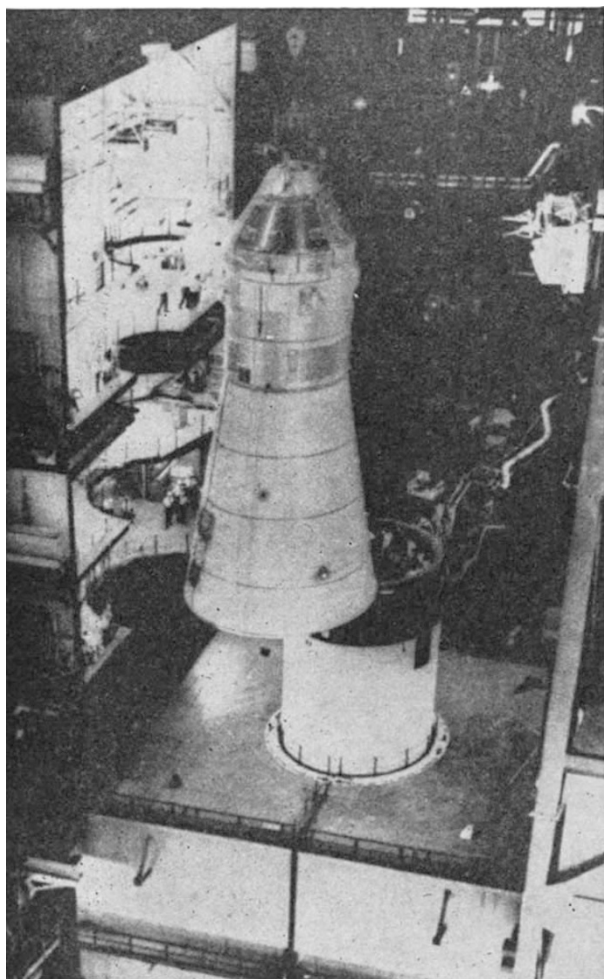


Thorium Ltd is aware that the advance which is the foundation of their present success could any day be followed by another advance which unseats them. The company is therefore planning to diversify. It still finds a ready sale for thorium oxide in gas mantles, chiefly in the Far East.

## ROCKETRY

### Space Race Hots Up

WITH a sigh of relief, the United States last week launched the first manned Apollo spacecraft—a series which, with luck, will culminate in a manned landing on the Moon next year. Although last week's launch was in essence planned many months ago, it will be seen by Americans as an answer to the Russian achievement only three weeks earlier of sending the Zond 5 probe on an orbit around the Moon and its recovery in the



Indian Ocean. With the recent resignation of NASA's chief administrator, Mr James Webb, and the cuts in NASA's spending which triggered off the resignation, the latest Russian effort caught NASA by surprise. If all continues to go well with Apollo 7 after what seems to have been a virtually flawless launching, American hopes will be uplifted.

Meanwhile, conjecture about what the Russians were up to when they launched Zond 5 continues. In

*Science* last week (162, 245; 1968), Merton E. Davies, of the RAND Corporation and Bruce M. Murray, of the California Institute of Technology, argued that Zond 5 may have as much significance as the precursor of an entirely new and sophisticated type of unmanned planetary probe as it has as a test for a manned flight around the Moon. Their conclusion is based on an article by Professor A. Dmitriyev, reported in *Red Star* and in *Pravda*, which praised Zond 5 as a major advance in space technology relevant to the exploration of the planets. This was because the study of planetary surfaces requires the delivery to scientists on the Earth of detailed photographs and the like which could be seriously distorted if transmitted by radio. Zond 5 was therefore intended to develop ways of returning information from space directly to laboratories on the ground—a task which, Professor Dmitriyev wrote, was successfully completed. Davies and Murray add that a drawing of Zond 5 published with the article together with a verbal description lends weight to their argument. The spacecraft had large solar panels reminiscent of those on earlier Russian planetary probes, and was fitted with a very large high-gain antenna more in keeping with a planetary than a lunar probe. Because of this, Davies and Murray expect the Russians to launch a Mars probe similar to Zond 5 on the next favourable occasion, which will be during late February and early March.

Most American space scientists have nevertheless regarded Zond 5 as a threat to their aspirations to land on the Moon first, even though there was no indication during the flight of Zond 5 that the Russians yet have the capability of doing anything more than a manned circumnavigation. But because the conventional interpretation seems to be that such a Russian manned flight is imminent, the Americans are hoping to stretch the next Apollo flight (Apollo 8), scheduled for December, to include a trip around the Moon. A flight including ten lunar orbits is technically feasible, circling the Moon at a height of about 110 km. Much depends on the interpretation the acting administrator of NASA, Dr Thomas Paine, puts on the success of Apollo 7. Following Apollo 8, two further Apollo flights are planned before the attempt at a lunar landing by Apollo 11, late next year if all goes well.

## WEATHER COMPUTERS

### New Machine for Bracknell

THE Meteorological Office at Bracknell is in the market for a large computer, several times faster than Atlas, for delivery in the early 1970s. For a cost which is expected to be about £3 million, the Meteorological Office hopes to buy a machine which will speed up the process of numerical weather prediction forecasts for a larger area and make the forecasts more detailed. So far, the operational requirements of the new system have been drawn up and an order will probably be placed with one of the five principal manufacturers of large computers early next year.

Since 1965, the Meteorological Office has had an English Electric KDF 9 computer, which recently has been operating for virtually 24 hours a day. The Atlas computer at the Science Research Council's computer laboratory has also been used for experiments on numerical weather prediction. This involves