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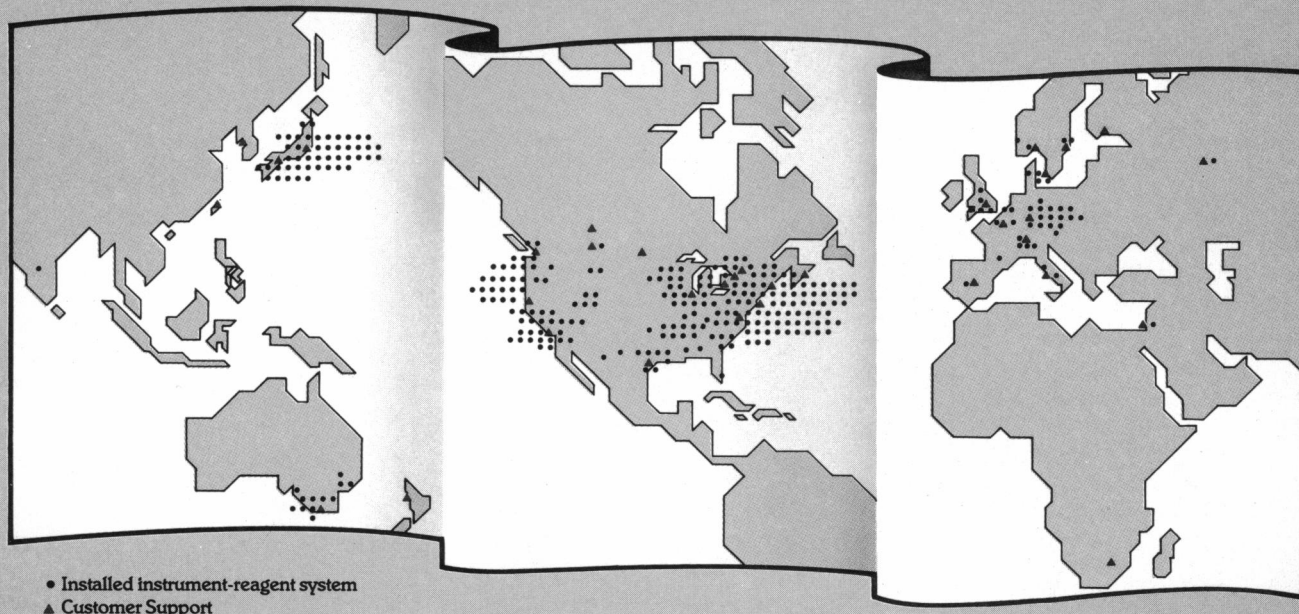
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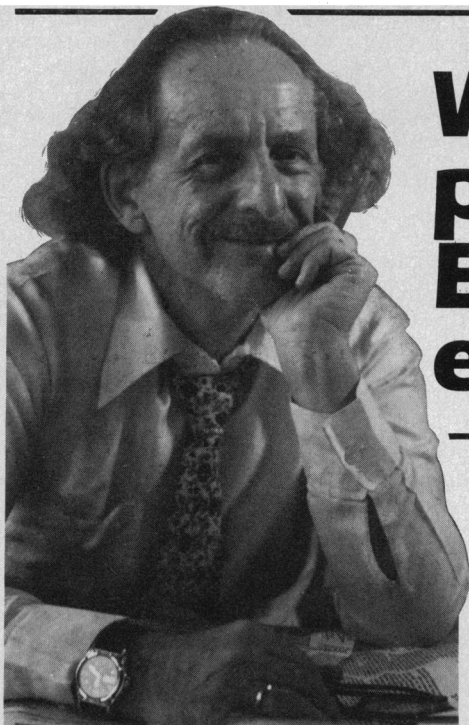
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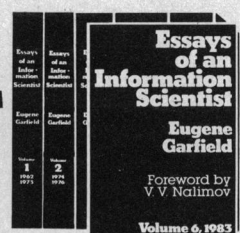
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COVER

Rocky Mountain bighorn ram (*Ovis canadensis canadensis*) courts an estrous ewe during a cooperative tending relationship. This ram, "Grayballs," had alpha dominance rank in 1980. Rams at lower ranks sometimes employed alternative mating strategies. See page 526. [John T. Hogg, University of Montana, Missoula, Montana 59812]

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Indian Development Trends

Growth prospects for most of the less developed countries continue to deteriorate. India is an important exception. It has tripled its food production, begun to approach energy self-sufficiency, and increased domestic manufacture. It has held down the rate of inflation. The country has key raw materials and intellectual resources.

For most of its history India has been plagued by recurrent famines. During the 1950's and early 1960's the country was a net importer of food at a cost of large amounts of foreign exchange. At that time annual production of food grains was about 50 million tonnes. Now the rate is 130 to 150 million tonnes. Part of this improvement can be attributed to developments outside India, but major credit belongs to indigenous efforts, including effective agricultural extension services and agricultural research.

The energy problems of the last decade affected India as well as most other countries. For a time in the 1970's most of India's foreign exchange went to pay for oil. However, that large drain has been attenuated. A giant pool of offshore oil was found near Bombay. The find was exploited rapidly. In 1980 total domestic production was about 9 million tonnes of petroleum. Production for the current year has been estimated at 24 million tonnes; total consumption is 34 million tonnes. Proportionately, India is slightly less dependent on imports than is the United States. The country has substantial reserves of coal that are being exploited, and the use of biogas from biomass is increasing. In 1950 installed electrical generating capacity was 2,300 megawatts. In 1983 it was 38,000 megawatts.

Equally noteworthy are achievements in expanding local manufacture. At the time of independence in 1947 India had the status of a colony that exported raw materials and imported manufactured products. Today many industrial products consumed in India are made in India. Examples include heavy electric generating equipment, railroad locomotives, most motor vehicles, and a large number of chemicals.

The forgoing should not be interpreted as indicating that India has reached a high level of development. In fact, in comparison with the United States it is a very poor country with many problems. Even with all the improvements, annual gross domestic product totals less than \$200 per capita. The country is experiencing internal dissensions arising from ethnic and religious differences. Some 18 different languages are spoken. While efforts are being made to control population expansion, this goal is being approached slowly. In spite of these long-standing handicaps prospects are good for continued economic development.

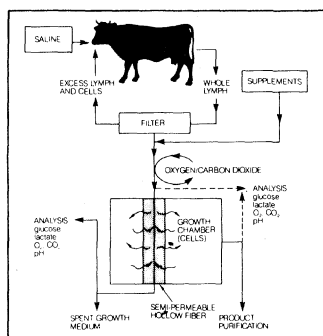
India is well-endowed with raw materials. For example, iron and manganese ores are very abundant. Coal reserves total 112 billion tonnes (present consumption is 140 million tonnes per year). A third of the country is covered with sedimentary rocks, the natural habitat of more petroleum. An Indian agronomist has told me that present food grain production could be doubled. Deforestation remains a problem, but it is gradually being countered by a tree-planting program.

One of the best grounds for predicting continued development is the presence in India of a substantial number of scientists and engineers who have had training in the United States. Their quality is such that they have been rising to positions of national leadership. Given adequate support—for example, equipment and supplies—they are capable of world-class research and development. As the economy strengthens and more foreign exchange is available, it will be possible for the Indian government to direct additional funds to R&D. The official attitude has long been favorable to science and technology. Jawaharlal Nehru was a strong advocate and his daughter, Indira Gandhi, is likewise committed. Trends in India are favorable. The necessary political, material, and intellectual factors are present. Further economic development seems assured.—PHILIP H. ABELSON

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