NEWS AND VIEWS

In Pursuit of Cosmology

To many people, the new analysis presented on page 357 of the radio source counts—the most gnawed at bone of contention in astronomy—will come as a surprise. New schemes for understanding the strange fashion in which the number of observed radio sources varies as one goes to fainter and fainter fluxes are rare, and only the boldest astronomers would attempt an embracing survey of the subject. This is what Professor W. Davidson of the University of Otago has now done, in a refreshingly original approach that will no doubt attract a fair amount of attention in the weeks to come.

What the counts of radio sources are all about is nothing less than the testing of different theories of how the universe began and subsequently developed. The observational problems are enormous. The worthwhile data come from the faintest of sources, assumed to be at great distances. Coupled with the finite velocity of light the inference is that the faint sources are a good deal closer in time to the origin of the universe than we are now. Needless to say, radio telescopes have to be pushed to the limit to obtain the really valuable data. It is to the credit of Sir Martin Ryle and his colleagues of the Mullard Radio Astronomy Observatory at Cambridge that a subject that was once merely a fond hope should now be a major branch of modern astronomy.

Now that the data coming out of the computers at the observatories are beginning to show trends, when earlier radio astronomy was only able to show a uniform universe, there ought to be some confidence in the interpretations that are being put forward. But that is a battlefield that is being well fought over too. There are those who would argue that the counts are best left alone, at least until more is known about quasars and how they are related to radio galaxies. After all, quasars have the largest redshifts. Then there is the question of sorting out the evolution of the radio sources, whatever they are, from the cosmological effects.

Professor Davidson, however, has boldly grasped the nettle. An essential part of the problem, before getting down to the testing of different cosmological models, is to establish what evolutionary changes have taken place among the radio sources. Basing his work on the Cambridge counts, Davidson concludes that the crucial factor is the luminosity evolution of the sources and not the density evolution. One of his predictions which turns up on the way to this conclusion is that most of the unidentified sources must be powerful radio galaxies, although one might then ask for reasons why they remain unidentified. One factor to be taken into account here, of course, is that the radio source associated with a galaxy may easily be well removed from the optical object.

To some people, Professor Davidson's paper will go against the grain, not that there is anything wrong in that. It might be argued that the case for establishing luminosity evolution as the dominating influence is not as firmly based as Davidson would claim. After all, this question of the rival claims of the evolution in time of the luminosity, density and power of the sources has been subject to the ebb and flow of debate for years now. Nevertheless nobody will blame Professor Davidson for this reminder that the question of what interpretation to place on the radio source counts is still crying out for a convincing solution.

GLACIOLOGY

History by Photography

from our Geomagnetism Correspondent

Some research projects take longer than others to complete, though where the observation of geological phenomena is concerned much is to be gained by extending the period as much as possible. In 1942 the US Geological Survey began a systematic photographic study of the Nisqually Glacier on Mount Rainier, Washington, "to explore the value and limitations of such photographs as an aid to glacier study". The results of the first 24 years of the study have been published recently (F. Veatch, *US Geological Survey Professional Paper 631*; 1970).

The Nisqually Glacier covers 2·5 square miles and extends from an altitude of about 14,300 feet near the top of Mount Rainier down to 4,700 feet in a horizontal distance of 4·1 miles. This glacier was chosen for the study because of the variety of its features, the availability of data from previous investigations (several photographs were taken sporadically between 1884 and 1941), its superior accessibility and its practical interest as an important source of water for the Nisqually River. Nevertheless, the begetters of the project clearly hoped that their studies would be of more than local significance—and their hopes were quickly fulfilled. Detailed analysis of the photographs showed that between 1890 and 1944 the front of the ice sheet retreated up the Nisqually River valley on the south side of Mount Rainier and at some points the ice thickness decreased by as much as 100 feet. In the 1940s, however, the glacier began to thicken again; and it later became apparent that the ensuing advance was the first documented sign of a worldwide climatic change that brought about advances in many glaciers.