zahler group should have gotten good data. They did a full 12 hours' observation, as did Walker's group.

The Caltech observers used nine antennas located from Sweden to South America, from Germany to California. That is an unusually large number for a single VLBI observation, and it includes three deep-space tracking antennas, which are rarely assigned to this kind of work. Two antennas did not work, but the remaining seven would be a good data base nevertheless. Walker says he knows they got fringes between Goldstone (one of the deep space antennas) and Owens Valley, and that's an indication they will have something good when all the data are processed. That is likely to be in a few weeks. □

Moonshining around the world

The development of alcohol fuels for transportation is attracting increased interest in the United States as gas lines grow. On May 4 and June 12 the House Subcommittee on Energy Development and Applications held hearings on the feasibility of what Chairman Richard L. Ottinger (D-N.Y.) calls "the Now fuel." Witnesses for the second hearing reported to the Congressman on the findings of the International Alcohol Fuels Symposium held in Asilomar, Calif., a week earlier. Among the witnesses was Rep. Toby Roth (R-Wisc.) who berated the U.S. government for the "lack of emphasis being given to the area of alcohol fuels by the Department of Energy, and by others in the executive branch." DOE currently allots less than 0.2 percent of its budget to alcohol fuel research.

The Asilomar meeting, and one in March sponsored by the United Nations Industrial Development Organization at its headquarters in Vienna, Austria, point to a worldwide research effort in alcohol fuel development, aimed at decreasing dependence on imported crude oil.

The leader is Brazil's government-sponsored National Alcohol Program (PROALCOOL), which is investing $5 billion through 1985. PROALCOOL is the only national energy program in the world that cultivates a renewable alcohol resource: sugar cane. Brazil's next crop will yield about 900,000 gallons of ethanol — more than twice last year's yield. Volkswagen has provided a fleet of cars and General Motors a fleet of busses that run on pure alcohol. Car owners can buy a $200 alcohol conversion kit from São Paulo mechanics for their gasoline engines.

The availability of alcohol fuel in Brazil has attracted car companies such as Ford, Fiat and Mercedes-Benz — all eager to produce alcohol-powered vehicles. To them Brazil has the advantages of lax pollution restraints, an underemployed labor force and a climate good for cultivation.

Other nations not so well-endowed in high-carbohydrate crops are turning to methanol production. Germany, Sweden, Canada, New Zealand, Australia and the Philippines process methanol from cellulose available in their own renewable resources — pine forests in the north or eucalyptus in drier climates.

The most popular nonrenewable source of methanol is natural gas. By 1981, the Soviet Union will have the largest methanol plant in the world, contracted by Davy Powergas and located in the heart of Siberia. The natural gas (85 percent methane) will be converted to methanol for easier transport. The odds are that because of the huge volume of methanol produced by the plant (2,750 metric tons per day), some will be used as transportation fuel, says Alec Jordan, spokesman for Davy Powergas.

Research from all over the world finds alcohol fuels, whether pure or mixed with gasoline, to be cleaner and more fuel-efficient than gasoline alone. Why then does Brazil stand alone as the most actively involved in alcohol production from renewable resources? Serge Gratch, lab director at Ford Motor Co. and witness at the Ottinger hearing, told SCIENCE NEWS, "The biggest single difference is the form of government" — Brazil's dictatorship welcomes the new technology with open arms. □

Protein lack and the next generation

Two unprecedented studies of rats recently conducted at the Massachusetts Institute of Technology suggest that the effects of protein malnutrition on human learning are more far-reaching, complex and hard to erase than was previously believed.

Specifically, experiments conducted by Janina R. Galler and her colleagues at MIT's Department of Nutrition and Food Science have shown that learning deficits may be severe when protein malnutrition is present across many generations, that males are more susceptible to learning difficulties due to one generation of protein malnutrition than are females, and that whereas females can recover from learning deficits due to multi-generation protein malnutrition in only one generation, it takes males at least three generations to recover.

The reasons such studies haven't been conducted before, Galler told SCIENCE NEWS, is that "we have a unique situation of having an animal colony that has been protein-deprived for up to 20 generations." In her first investigation, which she conducted with Michael Manes, Galler studied rats from this long-term, protein-malnourished colony, rats that had been protein-deprived for only one or two generations and rats from a colony that had never been protein-malnourished. There were both males and females in each of the three groups. Galler and Manes then gave all three groups of rats tests of visual learning, which required the animals to learn to discriminate between different patterns in two windows in a backboard and to jump through one or the other window in response to these visual cues. Galler and Manes found that whereas both female and male rats whose ancestors had been malnourished for many generations were much slower to learn these visual tasks than were controls, among those who had been nutritionally deprived for one generation, only males, not females, were slower to learn than were controls.

Galler and her co-workers aren't sure why cross-generation protein malnutrition should lead to learning problems, and why female and male rats should respond differently to protein malnutrition.

In her second study, which she conducted with Steven B. Wilkins, Galler switched rats that had been protein-deprived for many generations to adequate protein diets for several generations to see how long it would take them to catch up with control rats on the same visual learning tasks. Female rats were found to recover after only one generation on an adequate protein diet, but males did not recover even after two generations. Thus, provided an adequate protein diet is introduced, female rats are more likely to recover from learning problems due to cross-generation malnutrition than are male rats. Galler and Wilkins don't know why females should have the advantage.

Nonetheless, "The implications of this research for human populations are clear," Galler asserts. "By giving people with a history of poor nutrition an adequate diet, they will improve physically. However, these people who look normal may learn more slowly and have more difficulties in social situations because of the lingering effects of malnutrition. Food is the first step. It is the most important step, but for populations with a whole range of deprivations, economic and social as well as nutritional, good food is not enough."

So what is? Perhaps good food plus an enriched environment, Galler contends. She and her co-workers will now attempt to see whether rats deprived of protein over many generations regain their learning abilities more quickly if they are given an adequate protein diet plus an enriched environment-rather than simply an adequate protein diet.

Galler and her team reported the above findings at the recent annual meeting of the Federation for Clinical Research in Dallas and have submitted two papers detailing their results to DEVELOPMENTAL PSYCHOBIOLOGY. □