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IBP for India

EITHER IBP WAS INVENTED for India or India was invented for the IBP: the aims of the one match the circumstances of the other almost precisely. But the Indian government has not yet seen it this way; the national programme is short of money and is consequently slow in getting under way. The national committee chairman, Professor B. R. Seshachar, Head of the Department of Zoology at the University of Delhi, is rather hopeful of the stimulus offered by bilateral projects at this stage and has just completed a world tour to get some new ones going. Indeed, several are already arranged with British groups.

He found the Soviet IBP chairman enthusiastic and some themes for co-operative research are being developed. "For instance," says Seshachar, "most of the camel countries are in trouble at present; a bilateral programme on the camel based on Afghanistan seems useful." In the deserts of India and Soviet Asia, as well as in Africa, the camel is essential as a draught animal but the less studied Indian camel is very different from the African. Afghanistan is convenient because it has both the camels and a sizable Soviet community already present.

India offers tremendous scope for work in the Human Adaptability section. This is led by Dr L. D. Sanghvi, Director of Human Population studies for the country. Thinking at present favours concentration on problems in genetics where there is a lot to do. "India still possesses a large number of aboriginal tribes which have remained isolated for many years but will not remain so much longer," Seshachar points out. The blood groups of these aboriginals are not known nor, indeed, are other genetic factors. The closely knit community of Parsees—who belong to the Zoroastrian cult of fire-worshippers and who fled to the west coast of India around Bombay from the Moslem invasion of Persia centuries ago—show a characteristic pattern of endemic diseases. Among these are high susceptibility to certain cancers and to tuberculosis. The range of environments in India provides an almost complete spectrum of contrasted human habitats: the mountains of the Himalayas, the lowland plains and the deserts of India contrast sharply with wettest rain forest in the world in Assam, which can have over 1000 inches of rainfall a year. The phenomenal success of the Chinese invasion from the mountains in 1962 is put down to adaptability. The Indian troops rushed in were plainsmen who succumbed to altitude sickness and frost bite while the Chinese were unscathed.

The Indian population grows by the equivalent of the whole population of Australia, from 12 to 15 million people, each year. The only quickly available source of protein to match this galloping population increase is fish. "Fish should be our natural source" comments Seshachar. "We have used up all the cultivable land already. To make the deserts flower poses great difficulties and to engineer irrigation schemes is very expensive. So too are fertilizers to raise the productivity of normal agricultural land as India is very behind in building artificial fertilizer plant." The sea fishing industry is much hampered by the scarcity of harbours. Bombay is the only natural harbour around the entire subcontinent which has one of the 'smoothest' coastlines in the world. Great emphasis is being put on freshwater fish farming and management. There has already been substantial success in farming the carp. Indian waters have several species of carp. But they are very choosey and refuse to breed in confined waters. However, by injecting them with pituitary extract they become more amenable; they will breed in any freshwater and their response to the seasons is less marked. Initially the Indian experiments relied on carp pituitary but now mammalian extracts are used as they are easier to obtain. There is key work to be done in limnology apart from the fishery aspect. A number of man-made lakes are under construction, and India is a land of great rivers. But because of the monsoon pattern of rainfall, with all the rain coming in one concentrated dose, "the difference between summer and winter rivers is unimaginable —they are all dust in summer, and all floods in the winter".

ANGELA CROOME

Matador: new IBP station for Canada

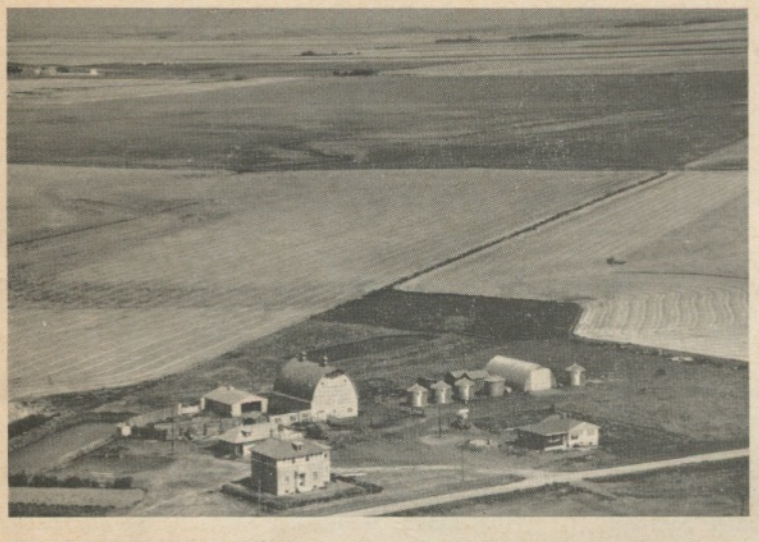
The Canadian Committee on IBP has announced that the University of Saskatchewan is establishing a biological field station near Matador, 48 kilometres north of Swift Current, Saskatchewan, for a long term study of biological productivity on grasslands.

The Canadian National Research Council is providing the major part of the financing for the project which is expected to involve several hundred thousand dollars in capital costs over the next few years and more than a quarter of a million dollars annually in operating expenses.

The Matador station is one of two in Canada—the other being in the forest zone at Petawawa, Ontario—studying biological productivity of grasslands, and research has already started. It is the largest new installation so far announced under IBP in the world. It also constitutes nearly one-quarter of Canada's share in the international programme.

Scientists from the University's Saskatoon and Regina campuses and from the Saskatchewan and Canadian Departments of Agriculture, the Canadian Wildlife Service, the National and Saskatchewan Research Councils, and other universities are co-operating in the project.

Dr R. T. Coupland, Head of the Department of Plant Ecology at the University of Saskatchewan, Saskatoon, has been appointed director of the Matador project and between 25 and 35 scientists, together with some 30 graduate students and 20 technicians, will



FERTILE WHEATLANDS of southern Saskatchewan are the site of Canada's newest biological field station. Established at Matador, near Swift Current, it is the largest new installation for IBP so far announced in the world. It is already operational and will be used mainly for the study of the biological productivity of grasslands

be engaged in the project. A large number of these will be quartered at the new field station during the growing season, but research on collected materials will also take place throughout the year in laboratories at Saskatoon, Regina, Swift Current, Calgary and Winnipeg.

Dr Coupland said recently that the project will be a vast interdisciplinary effort comprising, among others, representatives of numerous branches of biology, for instance, soil, crop and animal scientists and meteorologists. Further, the site, which is in Saskatchewan's south central grassland zone, is the only remaining extensive uncultivated area of first class wheatland in the prairies.

The vegetation, soils and microclimate will be studied as a unit (the ecosystem). These studies will provide information about the efficiency of different kinds of vegetative cover in utilizing nutrients, carbon dioxide and water, and in fixing the sun's energy in the production of carbohydrates. The studies will be carried out on native grassland, on a cultivated wheat field and on a cultivated brome grass field.

"We want to set up budgets of all that goes into the ecosystem and all that comes out and determine, much more precisely than previously, the extent to which man's harvests are in balance with the rate of production," declared Coupland.

He pointed out that, except for sunlight, all materials used by plants in making food are eventually released and can be used again for plant growth. The sun's energy, however, does not cycle as the other materials do.

"If there are no plants to receive the sunlight, or if there are the wrong kind, energy from sunlight is lost forever for the production of food. One measure of the efficiency of an ecosystem is the percentage of total sunlight used by plants in making food."

One of the objectives is to determine whether the use of the sun's energy in Western Canada is efficient and what level of production can be maintained indefinitely. The scientists will look into the problem of how many calories or energy per square metre of soil surface are used by native grassland, compared with a wheatfield and with a brome grass field.

The project will also involve studies of the transformation of plant food into secondary products, for example, the conversion of grass into animal production.

Pests and proteins from Africa's great lakes

African biologists are now organizing themselves to ensure that the three big new hydroelectric dams—Volta, Kainji and Kariba—in West and Central Africa will do their share to fill Africa's pressing need for a cheap source of protein. For years nutrition experts have urged Africans to eat more fish to relieve the protein deficiency that is Africa's most serious nutritional problem. Properly utilized, the huge new lakes behind the new dams in Nigeria, Ghana and on the Zambia-Rhodesia border could go a long way towards making fish widely available in these tropical countries.

Originally, the dams were conceived solely as sources of cheap hydroelectric power and little thought was given to the far-reaching consequences of so revolutionary a change in geography and ecology. In Ghana, for example, the new Lake Volta behind the dam on the Volta River will eventually cover four per cent of the area of the country. Yet almost no plans were made for developing a fishing industry on the lake or for combating the disease-carrying insects and molluscs which could breed there.

However, this year Dr Letitia Obeng, director of the Institute of Aquatic Biology of the Ghana Academy of Science, hopes to have completed the first year-long study of plankton movements in Lake Volta, an essential prerequisite to understanding the normal yearly pattern of fish migrations in response to the changes in lake volume in wet and dry seasons. This project is a good illustration of how the same African research effort can provide basic scientific information and at the same time be an essential underpinning to an undertaking of the greatest economic importance.

Nevertheless, the most pressing biological problem created by the new lakes concerns not fish but aquatic plants. Although neither the Niger nor the Volta River systems are known to harbour the notorious pest water hyacinth (see SCIENCE JOURNAL, IBP, March 1967) biologists at Kainji and Lake Volta must worry about the water lettuce (*Pistia stratiotes*) which is already growing thickly on the margins of Lake Volta.

The problem with *Pistia* is its ability to carry other organisms on its leaves and among its roots. Shallow waters are excellent breeding grounds for such disease vectors as malaria mosquitoes, the snails that carry the parasite of bilharzia and the mosquitoes that carry the microfilaria causing elephantiasis. Obeng examined bits of *Pistia* floating in Lake Volta and found that many were carrying snails and mosquito larvae. She has also found that these potential vectors have spread much faster to previously uncontaminated areas than would be expected from their rather limited flight and swimming power. Fortunately, no actual parasites have been found infesting the snails or mosquitoes around the lake, and there is still time to fight the weed with chemicals. Still, there is the danger that, in its zeal to industrialize, Ghana may unwittingly have created a major public health hazard.

In Nigeria, Dr Willis A. Evans faces an even greater challenge: that of organizing a research effort designed to provide a maximum of information about the River Niger and the land that will form the lake floor behind the Kainji Dam—or at least as much as can be gathered in the time remaining before the completion of the dam, now scheduled for July 1968. In addition to biologists, Evan's staff includes a Harvard trained anthropologist, Don Jeunesse, to lay the groundwork for the resettlement of tribes living along the river and the training of many fishermen who will fish the new lake. One of Jeunesse's first jobs will be to prepare the villagers for the demoralizing effects of the huge fish kills that will follow the first flooding of the lake. As the water rises, the land plants die and rot beneath the surface of the water, enriching the water with plankton nutrients and attracting large populations of fish. As decomposition proceeds, however, the natural purification capacity of the lake becomes overburdened, and the amount of oxygen dissolved in the water drops below the minimum needed to support fish life. This chain of events produced huge fish kills during the early years of Lakes Kariba and Volta, and indeed the fish population in them is only now rebounding towards normal levels.

Nigeria anticipates little difficulty in attracting fishermen to the new lake once the fish population has returned to normal. In contrast to East Africans, who regard fishing as a low class occupation to be undertaken only as a last resort, West African villagers are often good part-time fishermen. So rich will the lake waters be that Evans and Jeunesse hope for an influx of migrants from other areas. Once biologists are sure which species will be important in the new lake, specialists will design fishing gear tailored especially to the fish and fishing conditions in the different sections of the lake. Both newcomers and old residents will then have to be taught how to use the new equipment.

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