services, like air navigation and meteorology, which their satellites might sell some day to all comers, whatever nationality.

It is possible, however, that some form of words may be found to shelve the managership issue and to allow delegates to agree on the very beginnings of an agreement before going home in a few weeks' time. There has been general admiration, even awe, for the report of the preparatory committee under Mr John Killick of the British Foreign Office. It has summarized all the opposing views so succinctly that extracts from it could be lifted bodily and put into a permanent agreement, once the conference decides which of the views to accept. The Foreign Office, like the State Department and other diplomats present, quite apart from telecommunications representatives, believe the Intelsat agreement to be important as a model for other international commercial agreements that may have to be reached in the future—on nuclear energy or exploitation of the seabed floor, for example. And that is why there is genuine anguish all round that the Intelsat treaty is proving so hard to draft. If this one fails, it will be a bad omen for future attempts.

So much for internationalism. The American view, as it is felt in Congress and in Comsat, if not in the State Department, is bitter. The United States, they believe, did not need to invite a lot of outsiders to participate in its satellite consortium. Having developed the technology through its space programme, the United States could have found a way simply to sell it. "'We gave it to them and now they're trying to take it away from us," is the complaint. "Why should we give it to them ? What did they ever contribute to it ?" These are questions which the British–European and other Comsat opponents believe put the problem in a nutshell. Now is the time to make sure that there is not over-dependence on American technology for decades to come. Some of them are even willing to come back to another conference to do so.

SPACE RESEARCH

Scientific Work for Space Stations

THE scientific objectives of the piloted rockets on which the National Aeronautics and Space Administration is now working have been defined during the examination of the administration's scientific programme in the past week. After five more journeys to the Moon, the first so-called Saturn Workshop will be launched in the second half of 1972. The hardware for this device has already been tested on the ground and will be equipped with instruments and electronics in the next eighteen months or so. The first of the orbiting workshops, itself a part of the Apollo applications programme, will be used for the best part of a year by successive groups of men. Beyond that, however, the National Aeronautics and Space Administration is planning a more ambitious space station which will be supplied as necessary by means of the space shuttle rocket on which work is now beginning (see *Nature*, **225**, 685; 1970)—the best part of $110 million in the new budget will go on the design of the engine.

In his statement to the Committee on Science and Astronautics, House of Representatives, a week ago, Dr Dale D. Myers explained that it is now intended to launch the first Saturn Workshop as a completely equipped device using a Saturn V rocket, which will simply put the device into an orbit about the Earth 235 nautical miles up and at an inclination of 50° to the equator. The crew of three will be launched by means of a Saturn IB rocket one day later, and they will spend a month on largely astronomical work. It is also intended that a second crew will be launched after three months and will stay for two months and will in turn be replaced by a third crew.

The centrepiece of the first workshop will be a solar telescope consisting of five separate experiments for solar studies. The system can be pointed with an accuracy of 2·5 seconds of arc at any point on the surface of the Sun which is not too near the limb. The intention is that the signals received by the telescope will be monitored by the crew, although there is also an arrangement for sending a television signal to the ground. Data from the telescope experiments will be recorded photographically and eventually returned to the Earth.

The telescope instruments include two X-ray telescopes, one designed by the American Science and Engineering Company and the other by the Goddard Space Flight Center. The former is intended to have high geometrical and spectral resolution, while the second will provide a record of the X-ray emission over the entire disk and the near corona between 0·3 and 10 nm. The Naval Research Laboratory is providing a spectroheliograph operating between 15 and 65 nm and a spectrograph with high geometrical resolution operating between 90 and 390 nm. A complementary experiment (between 30 and 130 nm) has been designed by Harvard College Observatory—by making photoelectric scans of small parts of the disk, this spectrometer should provide precise information of the intensity of solar emission. The corona out to six solar radii will be recorded in white light by a coronagraph supplied by the High Altitude Observatory in Boulder, Colorado. One intriguing feature of the equipment is that the Sun's disk will be monitored by means of a display of the Sun obtained by recording extreme ultraviolet light and H alpha light in appropriate telescopes. Prototypes of this equipment have been carried on a variety of rockets in the past few months, so that final versions of the systems can be incorporated into the telescope used by midsummer.

The Saturn Workshop will also carry a great variety of scientific and technological experiments. For example, there will be a nuclear emulsion pack for recording cosmic rays, a Schmidt camera with calcium fluoride optics for obtaining stellar spectra in the ultraviolet, advice for photography of the Sun in the ultraviolet and a camera with a fused silica window for photographing the air glow in the ultraviolet. Similarly, the Saturn Workshop will be able to make photographs of the zodiacal light, while the enthusiasts for Earth resources satellites will be given a series of photographs of a number of ground locations taken through six synchronized shutters at different wavelengths. Micrometeorites will also be collected, while a number of cell cultures of human tissues will be carried and observed in flight in an attempt to determine the effects of weightlessness. Finally, there will be some experiments to determine the effect of space flight on circadian rhythm of *Drosophila*, mice and potato respiration.