

astronomers during the Assembly. Many institutes in the United Kingdom may also wish to take advantage of the presence of visiting astronomers to organize meetings before or after the assembly. Dr Sadler, like conference organizers the world over, is hoping that his plans will not be marred by duplication.

## Better Machines

THE Ministry of Technology has devised a way of supporting the development of numerically controlled machine tools. It involves collaboration between a government establishment (RAE, Farnborough), a research association (the Production Engineering Research Association) and industry (Airmech AEI). These three are establishing a numerical control advisory and demonstration service, which will set out to tell industry what is possible and how it can be done.

Some industries in Britain are already aware of the importance of numerical control. Having a machine tool controlled by tape not only releases a man for other activities, but also improves precision and makes much better use of machines. A machine controlled by tape can be used for 60 per cent of the time, against 20 per cent for one controlled by hand. Numerically controlled machines need fewer jigs, and may also reduce lead times—the gap between design and production. Most of Britain's 1,400 numerically controlled machines are in the aviation industry, and other industries have tended to fight shy. The production engineers estimate that eventually 10 per cent of the machine tools in Britain will have to be controlled in this way, a total of perhaps 125,000 machines, so there is plenty of room for expansion.

One of the difficulties has been to get an unbiased assessment of just how valuable numerical control is. The new service should be able to provide this, although by identifying itself with the scheme, PERA may have sacrificed its objectivity as far as industrialists are concerned. PERA says that it has been able to show a 20–25 per cent return on the investment for most companies contemplating the investment, and that each survey costs in the region of £1,200. The new service provides for the ministry to pay between 50 and 90 per cent of the cost of such surveys, as well as paying for the training courses. At the same time, the ministry is supporting the establishment of a numerical control centre at High Wycombe by Airmech AEI Ltd. This will contain a workshop with a range of machine tools equipped with Airmech AEI control systems, and will undertake contract work for industry on a commercial basis, in order to prove how cheap and effective numerical control is. The total cost of the scheme will be £685,000, spread over three years, half of which will cover the cost of buying numerically controlled machine tools.

## Infrared Geology

FIG. 1 shows an example of the infrared images (taken in the 8 to 13 micron band) which are providing information on the San Andreas fault system in the Carrizo Plain area of California. An aerial photograph is shown for comparison (Fig. 2). R. E. Wallace and R. M. Moxham have been taking pictures of 200 miles of the fault system as part of a joint project of the US Geological Survey and the National Aeronautics and Space

Administration. The infrared image was taken before dawn, when the properties of the rocks and soil are best indicated. The strong white line on the left is a hard packed road. It is thought that the particularly dark patches in the fault line itself are due to accumulations of tumbleweed which have exceptionally low thermal inertia and thus produce relatively low radiation temperatures before dawn.



Fig. 1. Infrared image of part of San Andreas fault.

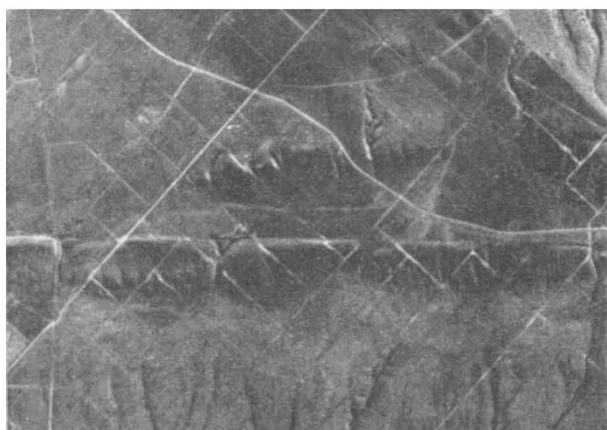


Fig. 2. Aerial photograph of the same area.

## Building High

MUCH modern building, particularly of high rise blocks, would be impossible without the detailed knowledge of soil technology which has been developed, principally in this century. Buildings, of course, have always depended on the security of their foundations, but until comparatively recently empiricism ruled supreme. Mr R. Glossop, giving the eighth Rankine lecture to the Institution of Civil Engineers on February 14, gave some intriguing examples of this approach. When Tower Bridge was built over the Thames in the late nineteenth century, there seems to have been no serious examination of the geological conditions below the foundations of the bridge. There was little excuse for this, as the techniques were known—for Saltash Bridge, I. K. Brunel sank 175 boreholes for the central pier alone. For Tower Bridge it was decided, evidently on scanty scientific evidence, that the clay would bear