required for optical astronomy in the southern hemisphere, for example, apparently completed late in 1968, except to say that it may lead to more instruments being installed in Australia and increased collaboration with the South Africans. A similar review of optical astronomy in the northern hemisphere, according to the pamphlet, implies that there may well be fewer university astronomy departments supported in future. It is also unlikely that those people in space research who claim that it is SRC policy, albeit an unannounced one, to favour only four groups, will be satisfied with the enigmatic paragraph on space research, which admits that a review has been undertaken and the competence of space research groups examined, but says nothing about what the SRC has decided. This will do nothing to allay suspicions. Obviously if the SRC is to have the goodwill that it needs then it will have to be more open about the way it goes about applying its policy of selectivity and concentration. This is especially so because, as the SRC admits, its policies mean that in future the council will have a greater say in the pattern of university research.

RADIO TELESCOPES

Ready to go at Westerbok

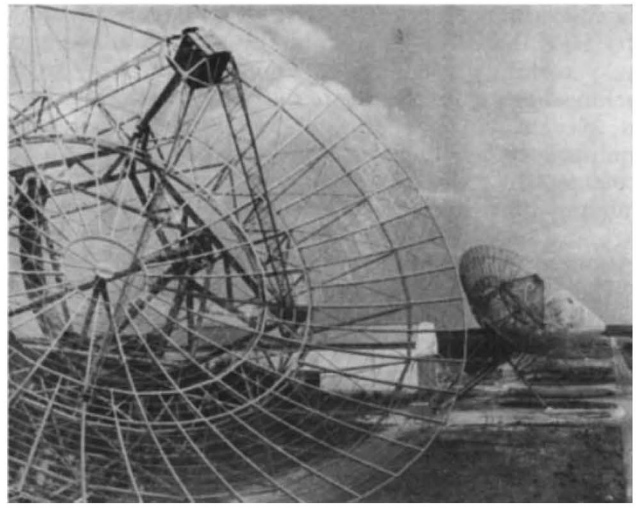
from a Correspondent

THE synthesis radio telescope at Westerbok in north-east Holland was expected to be put into operation officially on June 24 by Queen Juliana of the Netherlands. Over the past few months the instrument has been found to work at least up to the specifications—in fact it works better than that.

The idea for a large radio telescope arose a little more than ten years ago. In the original design a large number of telescopes, movable on rails, were to cover a rectangular area of 1·5 km by 1 km. Eventually after criticism by astronomers the design was changed to a cross-antenna of the same dimensions, to be financed equally by Belgium and the Netherlands with a total cost estimated at $10 million. After years of negotiations Belgium withdrew—there were suspicions that Belgian astronomers would not be in a strong position to compete for time on the instrument because of the relative inexperience of Belgium in radio astronomy.

Of course, this came as no surprise, and the Leiden astronomers together with Australian specialists applied the synthesis principle, first used at Cambridge, to their original plan. The telescope now consists of ten parabolic dishes, 25 metres in diameter, and two equally large antennas on rails. All the antennas are fully steerable and in line to within 0·5 mm. The distance between antennas is 144 metres (centre to centre), and the total length of the instrument is one mile.

The principle of the aperture synthesis technique is that the rotation of the Earth is used to alter the position of one antenna relative to the other, so that the response of a dish with a diameter equal to the length of the linear array is gradually built up. In this case every possible combination of antennas is achieved by placing the movable antennas in four different positions on the rails. The measurements at each position then last for twelve hours, corresponding to a 180° revolution of the Earth, so that a complete measurement takes 48 hours, plus the instrument setting time. This gives the data necessary to compute the signal that would have been received had the telescope been a one mile parabolic dish.



The Westerbok telescope—what Belgium is missing.

The total cost of the telescope has come to Dfl. 25 million ($7 million) including the on-line computer and the electronics. Parts of the dishes were prefabricated in factories and were put together in an air-conditioned temporary building on the site, which is next to a camp where Jews were held during the war and which is now used as housing for those Amboinese people who still consider themselves to be part of the "Free Republic of Amboine" in Indonesia.

All measurements such as the shapes of the dishes, the distances between them, their height, elevation and azimuth, have turned out to be well within the tolerance limits of 1 mm and 5 seconds of arc. Although any deviations could have been allowed for, this would have made the computer programming of the instrument considerably more complicated. First tests indicate that no allowances will need to be made.

At present the instrument is set up for work at the hydrogen line wavelength of 21 cm, but within a couple of years it will also be able to work at 75 cm and at 6 cm. At 6 cm the resolution will be 5 seconds of arc. Combined with the high sensitivity of the instrument, this should allow detailed mapping of radio galaxies, and of the centre of the Milky Way.

Professor J. H. Oort, who has been the moving spirit behind the instrument (although recently he has left much of the work to younger people), hopes that it will reach far enough into the universe to give some insight into its curvature, and thus its size, mass and history. The testing of the telescope is now virtually over and astronomers are becoming increasingly enthusiastic about the capabilities of their new machine.

JOIDES

Briton on Twelfth Leg

from our Geomagnetism Correspondent

VIEWED against the spectacular failure of Project Mohole, the abandoned attempt to drill through to the Earth's mantle, any attempt to drill into the crust through the ocean floor could hardly fail to succeed.