

pendent to each chapter of their book *Theoretical Nuclear Physics* explanations of the symbols and abbreviations used in that chapter.

Reference problems could be eased considerably if an internationally acceptable style of presenting references were worked out. If this could be achieved, national or even international reference "banks" can be imagined. Authors could just send to the bank long lists of designations, such as PHRV 109 0234 (4), and receive back the complete references in the accepted style, with guaranteed spelling, in a form that could be directly photographed for publication.

In the publication field a number of new experiments are needed, like the compilation journals *Nuclear Data* (5) and *Crystal Data* (6). The important thing here is to guard against the growth of a system of subsidies that would close the field to venturesome commercial publishers whose expertise and imagination can make noteworthy contributions.

Other novel proposals can easily be imagined. They should all, of course, be discussed and weighed before adoption. The committees proposed and existing seem eminently suited for do-

ing this. The important thing, I believe, is that the fundamental need to devise new tools for the compilers should be recognized. Bulldozers are needed where only spades exist now. Once the bulldozers are provided, there will be no need to plead that spades really are not so bad, especially with committees to tell you where to dig. Prospective bulldozer operators will be stepping forward, without inducement, to guide these machines into new and fruitful pathways.

Won't there be need for standards? Of course, but science has already evolved light-handed ways of providing these through editors and referees. For compilations too large for journals and edited compendia, book reviews and the marketplace test itself will set very severe standards. Coordination? This could come naturally through bibliographies and directories of existing works. A compiler is not likely to undertake duplication of a work he believes competent, if he knows about it. Today it is very difficult to find out. In the near future the work started by CODATA may produce the tool that is needed.

When this day arrives, you may get the notion some morning to do a little

summary of the data on the 3- octupole states in nuclei. You find quickly that in this field there is only one compilation which is pretty much out of date. A list of the key words nearest your topic goes off to a center. Back come bunches of cards with references and abstracts. You start to read, skimming here, really studying there. You plot this and that. Things settle, explode, reorient themselves. At last you see it. The writing is not so hard. The references are really easy. Everything goes off to a professional publisher. Probably no one will give you \$3000 (7), but you will be full of joy.

#### References and Notes

1. H. Brown, *Science* **156**, 751 (1967).
2. E. L. Brady and M. B. Wallenstein, *ibid.*, p. 754.
3. C. F. J. Overhage, *ibid.* **155**, 802 (1966).
4. PHRV 109 0234 means *Physics Review*, volume 109, page 234. The abbreviation for the journal title is taken from *Coden for Periodical Titles* (American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania). With the availability of *Coden*, anyone anywhere in the world can prepare a list of reference keys, such as PHRV 109 0234, which can be understood immediately.
5. *Nuclear Data, Sections A and B*, published since the beginning of 1966 by Academic Press Inc., New York and London.
6. *Crystal Data*, publication to commence in 1968 by Interscience (John Wiley & Sons, Inc.), New York.
7. This was offered at one time for some review articles [S. A. Goudsmit, *Phys. Today* **19**, No. 9, 52 (1966)].

#### NEWS AND COMMENT

## The Brain Drain: New Law Will Stem Talent Flow from Europe

A 1965 immigration law that becomes fully effective 1 July will plug the "brain drain" from Great Britain, Germany, and other parts of Western Europe for about 3 years and will open the way for a drain of talent from the Far East and the underdeveloped world. This unforeseen consequence of a widely hailed "liberalization" of American immigration laws is causing consternation in Washington. Some government officials and congressmen fear the new law will strip developing nations of their limited talent, thus aggravating their economic and political problems and undercutting the U.S. foreign aid program. Others are reluctant to see American institutions and

industry deprived of the beneficial flow of highly trained scientists, engineers, and physicians from Western Europe. The European scientists who have come to the United States in search of higher pay or greater opportunities in recent years are considered more competent, on the average, than the scientists who are likely to replace them in the new immigration pattern.

A handful of American officials has been aware for several months that a dramatic shift in the composition of the brain drain was likely, but this realization did not reach a wider public until the State Department's Visa Office published a detailed analysis of the new law late in November. In the en-

suing weeks efforts have been launched, by the Executive branch and by members of Congress, to nullify some of the unwanted consequences of the new law. Significantly, even an architect of the 1965 immigration law, Representative Michael A. Feighan (D-Ohio), has cited the "need for some modification of the system."

The new immigration law began taking effect in December 1965, but it included provisions for a 2½-year transition period before becoming fully effective at the beginning of the coming fiscal year. The main thrust of the law was to eliminate the old national-origins quota system and replace it with a series of "preference categories" under which immigrants from outside the Western Hemisphere are admitted to the United States on the basis of family relationships or personal skills, regardless of their country of origin (except that no more than 20,000 a year can be admitted from any one country). The new law set ceilings, for each category, that were expected to accord with demand, but during the transition period long waiting lists have built

up in several categories, including one covering scientists and other professionals. What's more, because of peculiarities in the working of the system under the old and new laws, scientists from Britain and certain other countries will find themselves far down on the waiting list once the law becomes fully effective on 1 July. Here's how this curious circumstance came about.

Under the old national-origins quota system, each foreign country outside the Western Hemisphere was allotted a specific quota of visa numbers, set according to the proportion of individuals of that nationality in the American population in 1920. This system assigned almost 70 percent of the annual visa numbers to just three countries—Great Britain and northern Ireland, with 65,631; Germany, with 25,814; and Ireland, with 17,756. Since the quotas in these three countries, and certain others, exceeded annual demand, any scientist—indeed any citizen—could emigrate to the United States almost at will. Meanwhile, the quotas assigned to other countries often fell far short of demand. Italy, with 5666, was heavily oversubscribed, and most Asian and African nations were limited to only 100 immigrants per year, far short of the demand. Not surprisingly, some countries developed waiting lists that were years long.

These backlogs were supposed to be wiped out by the new law, and, except for the case of Italy, this has happened. But during the transition period, new waiting lists have unexpectedly developed. The new law allows an annual maximum of 170,000 immigrants from the Eastern Hemisphere—somewhat higher than before—and it allots certain percentages of the total to various "preference categories." The numbers allotted to the first, second, and fourth categories—covering various relatives of American citizens and of aliens already resident in the U.S.—are more than ample. But the totals assigned to categories for professionals, skilled and unskilled workers, and brothers and sisters of American citizens have proved inadequate to meet the demand.

It is the third category, covering members of the professions or persons of exceptional ability in the sciences and arts, that affects the brain drain. The law allows entry of only 17,000 professionals each year. Yet the backlog of applicants—from countries with oversubscribed quotas—is expected to reach 48,000 by the time the new

## NEWS IN BRIEF

● **GRAD STUDENT STUDY:** Most U.S. graduate students are married, attend school part time, and pay their own way, the U.S. Office of Education reports. About 17 percent of the students surveyed during the spring of 1965 received grades averaging A- or better, while 42 percent scored B- or lower. The highest grades were achieved by students in philosophy and religion, while students in business administration and some education fields reported the lowest. The women's grades were slightly superior to those received by men. Tuition and fees ranged from a median of \$600 per year in public universities to about \$1500 in private institutions. The report also noted that expenses for full-time graduate students ranged from less than \$1000 to more than \$9000—with a median of just over \$2000 a year. Copies of *The Academic and Financial Status of Graduate Students, Spring 1965* (OE-54042) are available without charge from the National Center for Educational Statistics, U.S. Office of Education, Washington, D.C.

● **ENGINEERS' SALARIES:** A report on engineers' salaries by geographic region and by size of employer has been published by the Engineering Manpower Commission of Engineers Joint Council. The report indicates that engineers with 12 to 14 years of experience receive the highest wage if they work in the Middle Atlantic states, averaging \$14,700 annually, and the lowest, about \$11,750, if they are employed in the West South Central states. Other data show that experienced engineers generally earn about 12.5 percent more if they are employed by large firms rather than by small ones. Copies of the *Special Analysis by Region and Company Size*, at \$10 each, are available from the Engineering Manpower Commission, 345 East 47 St., New York 10017.

● **PALYNOLOGY ORGANIZATION:** The American Association of Stratigraphic Palynologists was formed in December to promote palynology—the science of live and fossil spores. Membership is open to persons who are interested in that science and in the objectives of the association. Annual dues are \$5. Additional information may be obtained from the asso-

ciation's secretary-treasurer, Alfred Traverse, at the Department of Geology and Geophysics, Pennsylvania State University, University Park, Penn. 16802.

● **R&D FORECAST:** Research and development expenditures are expected to increase 3.3 percent over the estimated 1967 level to \$26.5 billion in 1968, according to a forecast prepared by Battelle Memorial Institute. The forecast also estimates that federal spending for research in the social sciences will increase at a greater rate during 1968 than spending for research in the physical sciences. The forecast attributes the shift in emphasis, in part, "to a sharply reduced rate of growth of military, space, and atomic energy research programs" and also "to a national concern with education, health, urban, employment, and welfare problems." According to Battelle, federal R&D expenditures will total approximately \$17.2 billion in 1968 compared with other anticipated R & D spending of \$8.3 billion by industry, \$865 million by colleges and universities, and \$265 million by other nonprofit institutions. The Battelle forecast notes that "in 1968, it is estimated that Federal funds will account for approximately 65 percent of the total funds available for R & D. . . ."

● **NATIONAL SCIENCE MEDALS:** The 1967 recipients of the National Medal of Science are Kenneth S. Cole, biophysics, National Institutes of Health; Harry F. Harlow, psychology, University of Wisconsin; Alfred H. Sturtevant, professor of biology (emeritus), California Institute of Technology; Michael Heidelberger, immunology, New York University; Edwin H. Land, president, Polaroid Corporation; Igor I. Sikorsky, retired engineering manager, Sikorsky Aircraft Division, United Aircraft Corporation; Paul J. Cohen, mathematics, Stanford; Jesse W. Beams, physics, University of Virginia; Francis Birch, geological sciences, Harvard; Gregory Breit, physics, Yale; Louis P. Hammett, retired professor of chemistry, Columbia; George B. Kistiakowsky, chemistry, Harvard. The medal is the federal government's highest award for achievement in science, mathematics, and engineering.

law goes into effect. Visas will be granted on a first come, first served basis, so the 48,000 already on the waiting list by July 1 will be given priority over professionals from Great Britain, Germany, Sweden, and other countries that have had no waiting list. At the rate of 17,000 a year, it will take almost 3 years to work off the initial backlog. During this period there will be a sharp drop in the immigration of professionals from Western Europe and a sharp increase in immigration from the Far East. The Visa Office reports that in fiscal year 1967 about two-thirds of the third-category numbers were used by professionals coming from China (4454), India (3224), the Philippines (2690), and Korea (1087), the remaining third being scattered among many nationalities. This pattern is expected to continue until Western European professionals start getting their names on the wait-

ing lists and competing effectively for places 3 years hence. By that time the worldwide demand is expected to be such that no great number of professionals from any single country will be able to gain admission. Thus the brain drain from Western Europe may never regain its former volume.

The flow of talent from the Americas will also be inhibited. The law establishes no "preference categories" for this hemisphere, but it does limit Western Hemisphere immigration to 120,000 a year—considerably below the expected demand—so all potential immigrants from this hemisphere, including scientists, will find it more difficult to get in.

Efforts are already under way to ease some of the impact of the new law. The State Department is explaining the implications of the law to nations that may experience an increased outflow of talent, so that these na-

tions can take steps to keep their professionals at home if necessary. And several senators and congressmen will be looking at aspects of the immigration law and the brain drain early in the current session. Feighan's House immigration subcommittee will hold hearings on the law, including an inquiry into "what changes should be made in the classification of preferences." The House subcommittee on research and technical programs, which has scheduled a hearing for 23 January on the brain drain from developing countries, will presumably examine the impact of the new law. And Senator Edward M. Kennedy (D-Mass.) expects to conduct hearings on the immigration law and to resume hearings on the brain drain. Kennedy has told aides he expects to "find a legislative measure" that will ease the backlog problems that have developed in the third preference category.—PHILIP M. BOFFEY

## Dartmouth: Medical School Shows Good Recovery from 1966 Blowup

*Hanover, N.H.* In 1956, when the first big wave of federal research money began to reach the nation's health centers, Dartmouth Medical School, one of the oldest and smallest in the country, embarked on a major expansion program. Long a 2-year institution whose graduates went elsewhere to complete their advanced-degree work, the medical school, in its plans for growth, put special emphasis on doctorate-level work in fundamental science. Thus in 1959 the school added 25 basic researchers to its staff. Eventually the number rose to 70. Back in 1956, according to the current *Bulletin* of the school, there had been seven basic researchers. Meanwhile, the total student enrollment rose from 48 to 96; and discussions were held on developing a 4-year medical degree program, something that Dartmouth, founded in 1797, had voluntarily dropped in 1914 following the Flexner Report's criticism of its clinical train-

ing program. By the early 1960's there was no doubt that Dartmouth Medical School had established itself as a thriving basic-research center. However, where it stood as a training group for medical practitioners was a separate, less clear, and often seriously contended matter—so much so, in fact, that between 1964 and 1966 Dartmouth was the scene of a classic academic blowup. By the latter year, 11 researchers had resigned, including six who issued a statement that said, in part: "We came to Dartmouth to fulfill a unique opportunity for education and research in the *basic* medical sciences [italics supplied]. To those of us who are leaving it has become apparent that we cannot effectively accomplish this purpose here." And off they went.

The circumstances that led to their departure are now partially clouded by time. But it is generally agreed that the Dartmouth administration had come to feel that graduate training in

basic research was being emphasized to the detriment of education in the traditional therapeutic arts. Apparently this was not a run-of-the-mill teaching-versus-research conflict; rather, it seems to have been a conflict that, in large part, arose from differences over the balance between the teaching of fundamental science and the teaching of medicine. Disputes are said to have arisen also over alleged commitments to make matching money available in the quest for federal research grants. In addition, there was conflict over tenure. A great flow of federal funds was passing through the medical school's laboratories, but Dartmouth held to the policy that salaries for tenured personnel must come from secure, predictable sources, preferably endowment, and not from the sometimes unpredictable, year-to-year grants of Washington agencies.

Following the resignations, one top administrator sought to throw an optimistic light on the episode by stating, "The conflict at the Medical School provides no basis whatever for thinking that the School has failed in its purpose or that the quality of its medical education will be impaired. The men who are leaving are competent scientists, but it is significant that to the best of our knowledge they are going not to medical schools but to graduate departments or institutions of