NEWS AND VIEWS

Another Telescope for Cambridge

from our Astronomy Correspondent

THE hiatus in the building of large radio telescopes in Britain ended this week with the announcement that a start will be made on the three-mile array for the Mullard Radio Astronomy Observatory at the University of Cambridge. The delay reflects the financial doldrums in which radio astronomy is enmeshed, which has meant the postponement for two years of the Mark V telescope for Jodrell Bank and the imminent running down of the radio astronomy group at the Royal Radar Establishment, Malvern. At least Jodrell Bank gets a consolation prize—the refiguring of the Mark I telescope to improve the performance of the dish at short wavelengths. It has been known for some time, however, that the three-mile telescope for Cambridge was to be the priority project, as suggested by the Fleck report in 1965.

At a cost of £2 million provided by the Science Research Council, the new telescope is to make use of the latest in aperture synthesis techniques devised by Professor Sir Martin Ryle's group. A linear array of eight aerials will produce a map as detailed as from a three-mile dish, and is to extend the programme on quasars and radio galaxies now being carried out with the one-mile telescope. The present one-mile telescope has a resolution of twenty seconds of arc, and the maps which it produces suggest complexities below the limit of resolution. This is why the new telescope will be able to resolve down to one or two seconds of arc. The eight dishes making up the new telescope are to be 42-foot paraboloids supplied by Marconi and arranged in a linear array. Four of the dishes are to be fixed on concrete platforms 1·13 km apart; the other four will run on rails 1·17 km long and colinear with the fixed dishes. A closed section of British Rail track adjacent to the present Lords Bridge site of the Mullard Radio Astronomy Observatory makes a convenient basis for the array. The dishes will be built where the obsolete track runs east–west for a distance of three miles, and are to be controlled by a Marconi Myriad 2 computer.

Agents for the Science Research Council during the £10,000 design study for the telescope were the engineering group of the Atomic Energy Authority at Risley. Marconi has a large slice of the project. The eight 42-foot dish aerials are to be direct descendants of three 40-foot dishes built for a military programme, and a 40-foot dish on Ascension Island which is part of the US tracking system. Each dish is to be made up of aluminium sheets mounted on a quasi-paraboloidal steel backing. The secondary reflector in the Cassegrain system which is used is quasi-hyperboloidal and 1·2 m across. The signal is then picked up at the vertex of the main reflector. Initially, two detachable feed horns are to be fitted to cover two frequency ranges—2·7 GHz and 5·0 GHz. The receivers are to be provided by Professor Ryle's group and will be mounted on the hub structure of the aerials. Each dish will have a tripod mounting, and will be able to swing about two axes controlled by servo-driven motors under the eye of the Myriad computer.

An 8·5 m gauge track supported by a 1·17 km long concrete beam is to be laid down for the four movable aerials to an accuracy of one millimetre. The plan is to position the aerials to an accuracy also within one millimetre, with respect to thirty-two predetermined positions. The control room and the computer will be midway between the centre pair of fixed dishes. As well as overseeing the guiding of the dishes, Myriad will look after a complex delay system to allow for the different times taken by signals from the eight dishes to reach the control room. The computer will also feed a 30-inch line plotter. Construction time is expected to be three years.

The next step in the avowed aim of the Science Research Council to support two, and only two, schools of radio astronomy will be to make a start on the planned 400-foot Mark V telescope for Jodrell Bank. Meanwhile, work to counter fatigue problems on the 250-foot Mark I dish also carries with it the upgrading of the reflector so that measurements down to a wavelength of 3 cm can be made over the central 100 foot.

BUBBLE CHAMBERS

Waiting for Gargamelle

BRITISH high energy physicists will have at least a foot in the door to the European 300 GeV laboratory. In the long run, their entrance ticket could turn out to be the ability to cope with the reams of photographs which the new breed of bubble chambers will produce. The patience and perseverance which the analysis of photographs from conventional chambers requires are common knowledge, but the chambers which are going to be standard equipment in the high energy laboratories of the 1970s pose even more problems. A grant of £201,000 awarded by the Science Research Council to the Bubble Chamber Group at University College, London, is being used to set up equipment in Britain to handle film from the first of the new chambers, Gargamelle, a heavy liquid chamber designed and constructed in France under a joint contract with CERN for use with the 27 GeV proton synchrotron. But the problems which the group will solve are going to be common to the next generation of bubble chambers.

So far, bubble chambers have been small enough for one of the containing walls to be entirely of glass. To provide three-dimensional information about the tracks, the chamber is viewed by an array of three cameras, each seeing the entire volume of the chamber. In future, however, the size of bubble chambers will mean that photography has to be through narrow portholes drilled in the chamber casing. Gargamelle, for example,