Dapsone (diaminodiphenylsulphone) is the most effective so far—the ultimate aim must be the development of a safe vaccine to be used as a preventive rather than a cure. Here again, the successful propagation of the bacterium in animals is probably an important step forward in this direction, but it may be some time before the aim is fully realized. In the meantime there is a possibility that leprosy may respond to BCG vaccine for the prevention of tuberculosis, but this has not been established beyond all doubt.

ASTRONOMY

Bright Future for Infrared

from our Astronomy Correspondent

ALTHOUGH the prediction of what is likely to happen in astronomy in the future is a hazardous undertaking just now, it seems increasingly obvious in astronomical circles that infrared astronomy is going to be an important field of investigation during the next few years. The subject has so far been neglected chiefly because of problems with detectors but also because it promised comparatively little. The enthusiasm throughout astronomy has now, however, led astronomers to believe that important discoveries are just as likely to be made in this new branch as in any other. Progress with infrared devices has given the subject substance.

There is a wealth of problems to be tackled. One of the successes of infrared astronomy so far has been the detection of what seem to be very cool stars—strong emitters in the infrared but weak at visible wavelengths—which probably represent stars and planetary systems in the early stages of formation. The quasar problem has also received its fair share of attention from infrared astronomers, who have found that quasars are brighter in the infrared than their visible spectra might tend to suggest. So far the significance of this observation to the underlying mechanism of quasars is not understood.

In Britain, much of the progress in infrared astronomy is likely to come from a group now being set up at Imperial College, London, by Professor J. Ring. A proportion of the group is planning to continue Professor Ring's studies at the University of Hull on phenomena near the Earth, Balmer line emission from the night sky and the zodiacal light, but new infrared telescopes and spectrometers are taking shape as well.

One interesting development has been the introduction by Fellgett of a technique known as multiplex spectrometry, which makes possible the delineation of the infrared spectrum of faint astronomical objects in spite of the low sensitivity of infrared detectors. The essence of multiplex spectrometry, as used by the group at Imperial College, is a Michelson interferometer in which one of the mirrors is moving, thus imparting a sinusoidal modulation to the emergent light. The point is that the modulation is different for each spectral element, and the signals from the many spectral elements are recorded by the detector with no further dispersion. The spectrum can then be re-constituted from the modulation pattern on the record, so that the technique is analogous to the multiplexing of telephone conversations. Apart from the advantage of making efficient use of the detector, the size of the aperture is not limited to the same extent as it is in a conventional spectrometer.

Infrared astronomy is best carried out at high altitudes. Except for a few narrow ranges of wavelengths, water vapour in the atmosphere absorbs a large proportion of the infrared radiation and emission by the atmosphere itself also matters. This has led to the introduction of instruments which automatically compare the signal from the astronomical object under observation with the signal from an adjacent region of the sky. The group at Imperial College is at present using a site high in the Italian Alps at Testa Grigia, but it is looking out for other more suitable locations.

SCIENCE POLICY

No Best Seller

It is hard to see a best selling future for the recent report on United States science policy produced by Unesco (*National Science Policies of the USA*, Unesco, \$3.5; 21s.). For one thing the Unesco report contains less information than that produced by the Organization for Economic Cooperation and Development (OECD) earlier this year. For another, the Unesco document seems content merely to define the important issues of American science policy without paying much attention to how they could or should be tackled. The stimulus of the OECD examiners at least made the OECD report something more than a colourless collection of statistics, even if the burden of their questions went unanswered.

The director of the US Office of Science and Technology, Dr D. F. Hornig, has remarked that there is no such thing as a national science policy which can be isolated from the other policies of government. The OECD report bluntly observes that the total expenditure related to external challenge of one form or another accounts for more than 80 per cent of US government spending on research and development. The Unesco report, which bears no name on its title page but has apparently been compiled by the US National Science Foundation (NSF), is somewhat less forthright on this issue, although a section on the history of science policy in the United States describes the stimulus to government interest presented by the Second World War and the launching of the first Russian satellite in 1957.

A principal feature of science policy in the United States is the division of responsibility for research funding between the various mission oriented agencies, the role of the National Science Foundation being to support the areas of basic research which it considers have been poorly done by. The Unesco report points out that the task of deciding how and where this compensation should be made is a matter of considerable importance, but in view of its authorship it is not surprising that the report avoids discussion of the case for strengthening the role of the NSF.

The report discusses the "internal" brain drain of the United States, but has little to say about the external brain drain, a subject of primary interest to the other members of Unesco. The Korean Institute of Science and Technology was established jointly by the United States and Korea with the specific intention of encouraging Korean scientists to work in their own country; it would be interesting to know how successful this experiment has been and whether it is likely to be repeated.