

SCIENCE EDUCATION

Foreign Students and Immigrant Physicists

Foreign students are coming to the United States in rapidly increasing numbers to study physics. While the total number of visiting foreign students has doubled since 1955, the number of those studying physics has more than tripled. (During this same period, total US physics enrollments have roughly doubled; in 1961-62 there were about 22 700 upper classmen and graduate students studying physics.)

The Institute of International Education, in its annual report, *Open Doors*, lists the country of origin and field of interest of all foreign students at colleges and universities in the US. In 1962-63, according to the IIE report, more than half of the foreign physics students came from the Far East, while fewer than one sixth of the total came from Europe. Formosa alone sent more physics students than all European countries combined. The same was true of India, Korea and Japan each sent more than one hundred students, and another 82 came from Hong Kong. Iran led the Near and Middle Eastern countries by sending 77 physics students. Of the European students, more than half came from Greece (81), the United Kingdom (62), and Germany (36).

Table 1. Students studying physics in US

Area of origin	1954-55	1962-63
Africa	7	108
Canada	90	163
Europe (includes USSR)	127	321
Far East	251	1151
Latin America	77	161
Near & Middle East	52	244
Oceania	4	29
Other	2	3
Total	610	2180

In another study (*Scientific Manpower From Abroad*, NSF 62-64), the National Science Foundation reports the occupations of scientists and engineers admitted to this country as immigrants each year since 1949. The country of origin as well as the specialty are given for both immigrant scientists and foreign recipients of US doctorates in recent years.

Although specific information on physics degrees granted in the US to foreign students is not included, a broad picture of the doctorates awarded in the physical and engineering sciences over the four-year period ending in 1960 is given in the NSF report. Again, Asian students dominated the picture, with half of the doctorates going to students from the Near, Middle, or Far East. Three quarters of the Asian recipients came from

Table 2. Doctorates awarded in US in physical sciences and engineering to graduates of foreign colleges and secondary schools

Area of origin	Total, 1957-60
Africa	50
Canada	25
Europe	288
Asia (includes Near & Middle East)	691
Latin America	33
Australasia & Philippines	48
Other	16
Total	1377

India, Afghanistan, Formosa, and Japan. The rest came almost entirely from Israel, Korea, Iran, Iraq, Pakistan, and Lebanon. One fifth of the recipients came from Europe, and of these, half were from the United Kingdom, France, and Greece.

The NSF report remarks: "It is noteworthy that those countries with a long tradition of indigenous scientific education produced comparatively few US doctorates, while some Asian countries, only now developing graduate training in science, produced a comparative abundance. One of the reasons is undoubtedly the very high level of postgraduate studies in many European countries, which encourages European scientists to secure their doctorates at home. They then sometimes undertake postdoctoral research work in the United States."

Those Europeans who do come to the US for a few years of research after their doctorates often stay in this country. The extent of emigration of British scientists to the US has been the source of some British concern, as was evidenced in a report by the Royal Society published earlier this year. At least 140 recent PhD's in the natural sciences (about one fifth of them physicists) are leaving the United Kingdom each year, which represents about one eighth of the total output. Over the past ten years close to half of them came to the US. "The emigration of scientists," the Royal Society report continues, "has created some serious gaps in the scientific effort of this country. . . . The loss to this country of the leadership and the creative contributions to science and technology which these men might have made in the course of their working lives may lead to serious economic consequences."

United States immigration statistics support the British estimate. The United Kingdom has been the chief source of immigrant physicists in recent years, accounting for one quarter of those entering the US in the fiscal years 1957-62. During the same period the number per year increased sixty percent. More than one

Table 3. Immigration of physicists to US from July 1956 to June 1961. (Data for fiscal-years 1957 and 1961 and for 5-year period from July 1956 to June 1961).

<i>Area of origin</i>	<i>1957</i>	<i>1961</i>	<i>Total for 5 years</i>
Europe	99	113	517
Asia	9	12	61
Latin America	2	3	32
Canada	31	43	181
Others	4	7	38
Total	145	178	829

fifth of those entering in the same period came from Canada, and another fifth came from Germany.

Asia has supplied an average of only twelve immigrant physicists per year in the same five-year period. During these years an average of more than 750 Asians per year were studying physics in the United States.

Immigration laws favor the admission of people with special skills or abilities: fifty percent of a country's quota is allotted to them under the "first preference" provision. However, a US firm or organization must sponsor the alien. Relatively few scientists and engineers have actually been admitted under this arrangement. Only one percent of the Asians admitted in the fiscal year 1961, for example, were scientists and engineers.

Commission on College Physics

The Commission on College Physics, pressed by demands for further services to physicists and institutions, has expanded its staff and moved to larger quarters at 1062 Lancaster Avenue, Rosemont, Pa.

Edward D. Lambe has been granted an additional year's leave of absence from his position at the State University of New York at Stony Brook in order to continue serving as executive secretary of the Commission. He has held this post since September 1962. During the present academic year, E. Leonard Jossem, on leave from Ohio State University, and Arnold A. Strassenburg, on leave from the University of Kansas, will serve as full-time members of the staff. Alfred M. Bork of Reed College spent the past summer as staff consultant to the Commission.

Lecture Demonstration Material Wanted

The Demonstration Book Committee of the American Association of Physics Teachers, which has been engaged in collecting material for a reference source of physics lecture demonstrations, has issued a final call for contributions from individuals or groups having suitable material for inclusion in the book but who have not yet submitted it. All such contributions must be received by the Committee by December 31, 1963.

Information concerning requirements for the preparation of copy is contained in a brochure which was distributed early last year and which is available on request. Although the brochure suggests the maximum

content of submitted copy, the Committee emphasizes that simple demonstrations and brief descriptions are also acceptable and are desired.

Contributed material, requests for brochures, or other correspondence having to do with the program should be sent to Professor Harry F. Meiners, Demonstration Book Project, Science Center, Rensselaer Polytechnic Institute, Troy, N. Y.

Doctoral Programs

Beginning this fall, the University of Maryland is offering a PhD program in chemical physics as a joint endeavor of the Departments of Chemistry and Physics and the Institute for Molecular Physics. Students with backgrounds in physics, chemistry, mathematics, or engineering are eligible for the program. Those interested in obtaining further information should contact Professor Joseph T. Vanderslice, Chairman, Committee on Chemical Physics, Institute for Molecular Physics, University of Maryland, College Park, Md.

The Physics Department of the University of California at Santa Barbara has announced the inauguration this semester of a graduate program leading to the PhD in physics. Applications from prospective graduate students are now being received and reviewed.

Information concerning the program can be obtained from Professor Glen Schrank, Department of Physics, University of California, Santa Barbara, Calif.

Rocket and Satellite Astronomy

Since September, the Office of Naval Research and the National Science Foundation have been collaborating in a new program of graduate and postgraduate research in rocket and satellite astronomy at the Naval Research Laboratory in Washington, D. C. Emphasizing studies of astrophysics, planetary atmospheres, and the interplanetary medium, the program is conducted at NRL's recently established E. O. Hulburt Center for Space Research, which was named in honor of a former director of research at the Laboratory. Dr. Hulburt, a pioneer in space physics who devoted almost his entire career to Navy science, retired in 1955.

The Hulburt Center is designed to provide additional support and scope to the rocket and satellite astronomy program of the Laboratory and to open the facilities of that program to the participation of graduate students, postgraduates, and faculty members of academic institutions. The Center is directed by Herbert Friedman, superintendent of NRL's Atmosphere and Astrophysics Division. Visiting scientists' projects are coordinated with the space-research programs carried out by NRL's Rocket Spectroscopy Branch (headed by Richard Tousey) and the Upper Air Physics Branch (headed by Talbot A. Chubb).

Research appointments made under grants from the National Science Foundation will support the tenure of visiting scientists at the Center for periods normally