Food conference: New beginnings

As weary, snappish delegates slowly drifted away, the World Food Conference ended its two-week course with little fanfare. Its major accomplishment: a general agreement to hold still more meetings and an awareness of new imperatives for research and economic development.

Technical resolutions, for the most part, had smooth sailing, and from the deliberations emerged a new emphasis on "appropriate technology" as the key to raising underdeveloped nations from age-old cycles of poverty and malnutrition. A sense of awareness of the need to protect the environment during the development process and the inadvisability of wholesale transfer of advanced technologies was apparent among both industrialized and Third World nations.

Recognizing the need for better water management as a means of bringing new land into production and producing greater harvests from existing farms, the conference directed the United Nations Food and Agriculture Organization (FAO) and the World Meteorological Organization (WMO) to begin a comprehensive survey to see what water potentials exist, and to follow the survey with extensive programs aimed at expanding the amount of irrigated land, reclaiming land lost to salinity through improper irrigation, and exploring the economic feasibility of such "nonconventional" water resources as desalted seawater. The resolution also called for development of ways to use brackish water for food production (new plant strains are being bred to grow in such water), and to provide flood protection and watershed management in areas subject to frequent crop loss due to floods (such as Bangladesh, this year).

The conference followed the suggestion of the organizing committee in calling for a program to irradicate tsetse fly infestation in central Africa —a move that could open some seven million square kilometers of land for grazing. Cattle cannot now be raised in the area because of the disease trypanosomiasis, borne by the tsetse fly. A coordinating committee within FAO will initiate the program.

Other technical resolutions included moves to improve the quality and distribution of seeds to improve local crop strains, to have international coordination of pesticide and fertilizer supplies, and to improve nutrition through better use of foodstuffs once they reach the consumer. Again, the FAO was instructed to coordinate proposals by which international organizations would promote nutrition education, begin a worldwide program of nutrient fortification (especially supplementing vitamins) and conduct a global nutrition surveillance particularly aimed at identifying and helping the world's starving children.

The politically sensitive issue of land reform was largely ignored. But other social issues received heartening support. The conference paid particular attention to the role of women—who are the chief producers of food in many parts of the world, and the major marketplace consumers almost everywhere—and resolved "to involve women fully in the decision-making machinery for food production and nutrition policies as part of total development strategy." Special emphasis was placed on the need to improve nutrition for nursing mothers and education for all women "to promote equal rights and responsibilities. . . with men in the battle against world hunger." The conference delegates also reaffirmed the resolution made at a population meeting in Bucharest, asserting the right of all couples to determine the spacing and size of their families.

Agreement on the issues of aid and trade proved harder to come by. The organization of Petroleum Exporting Countries (OPEC) promised to contribute some of their oil money to an Agricultural Development Fund, to aid hard-pressed developing countries overcome the rising costs of imports needed to improve their crop production, but the United States apparently wanted to see specific figures before committing itself to the fund.

Deputy Head of the American Delegation Edwin Martin said that perhaps the most important thing to come out of the conference, in his view, was an agreement to establish internationally coordinated, nationally held food reserves. The details will be worked out later by producer countries.

The conference called on the United Nations General Assembly to form a World Food Council to coordinate the food related activities of various U.N. branches and also keep a watchful eye on individual governments, recommending policy changes when necessary, to avert shortfalls. Follow-up duties on the research proposals were given to the Coordinating Group on International Agricultural Research (CGIAR) which now oversees the eight major laboratories that fostered the "Green Revolution."

The conference agreed, in principle, to setting up an "early warning" system to share harvest data. Administered by FAO, the system would involve voluntary input of crop prospects, prices of food products, and livestock health by member countries. But cooperation by the two countries that now account for most of the world's uncertainty in crop reports remained in doubt: Russia said only it would "not object" to setting up such a system and would "consider" participating. China expressed "reservations."

The secretary general of the conference, Sayed Marei, expressed general satisfaction with the medium- and long-range resolutions that came out of the conference, and expressed hope that near-term emergency aid could quickly emerge from subsequent meetings. Addeke Boerma, FAO director general, also praised the new sense of urgency and the need for new priorities he sensed among delegates to the conference: "I think the conference will have an influence on these [developing] countries to help themselves."

Whether the world's half-billion starving people can really derive much cheer from all these words will depend entirely on how swiftly and how well they are put into practice. □

Enzyme therapy: Another success

There are some 2,000 known single gene disorders—that is, inborn errors of metabolism. About a hundred of these disorders are problems of enzyme deficiencies. Until 16 months ago, efforts to correct these deficiencies with enzyme therapy largely failed. Investigators couldn't get enzymes purified enough, or into the nervous system and brain.

Then Roscoe O. Brady and his colleagues at the National Institute of Neurological Diseases and Stroke managed to bring off successful enzyme therapy in two patients with Fabry's disease. This disease consists of fat-accumulation in the body because of the presence of an abnormal fat-metabolizing enzyme, a so-called alpha-galactosesidase. The main key to their success was purifying enough of this enzyme to use for treatment (SN: 4/28/73, p. 268).

Brady and his team now report a second success with enzyme therapy in the Nov. 7 NEW ENGLAND JOURNAL OF MEDICINE. This time the therapy is for Gaucher's disease. This disease also consists of an abnormal accumulation of fats in the body. But the culprit is an abnormal fat-metabolizing enzyme called glucocerbrosidase. An editorial in the journal describes the results as "an important and exciting advance in the therapy of inborn errors [and] even more promising than those reported by Brady and his co-workers just 16 months ago. . . ."

Brady and his colleagues purified enough glucocerbrosidase from human

placental tissue to use in treatment. They then chose two patients for treatment. One was an alert and cooperative 16-year-old boy who was confined to a wheel chair. Since the age of 12 he had been subject to disabling involuntary movements as the result of his disease. The other patient was a 51-year-old woman, cooperative but tense. Gaucher's disease had fractured and destroyed some of her bones and created low back pain. Without effective treatment, the patients would have continued to suffer from liver, bone and neurological damage.

Each patient received an enzyme injection. They both tolerated it well, with no sign of fever or other obvious side effects. The enzyme then made its way to the patients' livers. By 72 hours after enzyme therapy, fat in the patients' livers and red blood cells decreased considerably.

These results raise several questions about the future of enzyme therapy. Will enzyme therapy turn out to evoke immunologic reactions in recipients because the enzyme material contains other proteins as well? There is a chance this might happen. However, Brady and his team hope to get enzymes so pure that other proteins will be eliminated. Then, what is the possibility of extending enzyme therapy to inborn errors other than Fabry's and Gaucher's diseases?

In the past Brady and other investigators have suggested that only those two diseases out of dozens of fat-storage diseases would be treatable by enzyme therapy. In other words, even if enzymes for the other diseases were purified enough, they would have trouble getting into the brain to remove fats there. However, as the journal editorial points out, getting enzymes to a patient's liver might reduce fats in the brain as well. □

What activates egg cells? Calcium

An egg cell is an organism's investment for the future. It usually is endowed with a rich deposit of nutrients, is produced and protected by an elaborate system and is ready to burst forth with physiological activity at the first sign of fertilization. But what is this first biochemical signal that puts a waiting egg cell into metabolic gear? If cell biologists knew this, they might better understand the initiators of cell metabolism, differentiation and growth.

Four biologists now believe they have determined the universal factor that turns on cell metabolism during fertilization. Richard A. Steinhardt of the University of California at Berkeley, David Epel and Edward J. Carroll Jr. of the Scripps Institution of Oceanography and Ryuzo Yanagimachi of the University of Hawaii School of Medicine report this universal factor in the Nov. 1 NATURE. They found that intercellular stores of calcium (probably contained in or on membranes) can turn on cell metabolism if they are released into the cytoplasm. This release takes place after sperm penetration, but the team found that the release also occurs when the cells are treated with a calcium ionophore, a substance that allows doubly charged positive ions to pass through lipid membranes that normally would not allow the passage.

Steinhardt and Epel earlier this year induced activation of unfertilized sea urchin eggs with the ionophore. The whole group has now induced activation in unfertilized sea star, amphibian and mammalian eggs with the same substance. When the eggs were exposed to the ionophore, calcium stored internally was released. This event immediately preceded the cell's activation—the elevation of the fertilization membrane, the increase of respiration, protein synthesis and DNA synthesis—and led the team to conclude that the release of intercellular calcium is central to the activation of egg metabolism and perhaps cell metabolism in general.

Steinhardt is a neurophysiologist, and although this may seem far afield from embryology, he explained the connections. "We are actually trying to dissect the program of activation, and are interested in ions controlling metabolism." The permeability of nerve-cell membranes to positive ions has been established as the main factor in their ability to transmit bioelectric impulses. "Potassium activation in nerves has been linked to increased calcium inside cells, but it is hard to study this in nerve cells. Egg cells are a much easier cell model to study, so we looked for the phenomenon in eggs first."

The team did see changes in egg cell plasma membrane permeability following treatment with the ionophore and release of calcium (C^{++}). They observed an initial influx of sodium followed by increased permeability to potassium. These changes are qualitatively similar to those seen during nerve-cell metabolism and transmission, and may show intracellular calcium to be a factor in the control of cell metabolism, growth and differentiation, Steinhardt says.

Once the role of ions in egg cell activation has been studied thoroughly, Steinhardt says, he will apply the basic information to the study of nerve growth and learning. □

Lasker awards five researchers

During the past 29 years, the Albert Lasker Medical Research Awards have become America's most prestigious awards for biomedical research. One of this year's Nobel Prize winners, George Palade, was a former Lasker awardee (SN: 10/19/74, p. 244).

Now the recipients of the 1974 Lasker Awards have been named. They are Sol Spiegelman of Columbia College of Physicians and Surgeons, Howard M. Temin of the University of Wisconsin, Ludwik Gross of the Veterans Administration Hospital, Bronx, N.Y., Howard E. Skipper of the Southern Research Institute, Birmingham, and John Charnley of Manchester University in England.

Spiegelman has received a Basic Medical Research Award for his outstanding contributions to molecular biology. He was the first to successfully synthesize an infectious viral RNA molecule. Such synthesis showed that copies of molecules containing genetic information could indeed be made in the lab. He also helped develop the molecular hybridization technique, and showed that the technique can be used to detect the presence and operation of genes, specificially viral genes, within cells (SN: 1/27/73, p. 56).

Temin has received a Basic Research Award for advances in understanding the RNA cancer viruses. His experiments showed the existence and operation of the now-famous reverse transcriptase enzyme, which can synthesize molecules of DNA from molecules of RNA, and which may explain how RNA cancer viruses can incorporate their genetic information into host cells (SN: 11/6/71, p. 317).

Gross has received a Basic Medical Research Award for his work on cancer viruses (SN: 5/29/65, p. 341). He was the first to discover a leukemia-inducing virus in mice. His discoveries include the transmission of these viruses from one generation of animal to the next and the activation of the viruses by radiation and other stimuli.

Skipper has received a Basic Medical Research Award for his studies of the metabolic actions of anticancer drugs in normal and tumor-bearing animals. He developed quantitative biologic tumor models to clarify tumor inhibition and regression. He showed the curability of cancer in several animal systems (SN: 12/21/68, p. 626).

Charnley has received a Clinical Medical Research Award for his development of total hip replacement. Some 50,000 patients, especially arthritis patients, receive Charnley-type hip replacements annually. □