important that measurements of the outer ionosphere be matched with satellite data. It is not unlikely that, once certain relations are verified, ground-based observations will be capable of providing hour-by-hour and day-by-day information about the upper atmosphere which would be much too costly to obtain routinely with rockets. Furthermore, some of the indirect methods will permit routine measurements from regions too close to the earth for observations with long-lived satellites.

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Science in the News

Khrushchev Sees Aspects of American Science and Talks About Soviet Achievements

Soviet Premier Nikita S. Khrushchev's trip to the United States closed further the narrowing gap between science and politics. In his statement on arrival, the Premier made the first of many scientific references when he spoke of the Soviet moon rocket and of his country's newly launched atomic icebreaker. Of the moon rocket, he said:

"Shortly before our meeting, Mr. President, the Soviet scientists, engineers, technicians and workers filled our hearts with joy by launching the rocket to the moon. . . . A container . . . with a pennant bearing the national emblem of the Soviet Union is now on the moon. . . . We entertain no doubt that the splendid scientists, engineers and workers of the United States of America who are engaged in the field of conquering the cosmos will also carry their pennant over to the moon. The Soviet pennant, as an old resident of the moon, will welcome your pennant, and they will live there together in peace and friendship as we both should live together on the earth. . . ."

The atomic icebreaker that was mentioned is the 16,000-ton *Lenin*, which started its maiden voyage on 15 September, the day that Mr. Khrushchev arrived in the United States for his 12-day stay. The ship, which can carry enough fuel to cruise for several years, is designed to keep open the 11,000-mile arctic sea route between Murmansk and Vladivostok—a route at present open about 10 weeks each year.

Disarmament Plan Offered

Disarmament, including a nuclear-test agreement and cooperation in the peaceful use of atomic energy and outer space, was a persistent theme in virtually all of the Soviet Premier's speeches. He set the stage for his total disarmament proposal to the United Nations when he addressed the National Press Club in Washington on the second day of his visit. He said:

"The best, the most reliable way to make war impossible would be to place all states, without exception, in conditions where they would have no means of conducting war. . . .

"The Soviet Union and the United States are faced with this alternative: Either the latest achievements of scientific and technical thought—the discovery of the secret of the atom, the development of rockets and the penetration of outer space—will be placed

in the service of a peaceful future and prosperity of mankind, or they will be used for the purpose of destruction and annihilation and, as a result, the earth will be covered with ashes and graves. The Soviet people have long made their choice for peace."

Next day he repeated these views in a general discussion of peaceful coexistence before the members of the Senate Foreign Relations Committee and guest senators.

During an hour-long question period, Senate Majority Leader Lyndon Johnson (D-Tex.) asked whether the Soviet Union is willing to exchange secrets on space flight. Mr. Khrushchev replied that he does favor such exchange. When Johnson pressed him then as to why the Soviet Union had not participated in the U.N. *ad hoc* committee on this subject, he said that the United States had attempted to put the Soviet Union into the position of a "poor relation," that the Soviet Union had not been treated with the proper respect in this area, and that it was a subject on which the two powerful countries active in the field could agree.

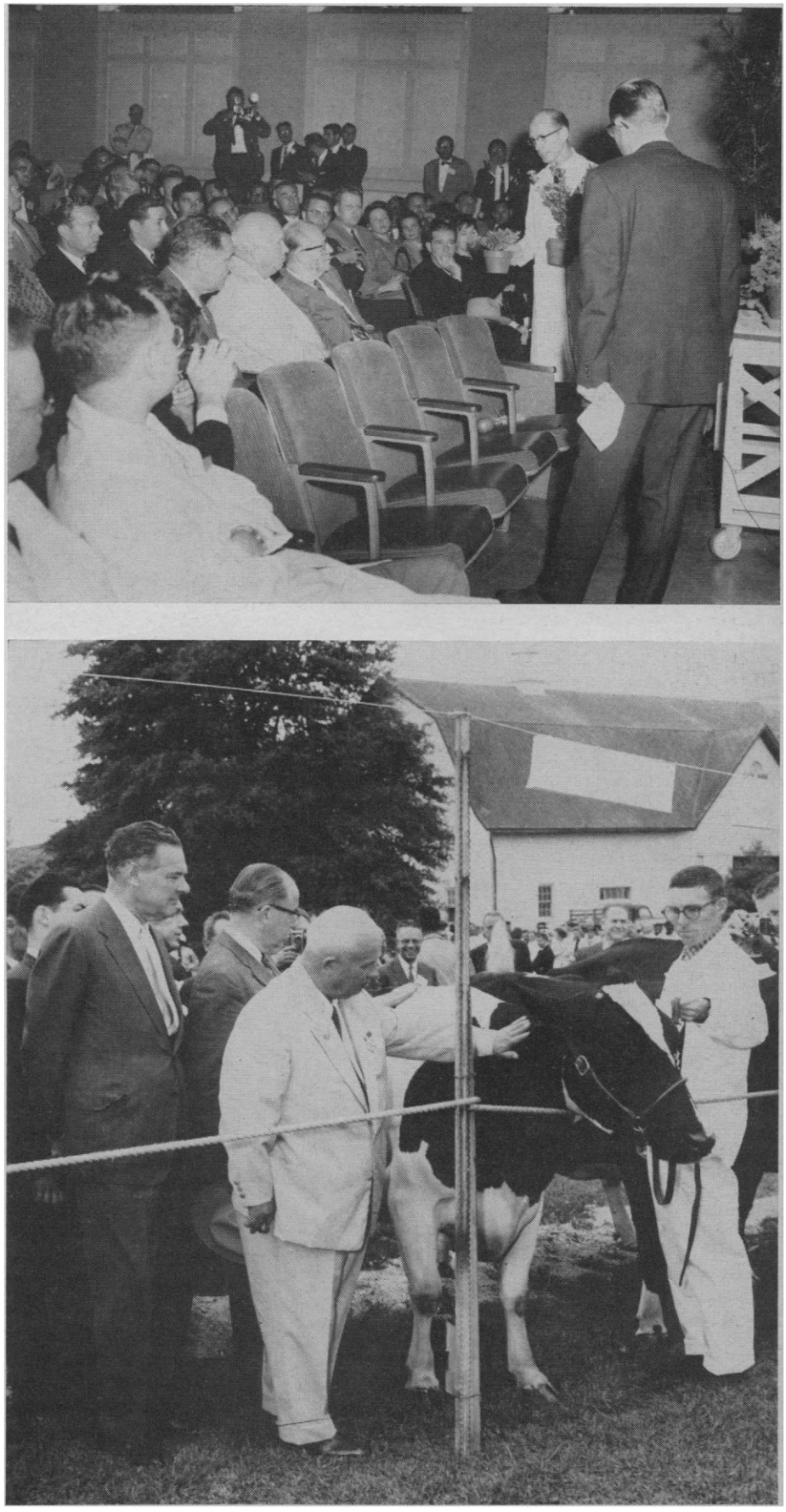
On the following day, 18 September, the Soviet Premier gave the United Nations his 4-year plan for general and complete disarmament of all states. Some of the scientific aspects of the plan are as follows:

"All atomic and hydrogen bombs . . . will be destroyed and their further production terminated. The energy of fissionable materials will be used exclusively for peaceful economic and scientific purposes.

"Military rockets of all ranges will be liquidated and rocket facilities will remain only as means of transportation and harnessing outer space. . . . The stockpiles of chemical and bacteriological means of warfare accumulated by some states . . . will be eliminated once and for all. . . ."

Later in the address Khrushchev considered control, proposing the establishment of an international body to set up a system of control over all disarmament measures. After first stating that the Soviet Government would not resume nuclear tests if the Western powers do not resume theirs, he said:

". . . The elaboration of a program of general and complete disarmament should not hold up the solution of such an acute and fully mature question as that of the discontinuance of nuclear weapons tests for all time. There now



Premier Khrushchev visits the Agricultural Research Center in Beltsville, Md., where he hears John W. Mitchell explain how chemicals can regulate plant growth and examines a cow especially bred for high milk production.

exist all prerequisites for such a solution. We hope that the appropriate agreement on the discontinuance of tests will be concluded and put into effect without delay."

Initial reaction in the United States to the disarmament proposals was restrained. Most official observers were reluctant to comment, except to suggest that at important points the plan was vague. Interest was expressed, however, in Mr. Khrushchev's test-ban remarks. Some observers, such as Senator Hubert H. Humphrey, chairman of the Senate Subcommittee on Disarmament, felt that these comments offered an unparalleled opportunity to initiate a disarmament control system. Others, such as Senator Clinton D. Anderson, chairman of the Joint Committee on Atomic Energy, have indicated that it would be wiser to attempt only a limited agreement, one which would permit continued testing underground without inspection.

The interrelationship of science and public affairs was demonstrated not only by words but also by Soviet Premier Khrushchev's itinerary, which listed an impressive number of research laboratories and agricultural and technical installations.

Beltsville Visited

Because increasing Soviet food production is a major aspect of the U.S.S.R.'s national policy, and because Mr. Khrushchev was in charge of Russian agriculture before he became Premier, it is not surprising that one of his first actions was to inspect the Department of Agriculture's Agricultural Research Center at Beltsville, Md. He paid a long visit there on 16 September.

In a slightly barbed welcoming speech, Secretary of Agriculture Ezra Taft Benson praised the progress of American agriculture "under our capitalistic free-enterprise system." He noted the cooperation in farm research between federal and state specialists and those in private industry, and called the family farm the "backbone of American agriculture."

The Secretary then turned the program over to some of the department's scientists in the Bureau of Plant Industry. Harry A. Borthwick recently helped discover a form of plant pigment that controls growth. He described how plant growth can be promoted or inhibited through the pigment by exposure of seed and plants to light. Next, Warren C. Shaw discussed a new weed killer that does not harm cereal crops and legumes. John W. Mitchell, shown in one of the accompanying pictures, displayed some results of the application of growth-regulating chemicals to plants, fruits, and trees.

After the lectures, Mr. Khrushchev told Secretary Benson that he thought the Soviet Union could benefit from American agricultural research. He also suggested that there should be an increase in the exchange of technicians.

The last part of the Beltsville visit was spent inspecting the experimental livestock, about which the Premier exhibited considerable knowledge. He is shown examining a cow which, during a 305-day lactation, produced 18,000 pounds of milk and 724 pounds of butterfat. Her forebear, eight generations back, produced only 15,800 pounds and 540 pounds, respectively.

Mr. Khrushchev saw the practical application of scientific farming on 23 September when he went to Iowa to inspect Roswell Garst's hybrid-corn farms and experimental growing plots. The Premier paid particular attention to chemical fertilizers, synthetic feeds, and new machinery. Garst's hybrid seed was exported to the U.S.S.R. in great quantity and opened the way for Soviet introduction of modern corn-farming techniques.

The Premier concluded the agricultural aspect of his tour with a visit to Iowa State College, Ames, a major agricultural research center.

Research Secrecy Discussed

While he was in California, Mr. Khrushchev toured the International Business Machine's computer plant, where he gave some of the workers souvenir medals commemorating the Soviet moon rocket. Later, when he discussed his IBM visit at a joint dinner of the San Francisco Commonwealth Club and the World Affairs Council, he turned to the topic of secrecy in research, saying:

"The plant we saw was making computers . . . I don't know who makes the better machines. . . . For the time being we're keeping them a secret. . . . Both sides are actually keeping them a secret for the time being. . . . But I am sure that the time will very soon come when there will be no such secrets and people will be able to see all such machines and benefit by them."

Two Major Visits Canceled

During the California stay, Mr. Khrushchev was also scheduled to see the Stanford Research Institute at Menlo Park, but time would not permit and he sent three delegates instead, including Vasily S. Yemelyanov, chief of the Main Administration for the Use of Atomic Energy. The projects shown to the Soviet officials included such subjects as research aimed at finding chemicals to cure cancer, efforts to improve the use of radar to give early hurricane warnings, a machine that uses principles of television to give a high-speed facsimile reproduction process, and research on opportunities for the private investment of capital in foreign countries.

Mr. Yemelyanov is reported to have found it difficult to understand that the institute was organized to sell research services in any field wanted by governmental or private customers. He commented that in the Soviet Union, research is organized for a specific purpose, such as the creation of better airplanes or the conquest of a disease such as cancer.

A second major scientific visit that the Premier was forced to cancel was that to the National Institutes of Health in Bethesda, Md., where an elaborate 1½-hour program had been prepared. A. M. Markov, chief of the Soviet Medical Service, and Dr. V. N. Butrov, of the Soviet Foreign Ministry, went in his place. Before leaving, Markov commented that American and Soviet medical people should join in eliminating disease in all countries:

"Our two countries are more or less equal economically. And if our doctors could get together, we could do very much for the peoples of all nations."

Next day, on 26 September, H. van Zile Hyde, Assistant Surgeon General for International Affairs, announced that the United States and the Soviet Union have agreed to engage in joint health-research projects in cancer, heart disease, and poliomyelitis. This group of projects is the first major cooperative effort in peaceful scientific pursuits to be announced as a result of the Premier's visit to this country.

Mr. Khrushchev's tour of the United States was set in historical perspective by the French paper, *Paris-Presse,* which quoted a comment Lenin made in 1920 to H. G. Wells. Lenin had just read one of Wells' science-fiction books, and is reported to have said:

"I, too, understand that all human conceptions are on the scale of our planet. They are based on the assumption that technical potentials, when

developed to the full, will not go beyond 'terrestrial limits.' If we arrive at establishing interplanetary communications we must revise all our philosophical, social, and moral conceptions. In that case the technical potentials, having become unlimited, will impose upon us the end of violence as a means and method of progress."

House Committee Questions Adequacy of Manpower Roster

In a report last month, the House Science and Astronautics Committee, headed by Overton Brooks (D.–La.), expressed reservations about the completeness and currency of the National Science Foundation's Register of Scientific and Technical Personnel. In criticizing the register, the report cited NSF studies that estimated that there are approximately 300,000 persons in the United States who would qualify under a generally acceptable definition of the term *scientist*. The committee juxtaposed this figure to the 170,000 the register now lists. Questions were also raised about the value of dated information on individuals whose profession is characterized by frequent changes of place of employment and field of investigation. Unable to decide whether the register was receiving sufficient support and planning, the committee asked the Science Foundation to report to it next January.

Answers to the committee's questions are currently being worked up for the NSF report in January. The foundation's position is that "very considerable progress" has been made in the register program. In testimony given during the last sessions of the hearings, NSF spokesmen cited the doubling of funds allotted for the program by the foundation for fiscal years 1959 and 1960. New and larger quarters have been acquired for the Records Center in Raleigh, and additional tabulating and microfilming equipment has been installed. Studies are under way on the problem of speeding up the processing of data as they arrive.

A simpler questionnaire is being prepared and plans are being developed to make the register better known and to make its data more readily available to participating scientists through professional societies.

Although the House committee and the Science Foundation have disagreed on some matters of interpretation concerning the register, the basic attitude is one of cooperation. The committee is aware of the difficulties that the register faces, some of which stem from the way Congress itself operates. For example, the House Committee on Science and Astronautics may want the register expanded, but it does not follow that the House Committee on Appropriations will give the Science Foundation the necessary funds. As Chairman Brooks himself noted, at the very time the spring hearings on NSF's division of scientific manpower and education were being conducted, the House Committee on Appropriations recommended a cut—later restored—in funds for the unit.

Radio Frequencies for Research Studied at Geneva

The allocation of radio frequencies for research in space is one of the major issues now before a 3-month-long conference of the International Telecommunications Union at Geneva. Radio astronomy and space communications, two fields that have expanded greatly since the last ITU conference in 1947, are the particular subjects of study of the 708 delegates at the conference, which began 17 August and will continue until 17 December. The ITU, a U.N. organization through which countries regulate international telecommunications, is using the long session to overhaul the regulations drawn up in 1947. Rapid technological change in recent years and the opening of new fields of communication led to the current sessions.

On the opening date of the conference, the United States delegation presented its position on the problem of frequencies for radio astronomy. After citing the increasing value of the new science's findings, the U.S. group proposed that a world-wide allocation to radio astronomy be made of the frequency band 1400 to 1427 megacycles per second (Mcy/sec). This band, also called the interstellar hydrogen line band, is the major one used in radio astronomy. Another proposal, put forth by the Netherlands delegation, specified a range from 1399 to 1427 Mcy/sec. Virtual agreement among the conferees is reported on the protection of a band at least as wide as that in the U.S. proposal. The U.S. paper also cited measures taken to afford national protection to radio astronomy observatories in this country.

In another action, the U.S. delegation proposed that six frequencies be set aside for space communications. These communications would be between the earth and satellites, and between satellite and satellite. The frequencies, which would be used for tracking, guidance, and telemetering of data, are: 1700 to 1725, 1825 to 1850, 2275 to 2300, 8300 to 8400, 15,150 to 15,250, and 31,500 to 31,800 Mcy/sec.

Some Opposition

The assignment of radio frequencies for research is not an easy matter, according to reports on the conference. Many conflicts come up that require extended negotiation. In the assignment of frequencies for space communication, for example, some opposition was registered by the delegation from the Soviet Union on the grounds that such allocations at this time would be premature. Pressure from the other delegations moved the Russian group to ask for more time to study the proposals. A number of organizations, particularly military and commercial users, object to the assignment of frequencies for research because the bands might be needed in the future for nonresearch uses. Conference proceedings are aided, however, by a considerable body of accepted practice that has accumulated during the years the ITU has been in existence. Because of this common body of accepted practice, the Union, which was formed by the merger of two of the oldest inter-governmental organizations in the world, generally manages to resolve the conflicts that arise.

Health Research Grant Practices Held Satisfactory

Large increases of funds for the National Institutes of Health will not result in a lowering of the quality of the research projects supported by NIH, spokesmen at the Bethesda, Md., facilities report. The review process for grant requests, and the growing volume of requests for funds for medical research, officials say, assure that the new funds will be used wisely.

Last August, President Eisenhower expressed some concern on this point when he signed the appropriations bill for the Department of Health, Education, and Welfare under which NIH