

Brain Drain: Aid in Reverse

Developing nations provide a growing share of immigrant scientists and doctors to U.S.

As long as the brain drain could be regarded as a problem of the world's developed nations, U.S. officials were able to take a relaxed view of it.

U.S. policy has been, by and large, that the loss of scientists, engineers and doctors to the United States is more the problem of the donor nations and would have to be solved by them. The policy says there's little the U.S. can or should do, beyond encouraging the rest of the world's nations to improve their attractiveness to professionals.

There is growing indication, however, that to an increasing degree the brain drain is a problem of the developing, not the developed, nations, and under Congressional pressure, there are policy shifts in the wind to deal with it.

It costs a developing nation some \$20,000 to train a professional; by this measure, according to a Congressional staff study, these nations contributed some \$88 million to the U.S. in 1966, more than offsetting the \$40 million in U.S. aid funds given to developing nations for technical training.

But the State Department has contended that "the size of this 'drain' is considerably less than most discussions would suggest."

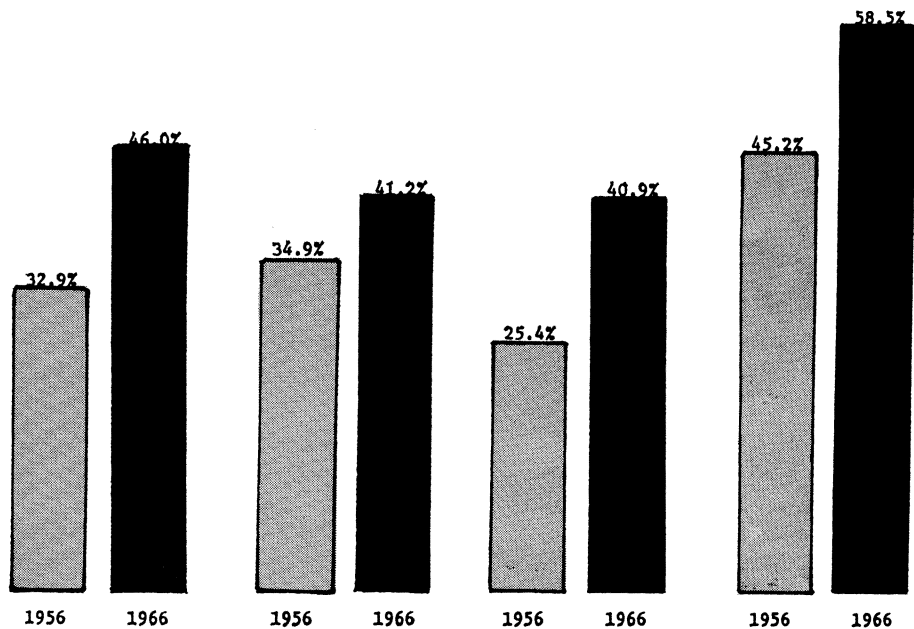
This laissez faire position is strengthened by the fact that, in the U.S., demands of space, military and other Fed-

Scientists,
Engineers
and Physicians

Scientists

Engineers

Physicians



Brain drain shifts: Developing nations (black) carry more of the burden.

eral programs periodically exceed the domestic supply of research scientists and engineers, and that the U.S. suffers a chronic shortage of physicians. Hefty numbers of domestic scientists and engineers are in non-research positions, and increasing numbers of domestic physicians are choosing research over practice, leaving critical holes for immigrants to fill.

Besides the inherent conflict the brain drain poses for U.S. foreign policy—taking from developing nations with one hand while giving with the other—reliance on foreign professionals tends to take the pressure off U.S. efforts to increase its own output in critical professions.

This is the double hole some members of Congress would like to plug.

The latest pressure comes from Representative Henry S. Reuss (D-Wis.), chairman of the Research and Technical Programs Subcommittee of the House Committee on Government Operations. He adds his voice to those of Senators Edward M. Kennedy (D-Mass.) and Walter F. Mondale (D-Minn.).

Reuss, a gadfly to the Government's patchwork science policy, does not call for restrictive legislation to cut off the brain drain. This, virtually no one advocates. He contends, however, that

the documentation his staff has developed calls for a "modification of the official U.S. position (and) a candid recognition . . . that the scientific brain drain from the developing countries is a growing problem." He has scheduled hearings late this month.

As recently as a year ago, State Department and Office of Science and Technology officials were telling Congress, in the words of Assistant Secretary of State Charles Frankel, "well over 70 percent of our skilled immigrants are from developed areas, and less than 30 percent from the less-developed areas of the world." Developed countries, according to State, include Canada, South Africa, Europe, Japan, New Zealand and Australia; all the rest are developing.

Reuss proposes, in support of his demand for a policy shift, to offer figures demonstrating that for scientists, engineers and physicians at least, the 67 percent of immigration which came from developed countries in 1956 had shrunk to 54 percent a decade later.

And Reuss fully expects that, when 1967 figures become available, and when the immigration act of 1965 goes into full effect in July, the shift will become even more pronounced; the act eliminates national quotas for allowed immigration and puts a premium on

professional training.

Already, according to the Reuss subcommittee staff study, immigration totals in a given year can equal two percent of the scientists graduated by U.S. institutions, almost 10 percent of the engineers and more than 25 percent of the physicians.

"Contributions of this magnitude to U.S. scientific manpower can hardly be regarded as unimportant," says the study. The total is over 10,000 a year.

Traditionally, the U.S. view has been that individuals are free to move where their aspirations dictate. The best the U.S. can do, this policy holds, is to encourage developing countries to develop environments in which their trained professionals can work.

Lately, however, there has been a shift: a new category of nation is emerging, where more specific assistance might be justified.

These are nations sufficiently industrialized and having a sufficient self-generated growth in national product to have outgrown the programs of the U.S. Agency for International Development. These post-AID countries, as they are being called, might qualify for special assistance in the creation of institutes of science and technology, the

existence of which should help stem—if not reverse—the brain drain.

One such institute was established in South Korea about a year ago; there are already indications that the outflow of professionals from that nation may be falling off and some reverse migration replacing it.

"We can't do this kind of thing just for the brain drain," says an official of the White House's Office of Science and Technology. "But if there are other reasons to justify an injection of more science and technology into an economy, then a damper on the brain drain is a satisfactory second result."

Other nations said to have reached this level of development include Turkey, Mexico and Taiwan.

Along with broader recognition by policy makers that the problem exists, Reuss is expected to urge:

- frank discussions with aided nations of alternative cooperative measures to reduce drain.

- greater efforts to expand the U.S. domestic supply of physicians and surgeons.

- consideration of the effects on foreign scientific manpower of proposed major Federal research and development projects. ◇

PLANETARY SCIENCE

New model for Chandler wobble

The earth's rotation on its axis is a mixture of several different kinds of wobbling.

The oscillation with the longest known period is that called precession, caused by the gravitational pull of the sun and moon on earth's equatorial bulge, resulting in a motion similar to that of the axis of a tilted spinning top. This motion of the earth's axis causes each celestial pole to complete a circular path every 26,000 years. It is a very large, but extremely slow motion.

The axis of earth's rotation also has a small, nodding movement called nutation, which is caused chiefly by changes in the position of the moon's orbit. The celestial pole completes a nutation about once every 19 years.

Another small polar shift is caused by seasonal fluctuations in the snow cover, resulting in a small change in the gravitational pull of the sun and moon on earth's mass; this has a period of a year.

There is another: a small but rapid wandering of the earth's pole, first observed in 1891 by astronomer S. C. Chandler. It has never been satisfactorily explained unless a new proposal, put forth by two scientists in the Jan. 14 NATURE, does the job.

They discovered, after working independently, that both had developed the same explanation for what is called Chandler's wobble—that it results from interaction between the earth's layers.

Chandler's wobble is a circular oscillation of the earth's axis of rotation somewhat like the wobbling of a badly thrown quoit. It has a period of 428 days, about 40 percent larger than predicted by Leonhard Euler in 1744, who proposed the first general rule for variations in a rigid, rotating body.

The reason for the difference, explained by Simon Newcomb in 1891, is that Euler's theory was based on an ideal body, unyielding, unchangeable in shape and unknown in nature. The elastic yielding of the earth and the mobility of earth's seas lengthen the period to 14 months.

Chandler's wobble is observed as an increase in latitude at one place and a simultaneous decrease in latitude at a place 180 degrees away in longitude, as Berlin, Germany, and Honolulu, where changes of up to 0.3 seconds of arc in latitude due to polar motion were first detected.

The free nutation observed by Chandler, and many others since then, has puzzled scientists because, according to theory, it should have died down. Many suggestions of mechanisms to excite the Chandler wobble have been put for-

MALARIA

Single pill against falciparum

Limited field trials of a new compound against the drug-resistant Plasmodium falciparum malaria will begin in Vietnam within three months.

The single-pill treatment for a strain of malaria that has beset thousands of American fighting men (SN: 11/19/66 p. 417) has been developed by researchers at the Harry S. Truman Laboratory of Comparative Medicine in Kansas City, Mo. under the direction of Dr. John Arnold.

The new treatment dramatically reduced the recovery time of inmates at the Jackson County jail who volunteered to be infected with the drug-resistant strain, Dr. Arnold says. Ten of 11 infected inmates were cured with a single pill. The 11th man required a second dose.

The compound—trimethoprim and sulfamethoxypyrazine—has shown no dangerous side effects, according to Dr. Arnold, who says he has been unsuccessful so far in inducing resistance to the combination. The treatment affects the malarial parasites' ability to either synthesize or utilize the vitamin folic acid.

Presently soldiers infected with the drug-resistant falciparum strain are hospitalized for exhaustive drug therapy that can last up to 30 days. Dr. Arnold believes his new drug can get a man

back into fighting trim within two weeks or less.

In the present treatment, patients receive daily doses of quinine, pyrimethamine, and diaminodiphenyl sulfone, and the regimen often leaves them in need of a transfusion.

Dr. Arnold says sulfamethoxypyrazine competes with p-aminobenzoic acid in folic acid synthesis and trimethoprim inhibits the enzyme dihydrofolic acid reductase. The combination thus blocks the falciparum parasite from either synthesizing or absorbing folic acid, one of the most important products of intermediate metabolism in all forms of life.

Folic acid is necessary in the synthesis of thymidine, a compound required for the manufacture of deoxyribonucleic acid (DNA), the ingredient that passes genetic information.

All the volunteers in the prison tests were watched for 60 days for traces of relapse. Dr. Arnold says the doses of the sulfamethoxypyrazine and trimethoprim considered effective do not cause a reduction of red blood cells, white blood cells or platelets.

The only side effect observed was gastrointestinal distress, which tends to prevent overdosage. The doctor considers this a favorable type of toxicity. ◇