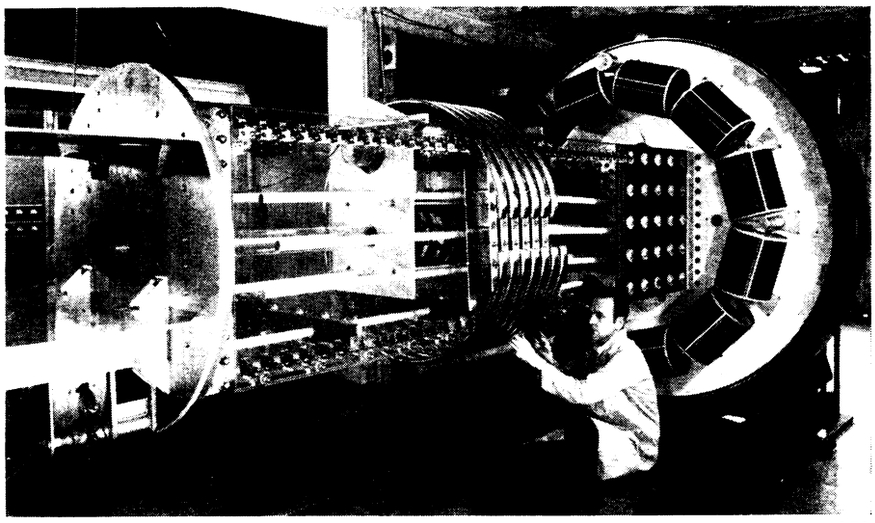

LRL

Injector for Berkeley Superhilac: The one U.S. entry will be complete by 1972.

A linear accelerator under construction at Darmstadt in West Germany, Unilac, will be able to take neon or argon to nearly 20 million electron-volts per nucleon. It will be able to accelerate ions as heavy as uranium to 10 million electron-volts per nucleon. Unilac should be finished by 1975.

Physicists at the Dubna Laboratory in the Soviet Union are building a heavy-ion cyclotron, which they hope will be ready in 1972. Its planned performance should roughly parallel Alice's.

The Berkeley Superhilac is expected to be finished by the end of this year. Its maximum energy per nucleon will be constant at slightly more than 8 million electron-volts over a range of weights from argon to uranium.

The only other American project at all alive at the moment is the wish of Dr. Milton G. White of Princeton University to convert the Princeton-Pennsylvania Accelerator to a heavy-ion accelerator. The PPA is a proton accelerator of 3 billion electron-volts energy, which the Atomic Energy Commission closed for lack of funds. Converted to heavy-ions, it could give them energies in the range of billions of electron-volts per nucleon, enough, says Dr. White, to go beyond studies of nuclear structure to laboratory imitations of cosmic rays and the behavior of nuclear matter in cosmological events. He has a promise of money for the conversion if he can find enough users for the machine after the job is done. Other American proposals, from the Argonne and Oak Ridge national laboratories and several universities, have not been taken up.

An important part of the technology of heavy-ion accelerators is the development of efficient means for stripping electrons from the ions. The higher the charge of an ion, the easier it is to accelerate. Here, too, Dr. Beringer sees the United States falling behind. "Really high charge states are needed," he says. "I hear of breakthroughs in the U.S.S.R." But in the United States, he says, physicists have to be satisfied with fairly low charges like tenfold ionized uranium.

As a result of both lack of money and lack of progress in stripping, Dr. Beringer suggests Americans concentrate on making accelerators more efficient, perhaps by using superconducting materials. A good cheap accelerator, he says, would be "just beautiful and so American and maybe not far from realization." □

SECOND SATELLITE

Chinese in space again

The launching of the second Red Chinese satellite last week came less than a year after China's space debut, April 24, 1970 (SN: 5/2/70, p. 427). Although not too impressive if compared with the Soviet Union's 81 space launches during 1970 and the United States' 28, the launch will undoubtedly add fodder to the Defense Department's Congressional arguments to move ahead with the complete Safeguard missile system of 12 antiballistic missile sites.

In his annual report to the Congress this week, Defense Secretary Melvin R. Laird predicted that between 1973 and 1975 China could develop an initial force of operational ICBMs. The North American Air Defense Command keeps track of the launching and the orbits of such spacecraft, but there is still debate about the degree of sophistication of China's booster development.

The second Chinese satellite circles the earth every 106 minutes with an apogee of 1,800 kilometers and a perigee of 269 kilometers. □

SPACE SCIENCE PRIORITIES

Some treats, some headaches

The National Academy of Sciences' recommendations for space science in the 1970's contain at least some treats for all space disciplines and a few headaches for the National Aeronautics and Space Administration. Although the priorities listed by the NAS are not likely to produce television specials or tickertape parades, they will, if followed, keep a variety of scientists busy for the next decade. In addition, and perhaps most important, the projects may help answer such existential questions as, in the report's words, "How did our home in the universe come into existence, and How did life originate?"

The report, issued this week, is sure to become the bible of various scientists and Congressmen in their yearly dialogue with NASA. It summarizes the views of 14 members of the NAS Space Science Board's executive committee. While the report emphasises this bias, it does, in addition, summarize the views of seven working groups representing various space disciplines, and ten previously published studies. At least 137 space scientists and program managers are listed as participants.

Confronted with such an awesome array, NASA will most likely fulfill all the major priorities during the next decade, but the sequence in which the missions are flown may not be according to the NAS list.

What NASA did was ask scientists, under the auspices of the academy, to examine projects they would like to see flown, if limited to a certain budget level. But it is not clear if the scientists and NASA are working with the same money figures. The report lists priorities in three groups: base, intermediate and high level. The base missions recommended are supposedly based on the 1971 fiscal year budget of $566 million for the Office of Space Science and Applications (OSSA); intermediate and high level lists would be additions to the base flights if the budget were increased by 25 and 50 percent. However, the 1972 OSSA FY request of $750 million already exceeds the intermediate budget level priorities.

Among the priorities at the base level are projects such as small planetary probes, orbiters and flybys (concentrating on Venus), astronomical observatories and telescopes and an earth-orbiting gyroscope. The report recommends an increase in earth observation satellites, sounding rockets and atmospheric balloons and a doubling of funds for data analyses of the tons of information already collected but not analyzed from previous space flights.