News of Science

Visit to Moscow

The American physicists who recently spent 10 days in Moscow [**123,** 834 (11 May)] report that they were permitted to visit any physics experimental facilities and laboratories they desired.

"They asked us to tell them what we wanted to see," one scientist said. "We saw everything we wanted. They answered every question. We were permitted to bring our cameras right into their experimental laboratories and take pictures of everything we wanted."

Members of the group also learned of the difficulties that many Soviet scientists encountered during the Stalin era. Some of the most brilliant physicists were kept under surveillance, arrested, or exiled during the years between the end of World War II and Stalin's death. Victor F. Weisskopf of the Massachusetts Institute of Technology, who speaks Russian, said Soviet research was already benefiting from the return to universities and institutes of scientists who had been held in labor camps. He commented that the release of prisoners, both scientists and ordinary citizens, had gone far to eliminate the atmosphere of fear in the country.

One American who had extensive private conversations with one of the most distinguished Soviet research men said that he was amazed to find that "Russia had its own versions of the Oppenheimer case. . . . I learned of Russian scientists who were subjected to similar treatment —or worse—by the Soviet Government because they refused to engage in certain lines of weapons research which the Government demanded."

Jack Steinberger of Columbia University said that the Soviets had already virtually assured a world lead in high-energy physics for the next decade. He commented that the U.S.S.R. had achieved this position by winning an equipment and construction edge over the United States. Steinberger described the new physical research center, the Institute for Nuclear Problems and the Electro-Technical Institute, that is being built at Bolshoya Volga, near the junction of the Moscow-Volga canal and the upper Volga River.

The center has a 680-Mev cyclotron that Steinberger said was superior to similar American machines. The visitors also saw a new 10-Bev accelerator that is virtually complete but has not yet gone into operation. This machine is almost twice the size of the largest comparable American facility, the 6-Bev accelerator at Berkeley, Calif.

Steinberger said that the Soviet apparatus weighs about 4 times more than the Berkeley apparatus, cost well over $100 million, and was built in about half the time it would have taken in the United States. However, despite the excellence of Soviet equipment, Steinberger felt that the level of Soviet experimental work was no higher than in the United States and in some respects possibly inferior.

An editorial in a recent issue of the Washington D.C., *Evening Star* made the following comment about the Moscow visit.

"Such information is well worth having, and it points up the value of exchanging visits with the Soviet Union along the lines advocated by President Eisenhower. This two-way street to knowledge can be traveled without endangering our security; indeed, it may actually help us in that sense. There is no monopoly in the field of abstract or applied science. We can learn from the Russians just as they can learn from us. It would be narrow-visioned of us, and self-denying, if we insisted upon maintaining a wall of intellectual censorship between our two countries.

Biological Effects of Atomic Radiations

Summary reports of a year-long study of the biological effects of atomic radiations were released 13 June by the National Academy of Sciences. The reports, which are the first in a series of continuing studies, were prepared by committees of scientists in each of the following fields: genetics, pathology, meteorology, oceanography and fisheries, agriculture and food supplies, and disposal and dispersal of radioactive wastes. The chairmen of the respective committees were Warren Weaver, vice president for the natural and medical sciences of the Rockefeller Foundation; Shields Warren, director of the New England Deaconess Hospital, Boston, Mass.; Harry Wexler, director of meteorological research of the U.S. Weather Bureau; Roger Revelle, director of Scripps Institution of Oceanography; A. Geoffrey Norman, professor of botany at the University of Michigan; and Abel Wolman, professor of sanitary engineering at Johns Hopkins University. The committees were appointed by Detlev W. Bronk, president of the NAS, and the work was supported by a grant from the Rockefeller Foundation.

The reports summarize present knowledge in the six fields and point out areas in which further research is most needed. The full report of each committee is to be published in monograph form by the NAS at a later date. The texts of the summary reports are available now from the NAS; they will also be published in subsequent issues of *Science*. A brief summary of some of the findings and recommendations follows.

Atomic weapons testing has not raised world-wide radiation to levels significantly greater than those resulting from natural radioactivity and dental and medical use of x-rays. Since all radiation is harmful, the dose should be kept as low as possible. Records should be kept of every individual's exposure to x-rays and other gamma radiation. Medical experts should initiate a vigorous movement to reduce exposure to x-rays to the lowest limit that is consistent with medical necessity. Humanly controllable sources of radiation should be restricted so that the general population shall not receive from such sources more than 10 roentgens, in addition to background, as a total accumulated dose from conception to age 30.

Improved techniques for monitoring world-wide fallout should be developed. Any large increase in the release of strontium-90 might be a matter for serious concern.

One of the pathological effects of radiation is a general increase in the rate of aging and a consequent shortening of life. Dose levels such as those the geneticists believe reasonable, or as have been established for persons working with radiation, have not been shown to have this effect.

Radiation from fallout inevitably contaminates the food supply. At present, the contamination is negligible, but the maximum tolerable level of radioactivity in food is not known.

Research through the use of radioactive tracer materials offers promise in the study of biochemical reactions, in the charting of ocean and air currents, and in the study of interrelationships among marine animals. However, such investigations may be possible only within the next 10 to 20 years, for in-

creasing radioactive contamination of the sea and atmosphere may make the detection of tracers impossible.

The accumulated radioactive waste products of a world-wide atomic power industry may represent more radiation than would be released in an atomic war. A national agency should control and keep records of all dumping of radioactive material in the ocean, and an international body should set up without delay safe standards, based on present knowledge, for the marine and air disposal of waste materials.

Accelerated research is needed in the following fields: genetics; radiation pathology; mixing between various parts of the atmosphere and the oceans; the concentration of radioactive materials by plants and animals; the geophysical and geochemical aspects of the ultimate disposal of radioactive wastes; the selection of biologically suitable sites for various atomic facilities; and safety devices for the control of accidental power surges in nuclear reactors.

Accidents in Nuclear Work

The British Atomic Energy Authority has announced that Graham Hawkins, a senior experiment officer, died of an electric shock suffered during tests of the Harwell Research Center's new proton particle accelerator. Hawkins was the first victim of a research accident at Harwell.

A serious breakage a year ago in Britain's biggest atomic explosives factory, and the heroism of 251 volunteers of the staff who kept the plant going, has also been reported. The volunteers, working in the face of intense radioactivity, welded a broken plate in a reactor and maintained production. They took turns manipulating welding equipment at the ends of 60-foot flexible arms thrust through holes in a protective screen.

The volunteers, both men and women, were allowed to work only a few minutes at a time—and in that time received the equivalent of 2 weeks of radiation exposure.

The accident occurred in one of two reactors at Sellafield, which makes plutonium. If the plant had been shut down, Britain would have lost a large part of her plutonium output.

Another accident, fortunately far less serious, has been reported in the United States. The Atomic Energy Commission announced recently that at least 15 persons, workmen and others engaged in the construction of a power reactor, had been exposed to "small doses" of gamma radiation at Fort Belvoir, Va., but that the amount was "not serious."

The AEC said that a bit of radioactive iridium, used in the x-ray examination of welds, "was removed from its shielded container and, contrary to standard practice, left unshielded for about three hours. . . . The amount of radiation to which the men were exposed was considerably lower than any which could result in an observable clinical effect."

What Happens to Science Fair Participants?

Alan T. Waterman made the following observations about the future of high-school science students in a speech delivered at the recent National Science Fair in Oklahoma City, Okla.

"So perceptive are the judges who evaluate your exhibits that I am able to read your futures. Would you like to know what you will be doing in the next few years? Of the 213 present at this Seventh National Science Fair, 187 of you will actually become scientists or engineers. . . . So expert has been the selection of former judges that we know that 88 percent of those whom they send to the national competition will go on to make science or engineering their career.

"A survey of the 248 young people named as finalists in the first five National Science Fairs developed the following information: of 85 percent who replied, 131 were in colleges or other institutions of higher learning, attending 83 institutions in 28 states, 58 were still in high school, 12 were in full-time employment, eight were in the armed service, and four were devoting full time to homemaking and child care. Interesting to you will be the career choices of the 131 college students: 41 were in physical science (chemistry 27, physics 13, biochemistry 1), 31 in engineering, 28 in biological science and medicine, 13 in miscellaneous science, and 10 in miscellaneous non-science."

Recent Archeological Finds

Salim Abdel Abdulhak, head of the Syrian Archaeological Department, Damascus, Syria, has reported the discovery of the 4000-year-old seaport city of Semira, which he describes as a "treasure mine of Phoenician, Aramean, Assyrian, and Greek archaeological finds." The city, which is in northern Syria, vanished at about the end of the Greek Empire, before the birth of Christ. United States, French, British, and Belgian expeditions have been trying to find it for a century but failed because they excavated along the seacoast. Semira was located about 3 miles inland, probably as protection against pirates.

Other recent archeological finds are seven Roman graves in Yugoslavia and a large source of Stone Age flint instruments in Jordan. The graves were excavated in a park near St. Mark's Church in the center of Belgrade. They bear the seal of a Roman legion and date from the second to the fourth centuries A.D. They appear to have been plundered by grave robbers, perhaps several centuries ago.

Workers clearing a spring under the direction of the United States International Cooperation Administration made the flint find at Qasr Azraq oasis, about 50 miles east of Amman. More than 500 artifacts of many sizes have been excavated and the workmen continue to turn them up. Some of the items appear to date back to the Lower Palaeolithic period, about 200,000 years ago. The flints are principally oval or roundish handaxes, ranging in size from 2 inches across to one of approximately 10 inches. This source of prehistoric instruments is considered to be one of the richest ever discovered.

Signals from Venus

The planet Venus has been heard from for the first time. Several times during May Ohio State University's Radio Observatory received strong radio signals. On each occasion the signals, crackling sounds like static, were observed distinctly for a period of several hours.

Venus, which is often called the earth's twin, is nearly the same size as the earth and comes closer to it than any other planet. In the evening it is the brightest object in the western sky. Before 22 June it was approaching the earth at the rate of 500,000 miles per day; on that date it reached its nearest point, 27 million miles, and then started to recede.

Conditions on Venus are not known because it is perpetually covered by clouds. The planet is the second from which radio signals have been received. Last year observers at the Carnegie Institution, Washington, D.C., picked up radio sounds from Jupiter, and since early this year studies of the Jupiter signals also have been made at Ohio State.

Assistance for Germany

Franz Josef Strauss, German Minister for Atomic Problems, recently said of his visit to the United States:

"As compared to the big nations of the world we have a backlog of 10 to 15 years with regard to the peaceful development of nuclear energy. The gate leading to the atomic era is closed to us, as it were. To open it, and to catch up with international developments more speedily, we need the assistance of the big