

the mice whose leukemia had been caused by the conventional virus. Regression was 56 percent among the mice whose leukemia had been caused by the regressive virus and 20 percent among the mice whose leukemia had been caused by both viruses. So it appeared that if the conventional virus was inoculated with the regressive virus, it resulted in a significant incidence of spontaneous leukemia regression.

Since submitting their report to *SCIENCE*, the investigators have identified the component of the regressive virus that is responsible for the regression. They have also found that

antibodies in the mice with regressing cancer react against the protein coat of the virus and to some extent against the leukemic cells infected with the virus. How this new information might help explain cancer regression remains to be seen.

Meanwhile, Furmanski told *SCIENCE NEWS*, they plan to use mice infected with the regressive virus to explore ways of prolonging remission in human leukemia patients. For instance, they may give immunotherapy to the mice to see whether it improves their immunity against the regressive virus and hence brings about regression for an even longer period than usual. □

A 2nd space monitor of dynamic earth

"If it doesn't have astronauts on it, nobody gives a damn," says a frustrated public affairs officer at the National Aeronautics and Space Administration, bemoaning the lack of public interest in most of its unmanned satellites. The Earth Resources Technology Satellite, however, has been a different story. Launched July 23, 1972, and already 150 percent past its predicted one-year lifetime, it has monitored such an incredible range of floods, crops, earthquakes, oil slicks, mineral deposits and other subjects (SN: 3/31/73, p. 214) that for hundreds of users it has become virtually a resource in itself.

So important is the continuity of its data in the eyes of NASA, Congress and legions of scientists and Federal, state and local officials that a second satellite, ERTS-B, was moved ahead a full year from its original 1976 launch date to its imminent take-off on Jan. 19. There are even plans for a third ERTS, conceived in the early months of the first one when it was already on its way to exceeding its planners' wildest dreams and now sweating out the question of Administration backing in the

NASA budget request due late this month. "If I had to pick one spacecraft, one Space Age development, to save the world," says NASA Administrator James Fletcher, "I would pick ERTS and the satellites which I believe will be evolved from it later in this decade."

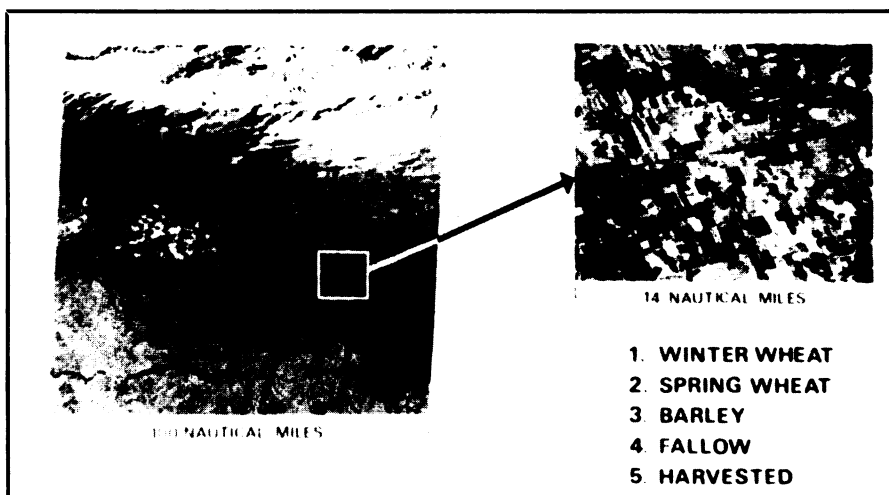
Besides providing data for a host of new studies, ERTS-B will be contributing to a huge group of 109 research teams in more than 40 states and as many foreign countries concerned specifically with continuing projects begun by ERTS-1. Covering farming, forestry, land-use surveys, mapping, geological studies, meteorology and various mineral, marine and other resources, they will range from tracking sorghum diseases in Illinois to monitoring changes in the central Niger River delta in Mali.

As investigators have worked their way through ERTS-1's more than 100,000 images of the earth, many of which are overlapping photos taken at different wavelengths of light to reveal different characteristics, their goals have become more specific and demanding (SN: 8/10/74, p. 88). It is

difficult, after all, says one university hydrologist, to imagine taking advantage of a 10 percent boost in the accuracy of watershed forecasts. "It seems like such a small increase," he says, "until it's there and you really find out you can count on it."

In addition to the narrow-gauge projects, however, ERTS-B will be turned to several really broad efforts, in hopes that it can help treat some of the national and global resource ailments that now afflict the planet. One of the major ones is the Large Area Crop Inventory Experiment (LACIE), to be run jointly with the Department of Agriculture and the National Oceanic and Atmospheric Administration. Touted at the World Food Conference in Rome by Secretary of State Henry Kissinger as "a promising and potentially vital contribution to rational planning of global production," LACIE will combine ERTS photos showing crop acreage with meteorological data from ground stations and other satellites in hopes of enabling the first truly accurate large-scale crop forecasts. The first year will be confined to wheat in North America, with other crops and countries to follow if it works. The availability of such information could affect activities ranging from local irrigation planning to multinational foreign aid policies.

Merely having the satellites' data is not enough, however. As growing numbers of users have become increasingly dependent on the information, officials have found both their distribution plans and the limited availability of interpretation expertise to be bottlenecks in getting out the word. "It is time," says the program of the upcoming annual meeting of the American Association for the Advancement of Science, which is devoting an entire session to the problem, "to develop the operational hardware systems and particularly the administrative and management organizations to make the benefits of space observations available to all nations." □



ERTS-B's detailed wheat monitoring could lead to an accurate global cropwatch.

Insect-resistant corn found

The "numbers game" is starting to pay off for a team of agricultural researchers. After screening thousands of exotic corn varieties for resistance to insect pests, they have discovered several varieties that can withstand the attack of two of the most damaging pests, the European corn borer and the sugar cane borer.

Vernon E. Gracen and former graduate student Sue Sullivan of Cornell University and colleagues at the International Center for Maize and Wheat in Mexico have announced finding the

dual resistance in corn varieties from Antigua and Puerto Rico. This is the first time, they state, that corn varieties with natural resistance to both of the damaging insects have been found. The European corn borer destroys an estimated five percent of the crop in the United States Corn Belt and parts of the Northeast (as well as temperate areas in other countries), and the sugar cane borer does extensive damage to corn crops in tropical areas.

The insect resistance is controlled genetically, and the team hopes it can transfer the resistance from the exotic varieties to temperate varieties. Some corn now used in the Corn Belt is partially resistant to the European corn borer, but the exotic types show an improved resistance in the field.

Two generations of the insects attack the corn each growing season. Small caterpillars attack in the spring when the corn is short and leafy. Some Corn Belt varieties produce a natural toxin which kills some of the insects at this stage. But the survivors change into adult moths and lay eggs which hatch into a second generation of caterpillars the same season. These attack the plant in the summer when the corn is in the tassel stage, and damage the pollen, silk and stalks. The natural toxin does not protect against the second attack, but some mechanism (as yet unknown) in the exotic varieties protects against both generations of the borers.

The natural toxin in existing Corn Belt varieties disrupts the larva's life cycle, Gracen says, "and it is a feeding deterrent—it doesn't taste good." Studies have revealed low levels of the natural toxin in the exotic varieties, so "we know it's not involved in the insect resistance," he says. "Our hunch is that the varieties are nonpreferred or contain some other feeding deterrent. They may not contain a biological poison, but may perhaps have the wrong nutritional composition, so that the larvae die of malnutrition."

Gracen says the exotic varieties had no selective pressure from the European corn borer but probably did from the sugar cane borer and so evolved with resistance to that insect. "Our hypothesis is that the mechanism of resistance gives cross-protection." Cornell entomologist Ward M. Tingey is studying possible mechanisms.

After extensive cross-breeding between the exotic, resistant strains and Corn Belt varieties, the team hopes to release a synthetic with resistance. "We are shooting to release the synthetic two years from now," Gracen says. In areas where the resistant strains are already adapted, such as South and Central America, and where the sugar cane borer is the main problem, there should be "more immediate application," Gracen says. □

Progress on quake prediction

By successfully anticipating a small earthquake near Hollister, Calif., on Thanksgiving Day through measuring a variety of premonitory geologic changes, scientists of the U.S. Geological Survey have made "significant progress" toward actual quake prediction, says Director V. E. McKelvey. "This is the first time that such a variety of precursory phenomena have been observed for a single earthquake in the United States," he says.

The quake occurred in a geologically active area between the San Andreas and Calaveras Faults, which has fallen under close scrutiny in the agency's intensified earthquake research efforts. Beginning some six weeks before the quake, survey scientists began noticing a "dramatic anomaly" in the earth's magnetic field near the region where the quake later occurred. About four weeks before Thanksgiving, tilting of the earth's surface was measured at two nearby locations. Finally, significant changes in the velocity of various seismic waves were reported.

Such observations are expected as results of the "dilatancy" phenomenon now thought to precede earthquakes (SN: 3/9/74, p. 161). As pressure rises in a fault area, subterranean rocks begin to bulge and crack, allowing water to soak into the tiny fissures. The bulging can be measured as a slight tilting in the earth's surface; increased water content brings changes in wave conductivity and resistance to the flow of electricity. But monitoring all these changes over a wide region with sensitive and expensive equipment is difficult, and previous attempts to use these data to predict quakes have sometimes been frustrated by gradual release of the underlying pressure through slow creeping of the fault (SN: 4/20/74, p. 252).

Thus the recent success, "while adding greatly to our confidence and optimism" about attaining earthquake prediction, represents only the beginning of a much larger effort, McKelvey says. "Much more research and much more extensive installation of geophysical instruments must be accomplished before predictions will be of use in planning for public safety." Nevertheless, in the future, such premonitory observations will be reported to other scientists for evaluation and the public will be warned if a damaging quake is anticipated.

A dying child's sense of isolation

When a fatally ill child's condition becomes more critical, parents, as well as professionals (nurses and doctors) often tend to lessen the amount of time and contact with him. Research has also shown that children over 10 with a terminal illness can be aware and anxious of their impending deaths. But what about children under 10 years of age? Are they also aware of their hopeless condition? Do they feel anxieties as well as a growing sense of isolation? John J. Spinetta of San Diego State University and his colleagues at the Children's Hospital of Los Angeles report in the December *JOURNAL OF CONSULTING AND CLINICAL PSYCHOLOGY* their attempts to measure this alleged sense of being left alone.

The psychologists asked 25 leukemic children and 25 children with chronic but nonfatal illnesses between the ages of 6 and 10 to place four figures (nurse, doctor, mother and father) in their usual places, and where they preferred them, in a three-dimensional hospital-room replica which also included a doll representing a sick child in bed. Taking the distances between the statuettes and the patient doll as a reflection of the child's growing sense of isolation, the researchers found that

the fatally ill youngster not only perceives a growing psychological distance from those around him but also for whatever reasons prefers it that way. And in both groups, distance of placement increased in subsequent hospital admissions, though the leukemic children increased the distances significantly more than the chronically ill children.

"A lot of studies presume that if a child does not talk openly or use the word death, he isn't anxious about it," Spinetta told *SCIENCE NEWS*. "Our feeling is the child is very anxious about death."

Could the children have picked up their sense of isolation from the decrease in the amount of adult contact? "I think it works both ways," Spinetta says. "The child perceives he is getting more and more ill from external as well as internal clues he picks up from the nurses and family. I think he is also aware that something is going wrong inside of him."

The researchers hope that their study will provide further impetus to those working with dying children to take whatever steps are necessary to reduce adverse effects in the present methods of treating their illnesses. □