17,277				1,100	51,067	5,573		286,000
Great Britain.....	113	1,370	6,600							1,250	38,304	3,132	700	
Hungary.....											3,700	353	280	
Italy.....						1,475					16,972			
Latvia.....					467					156	1,073			
Norway.....			950	300			892				2,000		20	
Romania.....							1,132				323	2,106		
Soviet Russia.....							2,315				120,000			
Sweden.....				600							1,879	580		
Switzerland.....						300					3,500			
Turkey.....							9,496				10,900			
Yugoslavia.....							2,380				4,747			
Asia, Africa, etc.:														
British Malaya.....							218				120			
Ceylon.....											830			360
China.....			400								6,761			
Dutch East Indies.....											1,288			1,510
India.....											89,068			
Japan.....				900							52,792	8,388	582	56,590
Thailand.....							28				111			
Australia.....		74					3,522	4,630	1,363		4,769	175	49	19,739
Egypt.....											3,524			
Union of South Africa.....											3,098			5,571

EASTERN HEMISPHERE—Continued

TABLE 8—Fields 43 to 54

Field No.	43	44	45	46	47	48	49	50	51	52	53	54
	Nutri- tion	Personnel adminis- tration	Phar- macy	Physics	Physi- ology	Psychol- ogy	Social welfare	Social science n. e. a.	Statist- ics	Veteri- nary science	Zoology (biology, if aster- isked)	Miscel- laneous
Europe:												
Belgium.....				160							*150	
Denmark.....			200			49					*230	
Eire.....										507		
Germany.....			18,220	1,500			13,014			6,307	450	*1,285
Great Britain.....					480	750	7,248		1,050	2,264	*1,172	*1,700
Hungary.....			600			70		1,703				*1,000
Italy.....				47				15		569		*19
Latvia.....			156							139		
Norway.....											*100	
Romania.....										68		
Soviet Russia.....										17,000		
Sweden.....									190			
Switzerland.....			900							550		
Turkey.....			96									
Yugoslavia.....			1,500								*30	
Asia, Africa, etc.:												
British Malaya.....			26									
Ceylon.....										9		
China.....				218	112							
Dutch East Indies.....			121									
India.....										4,368		
Japan.....			21,802	100						2,100	638	*1,632
Thailand.....			7									
Australia.....			2,793				136			277		
Egypt.....			879							367		
Union of South Africa.....			1,440									

- 1 Roentgenology.
 2 Tropical medicine.
 3 Home economics.
 4 Archeology.
 5 Ceramics.

Sources of Data

NORTH AMERICA

United States:

¹ Census, 1930.

² Membership of professional society, from National Research Council Bull. 101, 1937.

³ Data from National Roster files, 1941.

⁴ Miscellaneous official sources.

British Honduras: West Indies Yearbook 1939, for legal and medical fields; Census of 1931 for engineering.

British West Indies: West Indies Yearbook, 1939.

Canada: Census of Commonwealth, 1931; society membership from National Research Council Bull. 101, 1937.

Costa Rica: See "Fields" below.

Cuba: Minerva, 1937, for engineers; "Fields" below for others.

Dominican Republic: Data from U. S. diplomatic representative, 1941; see also "Fields" below.

Guatemala: Census of Capital, 1938; see also "Fields" below.

Haiti: See "Fields" below.

Honduras: Data from U. S. diplomatic representative, 1941; also from Census of 1935.

Mexico: Minerva, 1937, for engineers and architects; see also "Fields" below.

Nicaragua: See "Fields" below.

NORTH AMERICA—Continued.

Panama: Census, 1930, for other than "Fields" below.

Puerto Rico: Medical Directory, 1940, for doctors; all others, Census, 1935.

Salvador: See "Fields" below.

SOUTH AMERICA

Argentina: Data from U. S. diplomatic representative, 1941; Minerva, 1937, for society memberships; and "Fields" below.

Bolivia: Anuario Kraft and "Fields" below.

Brazil: See "Fields" below.

Chile: Data from U. S. diplomatic representative, 1941; see also "Fields" below.

Colombia: See "Fields" below.

Ecuador: See "Fields" below.

Paraguay: See "Fields" below.

Peru: Green Guide, 1938-39 for fields other than those listed in "Fields" below.

Uruguay: Minerva, 1937, for other than "Fields" below.

Venezuela: See "Fields" below.

EUROPE

Belgium: Minerva, 1937, and Index Generalis, 1939, for society memberships.

Bulgaria: Minerva, 1937, for society memberships.

Denmark: Minerva, 1937 for society memberships; also "Fields" below.

EUROPE—Continued.

- Eire: Census, 1936.
 France: *Minerva*, 1937; *Index Generalis*, 1939.
 Germany: Census, 1933; *Minerva*, 1937; *Index Generalis*, 1939.
 Great Britain: Census, 1930; *Minerva*, 1937, *Brit. Med. Directory*, 1940; *Dentists' Reg. of United Kingdom*; *Kalendar, Royal Inst. Brit. Architects*.
 Hungary: *Minerva*, 1937.
 Italy: Census, 1936.
 Latvia: *Statistical Annual*, 1937.
 Norway: Census, 1930; *Minerva*, 1937.
 Romania: *Romanian Annuary*, 1931-32; *Bucharest Annuary*, 1937.
 Soviet Russia: Data from Embassy of U. S. S. R.; "Planned Economy," 1939, No. 7; and other sources.
 Sweden: *Minerva*, 1937.
 Switzerland: Census, 1930.
 Turkey: Census, 1935; *Turkish Commerce Yearbook*, 1931.
 Yugoslavia: *Statistical Annual*, 1938-39, for medical and dental fields; *Commercial Directory*, 1934-35; and *Annuaire Oriental*, 1932, for other fields.

ASIA, AFRICA, OCEANIA

- British Malaya: *Singapore and Malayan Directory*, 1939.
 Ceylon: *Ferguson's Ceylon Directory*, 1940.
 China: *Interior Dept. Yearbook*, 1936, for physicians; *Minerva*, 1937, for all others, except anthropologists.

ASIA, AFRICA, OCEANIA—Continued.

- Dutch East Indies: *State Yearbook*, 1938, for all fields.
 India: Census of India, 1931; see also "Fields" below.
 Japan: *Jap. Dept.-Comm. Yearbook*, 1934, for engineering fields; *Jap. Labor Yearbook*, 1933, for medical and related fields; *Minerva*, 1937, for other fields.
 Thailand: *Stat. Yearbook*, 1937; *Directory for Bangkok and Siam* for legal field.
 Australia: Census of Commonwealth, 1933; see also "Fields" below.
 Egypt: *Statistical Annuary*, 1937-38, for medical and related fields; see also "Fields" below.
 Union of South Africa: *Official Yearbook*, 1939; see also "Fields" below.

Fields

- Statisticians: *Survey, Inter-American Statistical Institute*, 1940, for all American republics.
 Anthropologists: *International Directory of Anthropologists*, 1940, for nearly all countries.
 Architects: *Fifteenth International Congress of Architects*, 1939, except for British Empire; for Great Britain and possessions, *Kalendar, Royal Institute of British Architects*, 1938-39.
 Medical Professions: Data compiled by *Pan American Sanitary Bureau*, 1941, for all American nations, for fields of medicine, dentistry, and pharmacy.
 Agricultural Scientists: Data from 1940-41 survey of American republics by *Division of Agricultural Cooperation of Pan American Union*.

APPENDIX D

National roster of scientific and specialized personnel, distribution by professional field, sex and extent of education, Sept. 1, 1941

Field of specialization	Male					Female					Combined							
	Doctorate	Master	Bachelor	4 years college, no degree	Others	Total	Doctor of philosophy	Master	Bachelor	4 years college, no degree	Others	Total	Doctor of philosophy	Master	Bachelor	4 years college, no degree	Others	Total
Languages.....	2,403	1,109	1,310	107	477	5,406	382	498	288	9	89	1,266	2,785	1,607	1,688	116	506	6,672
Genetics.....	391	136	74	11	59	671	44	28	8	2	84	435	184	82	13	61	755	
Zoology.....	1,379	897	562	28	281	3,147	121	78	35	13	247	1,500	975	597	28	294	3,394	
Physiology.....	504	40	9	1	1	554	50	10	4	1	64	554	50	13	1	1	618	
Botany.....	613	183	65	2	5	868	128	64	14	1	208	741	247	79	3	6	1,076	
Bacteriology, immunology, and pathology.....	1,252	271	282	17	40	1,862	132	78	87	8	16	321	1,384	349	269	25	56	2,183
Anatomy.....	439	21	12	1	3	476	45	4	1	1	50	484	25	13	1	3	526	
Tropical medicine.....	236	27	18	1	4	285	9	3	1	1	13	245	30	18	1	5	298	
Chemistry.....	6,950	6,937	18,345	1,201	3,347	36,780	395	441	748	41	47	1,672	7,345	7,378	19,093	1,242	3,394	38,452
Physics.....	2,420	1,576	1,280	80	209	5,565	87	103	55	2	9	256	2,507	1,679	1,335	82	218	5,521
Mathematics.....	1,732	1,467	678	26	38	3,541	170	371	202	5	6	754	1,502	1,838	880	31	44	4,205
Geology.....	505	982	1,972	147	477	4,483	27	38	24	7	96	332	1,020	1,996	147	484	4,579	
Actuarial science.....	9	93	267	8	99	476	3	11	1	1	15	9	96	278	8	100	491	
Speleology.....	17	6	13	2	26	64	1	1	1	1	6	17	9	13	2	20	64	
Horology.....	135	1,616	5,814	291	1,355	9,211	135	1,616	5,814	291	1,355	9,211	135	1,616	5,814	291	1,355	9,211
Civil engineering.....	4	76	313	51	269	713	1	11	2	2	13	4	76	313	51	269	713	
Marine engineering.....	9	41	366	59	584	1,059	1	1	1	1	1	9	41	366	59	584	1,060	
Safety engineering.....	2	31	125	8	100	266	1	1	1	1	1	2	31	125	8	100	266	
Traffic engineering.....	107	347	903	73	702	2,132	1	1	2	2	6	108	348	905	73	704	2,138	
Radio engineering.....	69	201	564	35	236	1,105	1	10	3	1	16	70	211	567	36	237	1,121	
Testing material engineering.....	331	593	1,903	137	316	3,280	2	12	1	1	16	331	595	1,915	138	317	3,296	
Chemical engineering.....	226	1,336	5,394	218	1,203	8,377	2	3	8	1	2	16	228	1,339	5,402	219	1,205	8,393
Electrical engineering.....	114	1,055	4,495	287	1,476	7,427	3	5	2	2	11	117	1,055	4,600	288	1,478	7,438	
Mechanical engineering.....	2	12	69	9	121	213	1	1	1	1	3	2	12	69	9	124	216	
Motion pictures engineering.....	48	215	1,047	99	1,141	2,550	1	4	4	4	4	48	215	1,047	99	1,145	2,554	
Automotive engineering.....	55	328	1,627	138	986	3,134	1	2	3	3	55	328	1,627	139	988	3,137		
Aeronautical.....	99	303	1,125	97	1,104	2,728	4	6	11	1	10	32	103	309	1,130	98	1,114	2,760
Management engineering.....	18	168	861	95	693	1,815	1	1	1	1	3	5	19	159	861	95	696	1,820
Heating and ventilating engineering.....	330	854	2,729	154	611	4,678	5	2	4	1	12	335	856	2,733	154	612	4,690	
Mining and metallurgical engineering.....	1,042	806	398	17	104	2,367	61	61	27	1	160	1,103	867	425	17	105	2,517	
Economics.....	1	39	175	35	392	642	3	1	1	1	6	1	42	176	36	393	648	
Accounting.....	1,523	629	123	6	9	2,290	434	384	58	1	878	1,957	1,013	181	7	10	3,168	
Psychology.....	234	119	69	14	21	457	47	28	26	11	112	281	147	95	14	32	569	
Anthropology.....	1,885	1,068	348	17	48	3,366	235	299	65	16	615	2,120	1,267	413	17	64	3,981	
History and political science.....	284	868	894	81	496	2,623	64	482	284	19	112	961	348	1,350	1,178	100	608	3,584
Personnel administration.....	53	37	5	4	99	17	73	34	4	6	130	70	110	39	10	229		
Speech pathology.....	535	529	433	25	103	1,625	60	86	84	4	5	239	595	615	517	29	108	1,864
Statistics.....	209	135	73	8	41	466	22	36	25	15	98	231	171	98	8	56	564	
Geography.....	423	245	95	3	17	783	49	56	38	1	8	150	472	301	133	4	23	933
Sociology.....	30	241	504	43	148	966	3	70	146	9	37	265	33	211	650	52	185	1,231
Recreation leadership.....	993	822	635	21	67	2,538	27	17	7	2	53	1,020	839	642	21	60	2,591	
Horticulture, agronomy, and plant pathology.....	135	982	2,267	71	416	3,871	1	1	1	2	8	136	982	2,272	71	418	3,879	
Forestry and range management.....	349	650	5,867	67	258	7,211	1	4	20	1	26	350	684	5,887	57	250	7,237	
Animal sciences.....	28,095	28,111	64,114	3,782	18,743	142,845	2,628	3,343	2,353	109	448	8,881	30,723	31,464	66,467	3,891	19,191	151,726