MOON BOUNCING FROM ITALY by I4BER

November 19, 1975 at 2351 GMT. First QSO via the Moon between I4BER and SK6AB. First EME from Italy, first SM-I on 432 MHz. Exchanged reports were: 419 from Sweden and a 559 from Italy but the latter report was largely due to the excitement of the operator more than to the actual strength of the received signal! Three days later another QSO with Sweden: SM5LE. This time 559 both ways. Signals were strong at times but QSB also very strong.

In short the story behind the successful QSOs. I4BER has access to the large Italian radiotelescope THE NORTHERN CROSS of Bologna, being one of the staff, and can, when the plant is not doing research, for example during maintenance period, use the antenna at will. The E-W arm of the CROSS (which is really a T) is 600 m. long and it is divided, to reduce feed losses, into 6 sections. Each section drives a radioastronomical receiver housed in a small hut underneath. The outputs of of the receivers are sent via buried coax cables to the central post were several beams are synthesised by proper phasing and summing. The beamwidth of the E-W arm (total power) is 4' x 1.5° (yes 4 minutes of arc!) at 408 MHz. The antenna is relatively broad band so the loss at 432 is insignificant. The entire antenna cannot be used for moon bouncing but one of the sections can. The single 100 m. section has a beam width of 24' x 1,5° of arc making up for a gain greater than 45 dB! The antenna is steerable in N-S only (declination from -30° to + 120°) the other movement being done by the Earth rotation. Therefore the moon cannot be "followed" and once the declination is properly set you must wait for the time when the celestial object crosses the meridian and hence the beam of the antenna. This crossing only lasts a couple of minutes so there is not much time left for courtesies after the QSO is done! A sked MS-like is therefore necessary if a complete QSO is wanted: on the other hand both SK6AB and SM5LE are well acquainted with fast MS procedure. The receiver used was really conventional being a Japanese all band. The converter-preamplifier is a professional design by I4BER (in practice one of the radioastronomical receivers) having less than 1.5 dB of N.F. A narrower IF bandwidth and an audio filter would have improved our reception by several dBs. The frequency used was 432.080 which is a rare clear spot on Italian lower portion of the 70 cm. band, crowded with splattery military radio links. An effort like moon boucing is rarely a single man job. Amateurs like I4CHY, IW4ADH, IW4ADT, I4FKD, I4BNR were essential during the test. In particular the trasmitter used was home made by I4CHY and delivers some 30 W on any frequency in the band, and all modes. The linear amplifier we used with its 100 W out belongs to IW4ADT. One thing I remember clearly: it weighs too much!
The following amateurs helped in a way or the other or assisted during the tests: I4AOR, 4BXN, 4EAT, 4MZY
A few skeds might be arranged in the future with other moon bouncers provvided they can accept the actual timing just a day or two before via telegram or phone.