

IBP: Predictive ecology biome by biome

The International Biological Program was set up in 1965 to study the biological environment and man's place in it. Sixty nations, including the United States, are currently involved.

U.S. IBP scientists are studying large slices of the environment, such as grasslands and forests, to see what makes them tick and to make computer models of them (SN: 10/23/71, p. 282; 7/29/72, p. 78). U.S. IBP scientists are studying the effects of different environmental stresses on people, such as high altitudes and migration (SN: 3/4/72, p. 154; 6/17/72, p. 395). U.S. IBP scientists are also trying to see what biological controls might be applied to pests in different environments.

As the IBP moves along to its termination date of June 1974, several questions become pressing. Will the aims of the U.S. IBP be fulfilled by the time the IBP ends? Will the U.S. IBP have a widespread and positive impact on ecological science? Scientists attending the annual meeting of the U.S. IBP in Washington last week indicated that progress is being made toward reaching these goals.

Stanley Auerbach of the Oak Ridge National Laboratory and director of the Eastern Deciduous Forest Biome Studies, reported that his team has already completed computer models for some of the ecosystems within the Eastern forests and is now verifying the models. The models are for movement of water in soils; how lakes and the fish in them behave; how chemical elements, whether nutrients or pollutants, move through the forest floor. Such models already offer predictive value. They can predict, for example, the effects of thermal pollution or of eutrophy on lakes.

Paul Baker of Pennsylvania State University and director of the IBP Human Adaptability Studies reported that his team has found that Amazon Indians have quite a few scrambled chromosomes, which suggests that if scrambled chromosomes are detected among civilized populations, they should not necessarily be attributed to pollutants and other insults of the civilized environment. Baker's team has also found that Amazon Indians are virtually free of heart disease. So were the Aleutians of Alaska until they started adopting the ways of modern civilization. Indians living at high altitudes in Peru have little heart disease, even when they migrate to lower altitudes. So far, human adaptability studies do not offer a unifying explanation for why these less civilized peoples might escape heart disease. The Amazon Indians, for example, do not eat

salt. The Peruvian Indians eat a high carbohydrate diet. The IBP team does have evidence, however, that trace elements in the diet may be critical to the health of different populations. Low magnesium intake in Thailand, for example, has been linked with sudden deaths among infants.

Along with the U.S. Department of Agriculture and the University of California, the IBP is looking into the effects of biological controls over pests in different environments. Although this IBP effort has only been on for a few months, it is already coming up with some findings, according to Joe C. Ball of the University of California at Albany and one of the scientists in the IBP program. For example, the IBP team has found that a number of soybean strains can resist the Mexican bean beetle. Some viruses may be carried by plants without economic damage. Presently they are trying to see what parasites from Hong Kong can do to protect Florida's citrus trees.

As the IBP comes to maturity, there is little doubt that the U.S. IBP is making some valuable contributions to ecological science. John Reed of the University of Wisconsin and chairman of the U.S. IBP points out that a thousand American scientists are working on IBP projects. American IBP scientists are starting to publish their findings in journals that are read by the scientific community at large. As IBP scientists around the world amass information, they are collaborating with U.S. IBP scientists. Last August, for example, 70 IBP scientists from many nations, including Russia, met in Seattle and put their environmental data into U.S. IBP computers, so that computer models of global environments can be drawn up. The U.S. IBP contributed to the United Nations Conference on the Human Environment in June (SN: 6/24/72, p. 404). Cambridge University Press in England is publishing a synthesis of global IBP efforts, which includes the U.S. efforts.

Most crucially, Reed says, the U.S. IBP is bringing together scientists from many disciplines and having them work together as a team toward specified goals. The United States and Canada have been world leaders in the integrated ecosystem analysis approach, says Frank Blair of the University of Texas, Austin, and vice-chairman of the International Special Committee for the IBP. "I think we have sold the approach on an international basis."

The U.S. IBP, Reed indicates, is also doing an outstanding job in making predictive computer models of ecosystems. "Prediction," he stresses, "is the important word." The better the models can predict this or that change on the ecosystems they represent, the more valuable they will be as tools for the

management of relevant ecosystems.

The U.S. IBP, however, has faced some serious obstacles. For example, Auerbach says, there has been a shortage of ecologists who are trained in computers and math and who can model ecosystems. Also, as Baker points out, the U.S. IBP human-adaptability studies have been hampered by lack of funds. "I cannot say," Baker admits, "whether we have succeeded or not yet." The U.S. IBP also faces some challenges. One, Reed stresses, is to make all the information the IBP collects useful to the public. "We are also concerned," he says, "with how this new, big multidisciplinary activity can be picked up at the national and international level."

Blair points out that the UNESCO Man and Biosphere Program that is now underway was completely patterned after IBP. After IBP terminates, Blair says, U.S. IBP efforts should move under other auspices, perhaps under the UNESCO program, and emphasize man's effects on various ecosystems. U.S. IBP efforts, he says, could also profit from more money. Presently IBP garners \$11 million annually from the National Science Foundation, various government agencies and the Smithsonian Institution—about the cost of one F11 fighter. □

U.S./U.S.S.R. Bering Sea weather study

The earth's oceans are the single most important factor in weather patterns. In order to predict the weather accurately on a global scale, scientists need to be able to monitor ocean conditions daily. Such a large operation would best be done by satellite but the techniques of such remote sensing are still in the developmental stages. Experiments are being carried out to correlate known ocean and sea conditions with satellite photography and aircraft measurements.

NASA announced this week plans to carry out one of the recommendations of the August 1971 Joint U.S./U.S.S.R. Working Group on Satellite Meteorology. Between Feb. 15 and March 7 NASA and the Academy of Sciences of U.S.S.R. will conduct joint measurements of sea ice, sea surface and atmospheric conditions in the Bering Sea from ships and instrumented aircraft. Measurements are to be carried out by Soviet weather ships and an IL/18 aircraft and by a U.S. Coast Guard icebreaker and an instrumented Convair 990.

NASA says the purpose of the experiment is to obtain and exchange microwave measurements of the sea surface at varying temperatures and sea states,

Anthropologists and the glass bead game

Hermann Hesse once described a culture in which the intellectuals retreated to monasteries, gave up contact with the real world and concentrated all their erudite powers on an abstruse and arcane game—the glass bead game. Inputs to the esoteric game were all the elements of culture. Year in and year out the savants of the game would devise intricate stratagems and recondite theories that they would test on each other once a year at their annual intellectual super bowl. Eventually the game became more important than the knowledge it was based on and the intelligentsia floundered when they had to apply their learning to a real-life situation.

Hesse, of course, was warning intellectuals against ivory-towerism. Similar warnings were heard last week when 3,500 anthropologists met in Toronto for the annual meeting of the American Anthropological Association (see p. 376). The most sincere warning came from Georges Condominas of the Ecole Pratique des Hautes Etudes in Paris. Condominas, a French citizen born in Haiphong, with a Vietnamese grandmother, was invited by the AAA to give the annual distinguished lecture.

Describing himself as an old-fashioned participant observer, Condominas decried the current fashion in anthropology to produce something that will make one look like a theoretician. Most of this, he says, turns out to be purely speculative hocus-pocus enveloped in a pretentious and unintelligible jargon. The most important part of an anthropologist's professional life, he says, should be objective observation in the field. His warning to his fellow anthropologists came in the form of a personal example. He told how as a young anthropologist he lived among and observed the Montagnards of Vietnam. His first book, *Nous Avons Mangé la Forêt*, described them. Some years later Condominas learned that a person whose marriage he described in the book had been tortured by a sergeant of the U.S. Special Forces—the Green Berets. A few years after that he learned that

his book had been translated (without anyone's permission) by the U.S. Department of Commerce and distributed to the Green Berets.

"How can one accept," he said, "without trembling with rage that this work, in which I wanted to describe in their human plenitude these men who have so much to tell us about life, should be offered to the technicians of death."

Condominas had no power over how this research was used, but there are some who do have the power and refuse to exert it. Joseph B. Casagrande, president of the AAA, noted that since the 19th century colonial powers have attempted to use anthropologists to gather information to help manage and exploit indigenous peoples. Those who work in this way with governments, says Condominas, dishonor the profession by calling themselves anthropologists. Any well-meaning neutrality of research workers is not enough. Anthropologists, he says, must speak in defense of peoples and societies they are studying—against colonial imperialism. Not being involved in politics, he continues, signifies acceptance of existing injustice.

Condominas' warning against intellectual elitism and noninvolvement is not new and was heard many times at the meeting. Many native American Indians were present to protest their treatment by the United States and Canadian governments. There were at least six three-hour sessions on anthropologists and anti-imperialism. Anthropologists for Radical Political Action and members of Students for a Democratic Society denounced the United States for using anthropologists as informers in Thailand and complained that much anthropology is irrelevant to the contemporary problems of native peoples. Many concluded, like Condominas, that anthropologists will be obliged to "reformulate the ethical foundations of the anthropology profession and even to question the purpose of the profession itself."

the salinity, thickness, roughness and age of sea ice, and the water content of the atmosphere. Results of the experiment may contribute to a better understanding of the interaction of sea ice and atmosphere on the development of weather patterns in the Bering Sea and adjacent areas.

Experimenters hope to acquire more information on the performance of microwave radiometers mounted on aircraft, their relationship to satellite-borne instruments and their operational use in meteorology. The military has been using similar techniques now for years to track submarines. But civilian use is a new science. NASA will be flying a microwave radiometer on Skylab in May.

The U.S.S.R. aircraft will operate from the Anadyr Airport in eastern Siberia and the Convair 990 will be based in Anchorage, Alaska. The Soviet ship will operate in the sea, south of the ice near 179 degrees east longitude and the U.S. Coast Guard ship will operate in the ice between 58 and 63 degrees north latitude and 174 and 178 west longitude. □

Greenland rocks: younger, but still old

The oldest rocks in the world aren't as old as first believed, but they are still pretty old. Early this year, V. R. McGregor of the Geological Survey of Greenland and four researchers from the University of Oxford in England tentatively identified some granitic rocks from the Godthaab district in Greenland as 3.98 billion years old.

Now, McGregor, Stephen Moorbath, R. K. O'Nions, R. B. Pankhurst and N. H. Gale report, in the Nov. 27 NATURE PHYSICAL SCIENCE, the results of a much more detailed collection of rocks from the Godthaab region. The results confirm the great antiquity of the rocks in west Greenland, but require some revision of the dates proposed last February, they conclude. The rocks now appear to be between 3.70 billion and 3.75 billion years old. The 3.98-billion-year age found earlier, they conclude, "must now be regarded as fortuitous," resulting from inadequate sampling. The researchers view

their present results with much more confidence, because the samples came from three different geographic areas and all give essentially the same age range.

The five also reported ages of gneisses from a different region—the Isua area—some 150 kilometers northeast of Godthaab. The researchers are not sure yet how the geology of the Isua area ties in with that of Godthaab, but they have determined that the gneisses at Isua are contemporaneous with certain gneisses of the Godthaab area.

The accumulating evidence of ancient, widespread granitic rocks forces some revisions in theories about development of the earth's crust. Formerly the oldest dated rocks were found in the volcanic greenstone belts of southern Africa, Canada and Australia. Now it appears that a granitic crust formed even earlier in the earth's history. The sequence of events—at least, in Godthaab—appears to have begun with development of a granitic basement. Volcanic rocks of various types then repeatedly erupted or intruded through this crust to accumulate on top. □