granted ten or more doctorates in this subject: Columbia, 30; Missouri, 26; Ohio State, 23; Illinois, 18; Massachusetts Institute of Technology, 17; Yale, 16; Chicago, 14; Cornell, 14; Harvard, 13; Johns Hopkins, 10. Fifty or more doctorates were granted in psychology, physics, botany and zoology, twenty or more in bacteriology, mathematics and geology, and ten or more in geography, agriculture and physiology.

TABLE I

DOCTORATES CONFERRED IN THE SCIENCES

	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Wisconsin	22	17	16	9	24	15	32	44	41	64
Chicago	53	39	55	28	43	42	61	71	75	59
Columbia	34	37	24	11	25	26	31	58	57	51
Yale	24	25	9	4	23	27	22	34	22	41
Cornell	24	38	30	21	35	33	36	41	60	39
Johns Hopkins	22	24	7	7	21	21	28	58	44	36
Ohio State	2	8	7	3	6	8	13	21	20	33
Illinois	26	24	23	15	22	19	28	33	29	32
California	17	23	16	16	14	22	24	27	20	31
Harvard	16	39	15	14	28	25	21	31	35	25
Minnesota	7	9	10	8	4	16	16	17	23	23
Iowa University	2	3	9	4	5	7	12	12	16	19
Mass. Inst. Tech.	3	4	4	1	8	7	8	11	18	18
Michigan	10	13	8	4	9	7	20	15	25	15
Princeton	19	5	8	3	10	8	12	9	17	15
Stanford	0	4	0	2	4	5	7	8	14	15
Iowa State Col.	—	—	—	—	—	—	—	—	9	12
Pennsylvania	16	7	10	8	5	5	9	8	12	12
Brown	2	3	9	2	2	4	3	3	3	8
Indiana	3	2	4	1	5	1	3	5	5	8
Pittsburgh	0	5	1	2	2	2	7	7	5	8
Cincinnati	2	1	1	1	2	2	5	3	4	7
Nebraska	0	2	1	2	0	4	2	2	5	7
Clark	9	12	4	5	4	6	6	8	3	6
George Wash.	5	8	3	3	9	2	8	13	5	6
New York	0	6	0	2	2	4	3	10	2	5
Virginia	2	1	0	0	1	0	2	1	3	5
Kansas	0	0	0	0	1	1	0	2	2	4
Missouri	3	2	3	0	2	0	4	0	5	4
Catholic	1	2	4	0	1	1	0	1	3	3
Radcliffe	0	1	0	1	1	3	3	3	2	3
Washington	–	0	1	0	0	0	2	0	1	3
Northwestern	3	3	2	0	0	0	7	2	6	2
Bryn Mawr	3	2	1	1	1	2	7	0	1	1
Colorado	0	0	0	0	0	0	1	1	0	1
Wash. Univ., St. Louis	0	2	2	1	3	3	2	8	2	0
North Carolina	2	0	1	1	0	2	1	2	1	0
Boston	0	1	0	0	0	0	0	1	0	0
Mass. Agr. Col.	3	0	0	0	0	1	2	1	1	0
Texas	0	0	0	0	0	0	0	1	0	0
Syracuse	0	0	4	0	2	1	1	0	0	0
Notre Dame	—	—	—	—	—	—	—	—	1	0
Totals	336	372	293	180	325	334	450	572	597	621

TABLE II

DOCTORATES CONFERRED ACCORDING TO SUBJECTS

	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25
Chemistry	115	108	75	54	97	133	155	182	246	244
Zoology	34	30	33	24	38	37	39	45	42	71
Botany	37	37	39	23	48	29	37	64	56	65
Physics	35	32	17	18	19	28	56	54	51	56
Psychology	19	32	30	21	38	26	32	46	51	51
Geology	17	24	14	5	17	11	22	34	41	25
Mathematics	34	30	23	7	19	16	20	28	30	22
Bacteriology	5	11	11	6	7	19	15	32	12	20
Physiology	14	18	11	1	13	8	18	20	17	17
Agriculture	6	19	18	12	8	3	9	10	11	13
Geography	3	3	1	0	3	5	3	7	3	13
Pathology	2	6	8	6	3	1	27	21	12	5
Anatomy	1	3	5	0	3	4	5	10	5	4
Mineralogy	0	0	0	0	0	0	0	1	1	4
Astronomy	6	5	0	1	4	5	4	6	7	3
Metallurgy	1	0	1	1	0	2	1	2	2	3
Anthropology	1	4	2	0	2	4	0	3	3	2
Engineering	3	5	4	1	6	3	4	5	5	2
Paleontology	3	4	0	0	0	0	1	2	2	1
Meteorology	0	1	1	0	0	0	2	0	0	0
Totals	336	372	293	180	325	334	450	572	597	621

CALLIE HULL,
CLARENCE J. WEST

THE PROPOSED NATIONAL ARBORETUM AT WASHINGTON

IN response to the request of SCIENCE for an article on the National Arboretum which is proposed to be established in the District of Columbia, I present the following condensed explanation of the project:

SUMMARY

Nature. The proposed national arboretum at Washington would contain a permanent living collection of trees and other outdoor plants for purposes of scientific research and education. It would include the trees, shrubs, and perennials used in forestry and horticulture, and the wild relatives of these plants. It would be a bureau of standards for horticulture. It would contain a water garden and a wildrice preserve, and it would serve incidentally as a bird sanctuary.

Economic value. The arboretum would make the work of the Department of Agriculture more valuable to the country in many ways, but especially through plant breeding. The development of faster-growing timber trees, improved fruits, and disease-resistant plants generally, through the facilities afforded by the arboretum, would increase profoundly the agricultural wealth and welfare of the United States.

Location. The Mount Hamilton and Hickey Hill tracts in the District of Columbia, together with the Anacostia River flats above Benning Bridge, constitute an admir-

able site for the arboretum, convenient in location and with a great variety of soils.

Cost. About 400 acres of the proposed site is already owned by the government. It consists of marsh land, about to be drained by army engineers. The Mount Hamilton and Hickey Hill area, 408 acres, privately owned, was reported by the assessor in January, 1925, to be valued at $343,048, distributed among thirty owners.

Maintenance. If the purchase of the Mount Hamilton and Hickey Hill tracts in the fiscal year 1927 is authorized, it is estimated that the cost of maintenance of the arboretum for the first three years would be as follows:

1927. Nothing
1928. $25,000
1929. $50,000

To the summary given in the preceding paragraphs is added the following more explicit statement regarding the national arboretum:

1. The examination and mapping of the proposed arboretum site by a soil expert in 1917, by direction of Secretary of Agriculture David F. Houston, showed that the soils of this area are very diverse, over thirty different types being represented on the map accompanying the report. The area was described by Secretary Houston as "admirable in location, topography, present plant cover and in capabilities of future development."

2. The arboretum would contain a comprehensive collection of trees and other outdoor plants for purposes of scientific research and education.

3. It would serve as an introduction garden for the permanent preservation of authentic living specimens of the thousands of plants introduced by the Department of Agriculture from foreign countries.

4. It would contain all the wild relatives of cultivated plants which will grow out of doors in this climate, and would be an invaluable source of material for the breeding of more valuable varieties.

5. It would furnish such a knowledge of the breeding of forest trees as would make it possible, when the country reaches the point of setting out its forests, to use improved varieties which may grow twice as fast as those we now use.

6. It would furnish material for the breeding of disease-resistant varieties of cultivated plants to replace many of the present varieties which are of high quality but so subject to disease that the cost of their treatment is a heavy burden on American agriculture.

7. As a living collection of the species and varieties of trees and other cultivated plants it would constitute a bureau of standards for horticulture.

8. The plants in an agricultural experiment station may be likened to the books which one keeps in his office for continual every-day use, while a national arboretum may be regarded as a great library of living trees and plants from which can be obtained at once whatever is needed for some special investigation or experiment.

9. The national arboretum at Washington would constitute an out-door recreation area of 800 acres which would also be an instrument of widespread public education in botanical science, horticulture, agriculture and landscape gardening.

10. The city of Washington now has about two hundred professional botanists, most of them engaged in the advancement of American agriculture through their connection with the United States Department of Agriculture. The effectiveness of the work of these men and women will be enormously increased through the facilities afforded by a national arboretum.

11. The plan of the arboretum includes the preservation of a large tract of the original wildrice growth of the Anacostia River marshes as a feeding ground and refuge for bobolinks, blackbirds and other migratory birds which have frequented these marshes in hundreds of thousands.

12. The arboretum would constitute a permanent bird sanctuary.

13. The marsh area of the arboretum is well adapted to the development of a water garden, the beauty of which is well illustrated by the Shaw waterlily gardens now occupying a portion of the marshes.

14. Under authority similar to that given in the arboretum bill presented in the last congress, it will be possible to purchase the Mount Hamilton and Hickey Hill tract of 408 acres of forest and intervening farm land before the advance of the city turns this area to other uses. Whether the arboretum be developed rapidly or slowly, the area ought to be purchased at once.

15. The assessor's present valuation of the Mount Hamilton and Hickey Hill tract is $343,048, distributed among thirty owners. In 1920, when the purchase of the tract was under consideration for another purpose, the assessor's valuation was $254,520.

16. For maintenance of the arboretum it is unlikely that any funds additional to the purchase money would be required the first year. It is estimated that in the second year $25,000 would be needed, for accurate topographic, biological and other surveys and plans and preliminary soil treatment, and in the third year $50,000, for the expenses of an efficient operation and maintenance organization. These estimates do not include engineering development and permanent highway construction, which must be determined through conference with the board of army engineers now engaged in the drainage of the Anacostia River marshes, and with the Commissioners of the District of Columbia.

17. The proposed arboretum site is less than two

miles from the capitol building and three miles from the Department of Agriculture.

18. The location of the arboretum at a distance of several miles from the city has been proposed. In such a location the cost of administration would be greater, the work of research and discovery less effective, and the arboretum would be less useful for public education and recreation.

On December 7, 1925, Representative Robert Luce, of Massachusetts, introduced in the House of Representatives the following bill (H. R. 3890), which was referred to the Committee on Agriculture. An identical bill (S. 1640) was introduced in the Senate by Senator George Wharton Pepper, of Pennsylvania, and referred to the Committee on Agriculture and Forestry.

A BILL

AUTHORIZING THE SECRETARY OF AGRICULTURE TO ESTABLISH A NATIONAL ARBORETUM, AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Agriculture is authorized and directed to establish and maintain a national arboretum for purposes of research and education concerning tree and plant life. For the purposes of this Act, (1) the President is authorized to transfer to the jurisdiction of the Secretary of Agriculture by Executive order any land which now belongs to the United States within or adjacent to the District of Columbia located along the Anacostia River north of Benning Bridge, and (2) the Secretary of Agriculture is authorized in his discretion to acquire, within the limits of the appropriation authorized by this Act, by private purchase, condemnation proceedings, or gift, land so located.

Sec. 2. There is hereby authorized to be appropriated a sum not to exceed $300,000, to be expended under the direction of the Secretary of Agriculture for the acquisition of land as specified in section 1. No payment shall be made by the United States for any such land until the title thereto is satisfactory to the Attorney General and is vested in the United States.

Sec. 3. In order to stimulate research and discovery, the national arboretum established by the Secretary of Agriculture in accordance with the provisions of this Act shall be under competent scientific direction. The arboretum shall be administered by the Secretary of Agriculture separately from the agricultural, horticultural, and forestry stations of the Department of Agriculture, but it shall be so correlated with them as to bring about the most effective utilization of its facilities and discoveries.

Sec. 4. The Secretary of Agriculture is authorized to recognize and consult an advisory council in relation to the national arboretum to be established under this Act, to include representatives of the following organizations: National Academy of Sciences, National Research Council, Smithsonian Institution, Carnegie Institution of Washington, Garden Club of America, Wild Flower Preservation Society, Botanical Society of America, American Society of Landscape Architects, American Association of Nurserymen, National Association of Audubon Societies, American Forestry Association, Society of American Foresters, American Pharmaceutical Association, and American Association for the Advancement of Science.

FREDERICK V. COVILLE

SCIENTIFIC EVENTS

THE PAN-PACIFIC RESEARCH INSTITUTION

THE Pan-Pacific Union, an international organization having its center at Honolulu, has served an excellent purpose in two main directions. The first, in its mission of good-will to the various peoples whose lands border on the Pacific, and second, in the several international conferences, educational, journalistic, economic and scientific, called to meet under its auspices and under the general direction of its director, Alexander Hume Ford.

Last year a new departure was planned, that of an international research station, after the fashion of the one at Naples and the one at Woods Hole. With certain disadvantages of remoteness from centers of population, it has the advantage of access to a marine fauna of unparalleled richness. In addition to this, it affords a remarkable opportunity for the study of tropical fruits, of insect pests and the parasites which destroy them, of a tropical flora and of volcanic geology.

For the present summer, Dr. David Starr Jordan, as honorary president of the institution, has assisted Mr. Ford in its permanent organization. Its board of trustees is made up of leading men interested in the project from the various countries included in its scope. Its actual government is vested in a local council of scientific men engaged in actual research, in the employment as experts by the United States government, by the Territory of Hawaii, the Queen's Hospital or by some one of the great associations interested in sugar, pineapples, coffee or other industries. The headquarters of the institution are in a commodious residence in the Manoa valley, dedicated to this purpose by its owners. Here the council meets weekly at dinner, being followed by a scientific lecture, to which the public is invited. The chief purpose of the institution is the promotion of research in any field, in which local conditions are favorable. For the time being, only a small number of workers can be accommodated free of charge at the headquarters and no funds are yet available for special assistance. A bulletin is published monthly, but until a permanent endowment for publication is secured no records of new species of animal or plant will be