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. ◇

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 unsucessful 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. ◇

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-