

ards in all parts of the world), 1,400–1,427 MHz (which includes the hydrogen line at 21 cm and which URSI would like to see extended towards lower frequencies so as to make possible observation of Doppler-shifted lines, but where international reservation of the frequency seems to be impracticable), 1,660–1,670 MHz (where the draft would like to see improved protection for observations of the OH line) and at a number of frequencies in the GHz range where URSI would like to see improved protection.

How many of these matters will be implicitly decided before the ITU conference is at present in doubt, but there seems to be no shortage of potential problems. By then, the allocation of frequencies may be less immediate a question than the allocation of parking spaces for geostationary telecommunications satellites.

CARBON FIBRES

Morgan Changes Course

WHATEVER the outcome of the takeover bid by Morgan Crucible for Fothergill and Harvey, the Lancashire company specializing in composite materials, it is clear that Morgan Crucible has committed itself to a new policy on carbon fibres. The shutting down of the research laboratory at Northfield near Wandsworth marks the end of Morgan Crucible's effort in fundamental research in carbon fibres and signals its new interest in going full scale into the development and production of composite materials.

This train of events is not altogether surprising. Dr J. Saunders, head of Morganite Research, pointed out last week that the research laboratories have produced more basic knowledge than can be absorbed on the production side. The real profit from carbon fibres lies in the manufacture of composites, he said, and Morgan Crucible is now engaged in finding the best commercial arrangement to carry this out. The strands of fibre are essentially useless until they are incorporated in a matrix material, which can be a resin, a plastic or a metal.

Morgan Crucible has an exchange agreement with Whittaker Corporation in the United States for a feedback of information on fibre techniques, and it is hoping that, by taking over the going concern of Fothergill and Harvey, it will be better placed to produce composite materials in the immediate future. Dr Saunders has emphasized that the glass fibre techniques used by Fothergill and Harvey cannot be switched overnight to the production of carbon fibre composites, but that the transformation would be far simpler than starting up a plant from scratch.

The chances of the takeover going ahead are not very great, however. The initial response of Fothergill and Harvey to the offer has been cool. It may prefer to build up closer ties with one of the American companies with which it has been associated.

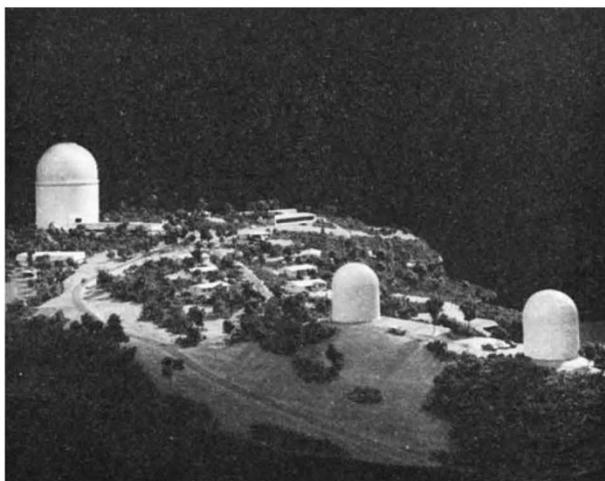
ASTRONOMY

Planning for Southern Skies

from our Astronomy Correspondent

EVERYONE knows of the rich pickings for astronomers in the understudied skies of the southern hemisphere,

and the British Science Research Council is now in the throes of seeing how best to exploit its facilities within a limited budget. Pride of place will of course go to the 150-inch reflector being built 350 miles north of Canberra as a joint effort with the Australian Government, but the burning question is what other telescopes the SRC will be able to afford. According to the Director of the Astronomy, Space and Radio Division of the SRC, Mr J. F. Hosie, rumours that the council is to cut down its operations in South Africa so as to concentrate on the Australian observatory are ill-founded. The key document in the council's deliberations is the Southern Hemisphere Review, so far unpublished, which was compiled last year by a committee of three under the chairmanship of Professor Fred Hoyle. Its members were Professor R. O. Redman (Cambridge), Dr R. Wilson (SRC Astrophysics Research Unit, Culham) and Mr Hosie. Limited to optical astronomy, the review was ready at the beginning of the year and, as well as spelling out the scientific case



Model of the observatory on Siding Spring Mountain. Dome at the left contains the Anglo-Australian 150-inch; centre dome is for the proposed British instrument; and the dome on the right marks a telescope which is being allowed for in the plans and could be added at a later date.

for astronomy south of the equator, it made specific recommendations which are at present under consideration by the Astronomy, Space and Radio Board of the SRC.

One of the recommendations is likely to be that a purely British telescope should be set up alongside the 150-inch Anglo-Australian instrument at the Siding Spring site. Justification for this comes out of experience at Pretoria, where the permanent staff were called on to give a great deal of assistance to visiting astronomers. The SRC feels that it would be public-spirited to have a permanent British staff on hand at the observatory, and that a telescope ought to be provided to keep them happy when not working on the 150-inch. Another reason is that some of the work British astronomers will want to do can almost certainly be carried out on a smaller instrument. Just now the question is what instrument would be most valuable. The Australian National University already has telescopes of 60-inch, 40-inch and 24-inch aperture, and the SRC is eager to choose something which would

fit well into this spectrum. One strong possibility is a 48-inch Schmidt to match the Schmidt at Mount Palomar and thus extend the Palomar Sky Survey to southern latitudes. A second possibility is a 60-inch telescope—either would cost roughly £750,000 spread over four years. The SRC hopes to come to a decision by the end of the year.

Naturally the SRC hopes the extra money will come from an increase in its resources, but the chances are that it will have to show willing by squeezing some of its programme. The facilities in South Africa which some have considered threatened are the Royal Observatory at the Cape of Good Hope, and the Radcliffe Observatory at Pretoria. Although it seems that only in the direst financial circumstances will the SRC abandon altogether its connexions with South Africa, the observatory at Pretoria which is leased from the Radcliffe Trustees is less secure than that at the Cape, taken over from the Admiralty together with the Royal Greenwich Observatory in 1965. The SRC assumed responsibility for the Radcliffe Observatory at a time when the trustees were finding the observatory a drain on their resources, and the lease expires in 1974—as it happens, the year when the 150-inch telescope comes into operation in Australia. After 1974, Mr Hosie says, the SRC has no legal responsibility for the Radcliffe Observatory, although there is a moral commitment to the staff involved. Just now the 74-inch Radcliffe telescope, and the 74-inch at the Mount Stromlo Observatory of the Australian National University, are the two largest telescopes in the southern hemisphere, and the Radcliffe Observatory is costing the SRC £55,000 each year.

JAPANESE SPACE

Another Rocket

JAPAN is to have a long-range space development programme, it has been announced by the Director-General of the Science and Technology Agency. Despite the country's distinguished record in rocketry—developed without outside help or military connexions and on a remarkably small budget—this will be the first time that there has been an extended "forward look", with clearly defined targets established. As part of the exercise, consideration is to be given to the creation of a central agency to coordinate and revise Japan's scattered space development projects. Somehow, this all sounds familiar and may draw a pang from officials of the Ministry of Technology and members of the British Interplanetary Society who seem over the past 10 years to have been continuously involved in evaluation of potential benefits and targets though the first nationally launched satellite is still 6 months away. The first Japanese attempt to launch a Japanese built satellite by a Japanese designed rocket took place two years ago.

Meantime, another Japanese Government agency has announced that a Japanese experimental communications satellite is to be built for launch in 1973. The Ministry of Posts and Telecommunications will be responsible for the design while the Science and Technology Agency will handle the launch method and provide the rocket hardware. As a preliminary, work is being carried out on an ionospheric satellite for launch in 1971. For this programme a further stage is

to be added to the LSC rocket which will then be Japan's Q rocket. (Japanese rockets have taken the letters of the alphabet starting from L as they have grown in size and sophistication.) The LSC rocket, which had its first firing (a relative success) last January, has a solid first stage and a liquid second stage. In support of the satellite communications programme, a Space Development Corporation is to be set up to look after matters relating to satellites for practical purposes. It will start with a staff of 150 drawn from current teams concerned with rocketry and radio research.

Japan has had individual views at the year-long Intelsat negotiations. Basically, it favours permanent arrangements for Intelsat but considers that the international organization's influence should be limited. For instance, Japan does not favour Intelsat taking over all special satellite communications services, such as meteorology, data collection and navigation satellites. Japan also strongly insists on her right to operate regional satellites in the South East Asia area.

INSECT PHYSIOLOGY

Unit Divided

THE Agricultural Research Council announced last week that it is setting up a Unit of Invertebrate Chemistry and Physiology which is to be based on two universities—Sussex and Cambridge. The section housed at Sussex is to be directed by the professor of chemistry there, Professor A. W. Johnson, while that at Cambridge will be directed by Dr J. E. Treherne. Why start a unit which, from the outset, suffers from the disadvantage of being split between universities as far apart as Cambridge and Sussex? The reason seems to be partly historical and partly the magnetism of Cambridge.

Originally, it seems that the ARC intended to set up the unit at the University of Nottingham with Professor Johnson as director, but when he moved to Sussex, the putative unit went with him. The ARC then decided to disband the Unit of Insect Physiology at Cambridge when Sir Vincent Wigglesworth retired last year. Several of Sir Vincent's group left Cambridge for the Field Station of Imperial College, London, at Silwood Park, Ascot, where the ARC set up a new unit for insect physiology headed by Sir Vincent's former colleagues Dr J. S. Kennedy and Dr A. D. Lees (*Nature*, **218**, 112; 1969). The rump of Sir Vincent's unit, including Dr Treherne, remained at Cambridge and, by all accounts, Dr Treherne was reluctant to leave Cambridge even for the attractions of Brighton. The new bargain also entails the unit taking over about half a dozen senior staff from the Biochemistry Department of the Ministry of Agriculture's Pest Infestation Laboratory at Slough, who will probably be divided equally between Sussex and Cambridge.

The Unit of Invertebrate Chemistry and Physiology, clearly the second lineal descendant of Sir Vincent Wigglesworth's old unit, will in the long term aim to provide a scientific basis for pest control and the development of pesticides, still very much a matter of trial and error. Even the mode of action of DDT, 1.5 million tons of which have been used in the past twenty-five years, is still obscure. But Professor Johnson is quick to point out that the new unit will be concerned with