considerably—several years have probably been saved.

The decision to build the $11 million telescope for observations of the Southern sky was taken in April last year by the British and Australian governments. This is only one of perhaps ten large telescopes planned or under way throughout the world, including a 6 m reflector being built in the Soviet Union—the world's largest telescope. This new crop of telescopes, possibly the last generation of ground based instruments before large telescopes in space above the disturbing effects of the atmosphere become a reality, is a measure of the wide variety of problems to be investigated in visual astronomy at present, and the shortage of instruments to solve them.

Because of the diversity of problems to be tackled with the new telescopes, versatility is an important factor in the Kitt Peak design. Modifications envisaged for the Anglo-Australian instrument include an increase in the focal ratio at the prime focus from $f/2{\cdot}8$ to $f/3{\cdot}3$. The Kitt Peak focal ratio was chosen so that faint stars could be photographed with reasonable exposure times, but the change to $f/3{\cdot}3$ makes the figuring of the mirror simpler and should increase the field of view that can be photographed without distortion.

The blank for the primary mirror was ordered in October last year from an American company which has developed 'Cer-Vit', a glass ceramic which has very much better thermal properties than other mirror materials such as 'Pyrex', used for the Mount Palomar 200 in., and quartz, the material of the Kitt Peak telescope. The manufacture of a 'Cer-Vit' blank is a simpler and cheaper process than making the quartz equivalent—the blank should be delivered in October.

The increase in the focal ratio means that the focal length of the primary mirror is 500 in., instead of the 420 in. of the original design, so the dome of the Anglo-Australian telescope will be larger than the 108 ft. diameter of the Kitt Peak dome, to accommodate the increased length of the telescope tube.

Operation of the Anglo-Australian telescope should be simplified by modifications to the arrangements at the prime focus. In the Kitt Peak design the prime focus cage, containing observing facilities and secondary mirrors, is complex and its weight of 28,000 lb. is excessive when the increased tube length of the Anglo-Australian instrument is taken into consideration. Design changes are envisaged which will simplify the system yet will allow rapid change-overs of the foci at which observations are being made.

Some of the general design details of the Anglo-Australian telescope, which is hoped to be completed some time between 1973 and 1975, have been described by Dr E. G. Bowen, Professor S. C. B. Gascoigne and Mr H. Wehner (*Proc. Astro. Soc. Australia*, **1**, 74; 1968).

Food in the Greenhouse

THE British glasshouse industry is the second largest in the world, with about 5,900 acres under glass compared with about 12,000 in the Netherlands and less than 2,000 in the United States, which has only the fifth largest acreage. This was a point firmly made by Dr G. W. Winsor of the ARC Glasshouse Crops Research Institute when he spoke about the nutrition of glasshouse crops at the meeting of the Fertilizer Society on April 25.

The opportunities for controlling the environmental conditions of glasshouses obviously make this a very suitable industry for Britain. Although the need for heating and artificial irrigation adds to the grower's costs, the provision of these two factors frees him from the vagaries of the British climate and allows him to produce crops at seasons when conditions in the field are quite unsuitable. Improved yields and quality are also being obtained by enriching the atmosphere with added carbon dioxide for photosynthesis. Light, however, becomes a problem in the glasshouse, for up to fifty per cent of it can be reflected from the surface of the glass. Artificial illumination, which is very expensive, is largely confined to tomato propagation in mid-winter, although it is also used to prevent premature budding in chrysanthemums. Dr Winsor made it clear that light seems to be the principal factor now limiting yields of glasshouse crops.

The ability to avoid limitation of growth by factors such as drought or low temperatures makes it possible to take greater advantage of soil nutrients in the glasshouse. This is reflected in the recommendations of the Ministry of Agriculture that fertilizers should be applied to glasshouse crops when the content of phosphorus and potassium in the soil is almost ten times greater than the value recommended for cereals. The recommended amounts of fertilizer to be applied are also very much larger for glasshouse crops than for any other crops; the average recommendation for application of potash to main crop tomatoes is about fifty times that for spring wheat. These great differences are not only a consequence of increased nutrient requirements in favourable conditions. The glasshouse grower seems to be prepared to increase his soil nutrient content to a level at which the crops would never be limited by shortage of nutrients. This would not be an economic proposition with field crops.

Remote Sensing

from a Correspondent

REMOTE sensing involves measuring the intensity of radiation emitted on any wavelength of the electromagnetic spectrum—gamma, ultraviolet, visible light, microwave, radio or sound. The radiation may be received passively or, at the longer wavelengths, may be actively transmitted from the sensor which later receives the reflexion. The field has expanded rapidly from visual aerial photography and has received a great stimulus from the possibility of satellite-borne sensors.

The fifth symposium on remote sensing of environment, held at the University of Michigan, Ann Arbor, from April 16 to 18, did not reveal any startling advance. Most papers were restricted to airborne sensing. This is perhaps the inevitable result of delay in launching an Earth resources satellite. It was generally agreed that sensor technology is no longer a major problem. It is now necessary to concentrate on image interpretation and data processing, and to choose the optimum combination of sensors for each purpose. Generalization is not possible; each discipline must examine a wide variety of photography and imagery to discover how features of interest may be identified and which environmental conditions permit clearest discrimination. Where a feature is not identified uniquely by the magnitude or pattern of its signals on