SELENOLOGY

Exchange of Information

from a Correspondent

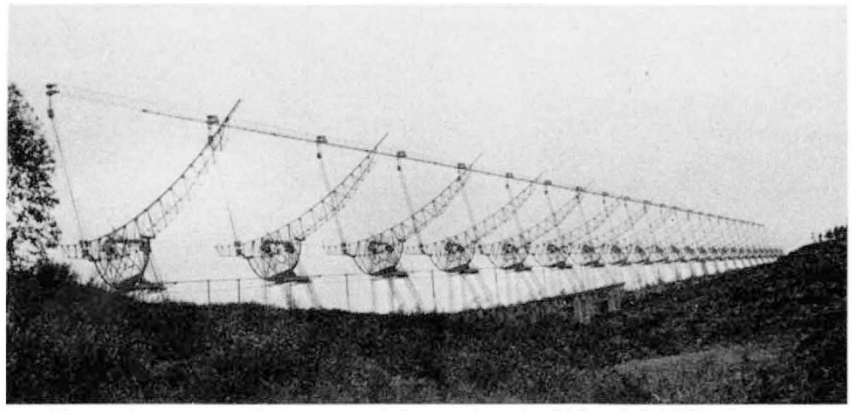
LIKE the NASA-sponsored First Lunar Science Conference at Houston, Texas, in January 1970, the International Astronomical Union symposium on the Moon at Newcastle upon Tyne on March 22–26 was of outstanding interest but for quite different reasons. At the Houston conference, leading specialists presented preliminary accounts of their work on returned lunar samples. At Newcastle, speakers were by no means restricted to discussions of Apollo samples; and they had spent more time absorbing the early Apollo results.

Stressed for their importance, lunar mascons formed a theme that was encountered repeatedly throughout the symposium. Everybody seemed to agree that once the nature and origin of these mass concentrations were settled, they would have a much better idea as to how the Moon originated. Mascons are important not because they are exceptionally large positive gravity anomalies—they are not—but because they exist at all in a Moon that has been thrice dated as of such an age that excess masses would normally be expected to have attained complete isostatic adjustment. Professor H. Urey (University of California, San Diego) maintained that the mascons were very old (although this was not demonstrated explicitly) and that therefore the Moon must always have retained great rigidity and strength. Dr P. Müller (Jet Propulsion Laboratory, Pasadena) had calculated that the stress required to support the larger lunar mascons was in the range of 50 to 400 bars and that a lunar crust, of the order of 100 km thick, could not have been heated to above 800° C at its base but must have been endowed with great strength for geological periods of time. On the other hand, it is relevant to note that there are no age determinations of lunar rocks at any mascon site; and that most observers agree that lavas from hot materials at depth may have flowed more recently than 4.5×10^9 years ago, layer upon layer, at least across those of the maria over which mascons are observed. Lunar absolute altitude determinations indicate that, apparently unlike the mascons, the maria and highlands are, broadly speaking, in complete isostatic adjustment. An important step forward in understanding mascons was announced by Dr Müller: in the case of the Mare Orientale and Mare Autumni mascons, at least, the previously questioned negative gravity anomalies coinciding with the surrounding rings of mountains (Rook and Cordillera, respectively) were said to be a reality—they were definitely not introduced spuriously by the use of simplified methods of reduction.

It seemed that the geologists and geophysicists had their feet on the ground more firmly than did the astronomers when the perennial question of the Moon's origin came under examination. Among others, Professor A. E. Ringwood (Australian National University, Canberra) and Professor M. Brown (University of Durham) emphasized how the extreme diversity of types among the lunar basalts argued for partial melting processes at depth in the Moon.

By comparison with the relatively concrete (albeit based on poor sampling) starting point of the mineralogist and petrologist, the classical astronomer's approach to the problem of the Moon's origin seemed particularly weakened. Mr L. V. Morrison (Royal Greenwich Observatory, Herstmonceux) reported that a value of the secular acceleration of the Moon deduced from recent occultations tended to agree closer with the value deduced from ancient eclipses than with the value of about twice as much (minus 22 seconds of arc per century) which Spencer Jones deduced from observations of the longitudes of the Sun, Moon and planets. It is well known that the whole question of the recession of the Moon from the Earth depends on such unknown factors as the past elasticity of the Earth as a planet. The assumptions that are made by planetary dynamicists regarding the state of the Earth's interior in the geological past are particularly difficult to investigate. This is one of the many examples, given implicitly at this symposium, of the need for communication and understanding between scientists studying one and the same problem from diametrically opposed schools.

India Enters Radio Astronomy



THIS illustration comes from an article in next Monday's *Nature Physical Science* in which G. Swarup and his colleagues of the Tata Institute of Fundamental Research, Bombay, describe the new radio telescope at Ootacamund, in the Nilgiri Hills of south India. Basically, the frame of the telescope consists of twenty-four parabolic frames spaced 23 m apart, and the reflecting surface is made up of 1,100 stainless steel wires stretched between the two end frames and supported at each intermediate frame. They give the telescope an effective collecting area of 8,700 m², equivalent to a parabolic dish 138 m in diameter operating with an aperture efficiency of 60 per cent. By installing the telescope on a hill, the slope of which is the same as local latitude, 11° 23′, the axis is made parallel to the rotational axis of the Earth, and radio sources can be tracked in hour angle for 9½ hours per day.

Swarup and his colleagues report some of the results since the first observations with the telescope in February last year. At present the telescope is tuned to 326.5 MHz, with a band-width of 4 MHz, but eventually the focus will also be fitted with dipoles for observations at 110 MHz. So far the radio astronomers in India have been particularly concerned with the determination of accurate positions for radio sources using the lunar occultation technique, and Swarup and his colleagues explain how the new telescope is well suited for work of this sort.

They report that the occultations of 150 sources have been recorded, in most cases leading to positions of 1 s of arc or better in both right ascension and declination. In forty-one cases there has been an attempt to find the sources on the Palomar Sky Survey prints, leading to thirteen successful identifications. The telescope is also to be used for work on pulsars—the Indian team hope to find more weak pulsars—and on interplanetary scintillations. And two radio dishes, 13.5 m in diameter, are being set up nearby to form an interferometer. The telescope was built entirely in India, and Swarup and his colleagues are hoping that it will be a valuable impetus to astronomy in India.