science and man in the americas

From our reporter at the meeting on Science and Man in the Americas in Mexico City

A jojoba industry in Southwest's future?

An important industry based on utilization of the hardy desert shrub jojoba appears to be on the horizon in the southwestern United States and Mexico. This is the report of Edward F. Haase and William G. McGinnies of the University of Arizona's Office of Arid Land Studies.

Oil from the jojoba is apparently unique among plants and has many characteristics similar to sperm whale oil, used extensively as a lubricant for machinery. The trend toward a total ban on whale hunting seems to heighten the potential of jojoba oil as an attractive natural substitute for sperm whale oil. Jojoba oil might also be used in pharmaceuticals, in cooking and in cosmetics. Shampoo, hair oil and soap products from the jojoba are already produced and marketed in Mexico.

Haase and McGinnies note that the Indians in the southwestern United States have great need for a viable and stable economic system and that extensive stands of native jojoba grow on the San Carlos and Papago reservations in Arizona and might be cultivated elsewhere in the Southwest.

Indians in Arizona and California harvested 87,000 pounds of jojoba seed in the summer of 1972 to provide a large stockpile for testing. Substantial amounts of seed production are unlikely sooner than 10 years from now.

The cultivation of jojoba, say Haase and McGinnies, promises a minimal disruption of the arid zone ecosystem when compared with the impacts that have resulted from large-scale irrigated agriculture in arid zones, such as along the Gila River.

Volcanoes and earth's underthrusting fingers

The theory of plate tectonics envisions huge slabs of the earth's outer shell, or lithosphere, moving horizontally a few centimeters a year. Where the edge of one plate meets another, the first may underthrust the other. This is happening along the Pacific coast of Central and South America, where the eastward-moving oceanic plates are thrusting beneath the continental plate. This helps explain in a gross way the prevalence of earthquakes and volcanoes and the creation of the Andes Mountains down the length of the coast.

But for geologists to use the insights from plate tectonics in detail, they need to be able to interpret specific effects on relatively small areas—less than 100 kilometers.

Michael Carr of Dartmouth College has detected such small-scale relationships between broken segments of the underthrusting plate and specific regions of volcanoes in Central America. From seismic evidence, he hypothesizes that the underthrusting crustal plate in Central America is broken into segments, like the fingers of a hand burrowing beneath the edge of a blanket. The continental crust above these fingers, he believes, is broken into corresponding segments.

He notes that the chain of volcanoes extending down the length of Central America can be divided or categorized into perhaps seven different regions. The volcanoes in each region differ in alignment and other characteristics from those in adjacent regions. Carr suggests that each of these volcanic regions corresponds to one of seven of the broken segments or fingers of the underthrusting crustal plate. He says he sees similar evidence for such relationships along the coast of Mexico.

How nutrition affects placental growth

Many studies have explored the relationship between maternal nutrition and birthweight, but very few have focused on the effects of maternal nutrition on the placenta. In general, the smaller the placenta, the smaller the baby.

Animal studies have shown that severe protein-calorie malnutrition during pregnancy causes a decrease in placental weight, and some studies have shown similar effects on humans. But these latter studies have been criticized because they compared groups in Guatemala and Chile with groups in the United States. It was argued that there were too many differences between the two groups to make the results certain.

Now Aaron Lechtig and nine colleagues at the Institute of Nutrition of Central America and Panama in Guatemala have completed two studies designed to overcome that criticism. One study compared poor mothers with well-off mothers in urban Guatemala City. The average placental weight in the low socioeconomic group (moderately malnourished) was 15 percent lower than that of the high socioeconomic group (adequately nourished).

The other study examined the effects of a food supplementation in four rural Guatemalan villages. The investigators found a significant association between the total calories consumed from the supplements during pregnancy and the weight of the placenta.

Summarizing their data, "We conclude that moderate protein-calorie malnutrition during pregnancy leads to a lower placental weight and a higher prevalence of low birthweight. At the same time, this low birthweight is consistently associated with higher mortality during the first year of life. . . .

"In Latin America, 3 to 4 million babies with low birthweight were born during 1972. . . . We believe it is possible to decrease the prevalence of low birthweight, and consequently its human and social costs, through an improvement of the nutritional status of the pregnant mother."

Has irrigation affected Northwest rainfall?

The question of a major climatic effect due to changes in an area's water use has been debated for some time. One area of great interest is central Washington State, where the Columbia Basin Project has placed some 200,000 hectares of former semidesert under intensive irrigation. Several studies have suggested that the irrigation has caused an increase in rainfall in the area. Now that view is disputed.

Meteorologist W. B. Fowler and a hydrologist J. D. Helvey of the U.S. Forest Service's Forest Hydrology Laboratory in Wenatchee, Wash., have examined trends in summer air temperature and in July-August rainfall at stations inside and outside the irrigated area for the period before irrigation (1921-1950) and since irrigation (1951-1971). They found little or no change attributable to irrigation.

"We view our generally negative results particularly of interest relative to possibly smaller but more intensive application of water to an area." They mention spreading sewage effluent over forests or dryland, power-plant cooling and warm-water irrigation from future nuclear power plants. "Immediate site changes understandably will occur, but widespread climatic effects may well be minimal."