US-USSR agreements: Agriculture and ocean

In connection with the visit to the United States by Soviet Communist Party boss Leonid Brezhnev, three treaties were signed that could increase exchanges between Russian and American scientific personnel.

An agriculture agreement provided for regular exchange of information about crops and commodities, much as the United States now has with other countries. The United States is reportedly ahead of the Soviet Union in crop forecasting, and the meetings can hopefully avoid the last minute panic of importing vital food, as during the recent Russian wheat failure.

American scientists, for their part, believe they can learn a great deal from Soviet experts about land reclamation and new plant hybrids. With its widely varied growing climates, Russia has developed new germ plasmas for a variety of plants and is reportedly quite advanced in land-reclamation techniques that might be helpful to American strip miners.

An ocean research agreement extends efforts begun during President Nixon's Moscow trip in May 1972. Specifically, projects added to the list of cooperative programs include deep-sea drilling, planet-wide ocean current tracing, ocean-atmosphere-interaction research that is vital to weather predicting, estimation of the ocean's biological productivity and standardization of oceanographic instrumentation and methods.

Soviet and American scientists have found increasing need for collaboration in ocean research as the time nears for critical agreements to be reached in order to avoid overfishing the seas. Information from the present projects is expected to play a vital part in drawing up future treaties on the ocean.

A transportation-information treaty was also signed. Here, Soviet technology is reportedly superior in construction of railbeds and very cold climate construction of bridges and trestles. In return for information on these subjects, the United States is expected to provide insight into its own computer-regulated transport systems.

While American scientists have recently enjoyed contacts with their Russian counterparts brought about by such agreements, the fact that such exchanges must be financed from shrinking research budgets may begin to lessen their enthusiasm. □

Skylab science: Delight despite problems

Pictures of the sun—30,242 of them, described as hundreds of times better than any taken before—were among the many accomplishments being cited for the first U.S. space station crew this week as the astronauts prepared for splashdown in the Pacific Friday.

During their fourth and last week in space, the repairmen of Skylab 1, set a new space endurance record surpassing the old Soviet record of 570 hours and 22 minutes set two years ago by cosmonauts Georgi Dobrovolksy, Vladislav Volkov and Viktor Patsayev. Commander Charles Conrad marked the occasion by sending his respects to the cosmonauts.

The three astronauts also received honorary Masters degrees in Aviation Airframe Maintenance from Colorado Aero Tech for their sundry fix-it jobs.

The last repair job, they hoped, was during the third extravehicular activity (EVA) on Tuesday—fixing a broken battery charger by hitting it with a hammer. The charger, similar to a voltage regulator on an automobile, was thought to be the culprit causing the malfunction of one of the telescope batteries. The jolt from the one-pound hammer freed a stuck electrical switch. Joseph Kerwin, who had remained inside the space station, reported that electricity surged into the dead battery after the hammering job. This added 240 watts of power.

During this last spacewalk, Conrad and Paul Weitz also retrieved the solar telescope film which contained pictures of the first solar flare ever photographed by man outside the earth's atmosphere. "We've had bits and pieces [of flares] before," said Giusseppi Vaiana, one of the solar scientists working with Skylab, "but we've never had the opportunity to see as much as we've seen today. It's really significant and hundreds of times better than anything we've had before." The flare occurred June 15 while Weitz was working at the telescope console. An alarm sounded the beginning of the flare and Weitz immediately focused the cameras on the hotspot. "We want you to be the first to know," Kerwin told the ground controller, "that the pilot [Weitz] is the proud father of a solar flare."

The crew succeeded in photographing the flare from its beginning to end over a 15- to 20-minute period. The flare started as just a pinpoint of light about 10 times brighter than its surrounding area, building up slowly, spiraling outward from the sun's surface, then bursting in a gigantic explosion of light and gases.

The event was just what the solar scientists had ordered. Solar flares are little understood (SN: 1/27/73, p. 60). "Flares are the most intriguing solar physics phenomena," Vaiana explained. "We do not understand how this energy is stored [on the sun] and how it is released. Now we have been able to observe a flare with the best instruments ever built." Some single solar flares produce more energy than used by man on earth over several decades. The results of these flares disrupt communications on earth, influence the weather and affect the earth's ionosphere.

During the EVA Conrad and Weitz also deployed an 18-inch piece of material from the unused sun shield carried into orbit. The material is the same as that of the parasol now shading the station. Some studies indicate the material may fade and rot from the harsh ultraviolet rays of the sun, and NASA wants the piece of material returned to earth by the next Skylab crew to analyze. Just in case the deterioration does occur, the second Skylab crew will deploy another parasol.

As the astronauts completed their last experiment this week, a medical test, Robert Parker, scientist-astronaut at the Johnson Space Center, summarized their accomplishments. Although the final grade on the Skylab science will have to await the results of the raw data, the time spent on each experiment looks promising, said Parker. The crew spent 81 hours of a planned 100 hours at the Apollo telescope mount studying the sun. They invested 90 percent of the medical time planned, 80 to 95 percent of the student experiments' time, and 100 percent of the time planned for the corollary experiments (experiments such as stellar astronomy). "Earth resources turned out to be the one experiment discipline that suffered the most from the power [loss]," Parker said. Of the time planned at the EREP cameras, 88 percent was invested, but only 60 percent of the data were obtained. "Had this been a normal mission, which Skylab did not start out to be . . . everyone would have been quite happy with the results," Parker said. "As it is, considering the mission . . . 'estatic' is too strong a word, but we are exceedingly happy." □

RAE B injected into lunar orbit

Radio Astronomy Explorer B (Explorer 49), the last scheduled U.S. satellite to the moon, was being put through a series of systems checks this week prior to the extension of its 1,500-foot antennas. The satellite was injected into its anchor orbit around the moon June 15 and will detect low-frequency radio waves coming from the galaxy (SN: 6/16/73, p. 394). □

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