Russians land hammer and sickle on Mars

The Russians landed a capsule bearing the hammer and sickle on Mars Nov. 27, Tass announced this week. Mars 2, launched May 19 (SN: 5/29/71, p. 367) ejected the capsule bearing the U.S.S.R.'s coat-of-arms as it approached the planet and then went into an orbit of 1,380 by 25,000 kilometers at an inclination of 48 degrees. The second Russian spacecraft, Mars 3, was still 136,000 kilometers from the planet at the time.

The Russians used the telex "hot line" set up between the Jet Propulsion Laboratory of the California Institute of Technology and the Soviet Union for communications about Mars 2 and 3 and Mariner 9 to inform U.S. space officials of the landing simultaneously with the Tass announcement. No mention was made in the Tass statement of scientific instrumentation aboard the capsule, or whether it merely crashed onto the surface or soft-landed. Most U.S. space officials believe, however, that if the Mars 2 capsule merely placed the flag on the surface, then the Mars 3 capsule will contain instruments to relay data concerning the Martian atmosphere and surface back to earth.

Mars has been enveloped in a global dust storm for over two months now (SN: 11/27/71, p. 355) that has obscured most of the surface to Mariner 9 television cameras. American scientists are eager to find out how the Mars 2 capsule fared through the storm. If the predicted 300-kilometer-an-hour or more winds are still active, says one scientist, "the going could have been rough." In addition, says Carl Sagan of Cornell University, since Mars is not in a vacuum like the moon, the possibility of a lander sinking into the dust on the surface is more likely than on the moon. (The moon's vacuum causes the moon's surface to be crunchy.)

Three in-course corrections were made with Mars 2—the last one, on Nov. 27 was performed automatically by the craft. Both Soviet craft weigh 10,230 pounds compared to the 1,200-pound Mariner 9. The Russian craft will make similar scientific measurements of Mars as Mariner 9 is doing, but the craft are also equipped with instruments for "in-flight" measurements en route to Mars.

The Soviets have not announced when Mars 3 will encounter the planet. It is expected that that craft will go into a different orbit around the planet, much as had been planned for Mariners 8 and 9 (SN: 9/12/70, p. 227) until Mariner 8 failed. Mariner 9's orbit is a near-polar one of 65 degrees inclination at a distance of about 17,000 by 1,380 kilometers.

Superheavy nuclei from Orsay's Alice

A heavy-ion accelerator is a machine especially designed to accelerate atomic nuclei that have been stripped of some or all of their attendant electrons (SN: 10/16/71, p. 266). If such nuclei are struck against other heavy nuclei, they may fuse with them and form superheavy nuclei. The superheavies are particularly interesting because some of them may be relatively stable, lasting millions of years instead of fractions of a second.

The machine called Alice at the Institute of Nuclear Physics at Orsay in France was the first heavy-ion accelerator designed for energies in the hundreds of millions of electron-volts to go into operation. In the Nov. 26 NATURE a French group working with Alice reports that experiments in which heavy nuclei are bombarded with other heavy nuclei do in fact produce the predicted fusions. They further note that there is some evidence that superheavy nuclei have been produced.

They used targets of germanium, cadmium and thorium and bombarded them with krypton ions at energies of 450 million and 500 million electron-volts. As the synthesized nuclei recoiled, they were slowed down in helium gas, transferred through a capillary and deposited on a steel rod in an evacuated chamber. Alpha particles coming from radioactive decay of the nuclei on the rod were recorded.

The energy of the alpha particles together with the half-life of the emitter can be used to determine what kind of nucleus is doing the emitting. On this basis many alpha particles with energies between 7 million and 9 million electron-volts were attributed to isotopes of polonium, which the investigators say might have been produced by fission of very heavy nuclei produced in the experiments. In addition there were some alphas and energies between 13 million and 15 million electron-volts that came from emitters with half-lives between 1/1,000 second and one minute. These cannot be attributed to elements of atomic number less than 102, say the investigators, and may be taken as additional evidence for the existence of superheavy nuclei.

Whether or not this is the first evidence for superheavies remains to be judged. There is an earlier claim for a quite different experiment by a group working at the Rutherford Laboratory in England under the leadership of A. Marinov of the Hebrew University in Jerusalem (SN: 2/2/71, p. 127). Although the Orsay group includes a note acknowledging the work of the Marinov group, others have criticized it heavily. In the same issue of NATURE the Marinov group gives some ground but not all to its critics.

What the Marinov group had done was to expose tungsten targets to high-energy protons in the Proton Synchrotron at the CERN laboratory in Geneva. The idea was that a proton striking a tungsten nucleus in just the right way would make it recoil to strike and fuse with another tungsten nucleus. The element to be produced in this way would be atomic number 112 or eka-mercury. On the ground that eka-mercury behaves chemically like mercury, the samples were subject to chemical processes that separate mercury. Spontaneous fissions in the separations were attributed to eka-mercury since spontaneous fission of mercury is so rare as to be nonexistent.

The critics allege that in spite of the care taken by the Marinov group californium 252 could have contaminated the samples. In their present paper the Marinov group agree that further analysis shows that up to 70 percent of the fissions observed by them could have come from californium 252 but contend that the remaining 30 percent cannot be so explained. □

Growth hormone and fetal nutrition

Growth hormone has long been a subject of debate in endocrinology circles. Evidence from research animals has suggested that although GH is continually present in the body, it moves into action only during a select time of life—the rapid growth years of adolescence. GH has not appeared to influence fetal development. Maternal GH does not seem able to cross the placenta in significant quantities. And when the pituitary, the source of GH, was removed from either maternal or fetal animals, the fetuses continued to develop normally throughout gestation. Now, however, a University of California School of Medicine team has found that maternal GH can indeed affect the fetus, by mobilizing crucial