pendent of amplitude and inversely proportional to frequency, then the condition will yield a period of 71 days. If Q is assumed independent of amplitude and of frequency the result is 65 days. Any additional effect of amplitude dependence would go in the sense of increasing the dissipation near perihelion where the amplitudes are greatest and therefore decreasing the period still further. It thus seems likely that Mercury is indeed in its final state of spin, and that its present rotation therefore reflects very accurately certain characteristics of the dissipation process.

The condition discussed here is based on the supposition that the solar torque exerted on the tidal bulge exceeds that exerted on any permanent deformation from axial symmetry. In the converse case a period of 88 days for the rotation would indeed result. This may imply that Mercury has not much permanent rigidity. The high surface temperature may be partly responsible for this. The solar system has thus provided us with an example of each of the two final states of rotation that tidal friction can bring about: the Moon, which has locked into the synchronous rotation, and Mercury, which has come to the rotation that is enforced in the absence of any permanent asymmetry of the body.

S. J. PEALE
T. GOLD

Cornell-Sydney University Astronomy Center,
Cornell University, Ithaca, New York.

[1] MacDonald, G. F. J., *Rev. Geophys.*, 2, No. 3 (1964).

RADIOPHYSICS

Flux Density of the Radio Source *CTA* 102

OBSERVATIONS at 920 Mc/s by Sholomitsky[1] suggest that the flux density of the radio source *CTA* 102 exhibits large variations with a period of about 100 days.

Observations of *CTA* 102 were made at Cambridge during 1964 in the preparation of the 4*C* catalogue[2] of radio sources. The 178-Mc/s interferometer[3,4] and a pencil beam system of similar resolution[5] were used simultaneously for transit observations of regions of sky approximately 6° wide in declination, centred at declination 09° during July 11–August 13, and at declination 13° during September 11–October 7.

The central dates of the surveys at 09° and 13° differ by only a few days from the minimum and maximum respectively of the variation suggested by Sholomitsky (extrapolating his curve by a quarter of a cycle). If the curve given by Sholomitsky also represents the behaviour of *CTA* 102 at 178 Mc/s the flux density of the source should be considerably greater during the 13° survey than during the survey at 09°.

When smoothed over the periods of observation the predicted ratio of flux densities is $\frac{S\,(13°)}{S\,(09°)} = 1{\cdot}55$. The observed ratios for the two instruments are as follows:

Interferometer system: $\frac{S\,(13°)}{S\,(09°)} = 0{\cdot}86 \pm 0{\cdot}12$ (r.m.s.)

Pencil beam system: $\frac{S\,(13°)}{S\,(09°)} = 1{\cdot}13 \pm 0{\cdot}15$ (r.m.s.)

Neither of these ratios differs significantly from unity and we conclude that any variation of the type proposed by Sholomitsky is either much smaller or absent at 178 Mc/s.

J. L. CASWELL
D. WILLS

Mullard Radio Astronomy Observatory,
Cavendish Laboratory, Cambridge

[1] Sholomitsky, G. B., *Intern. Astro. Union* (*Comm.* 27) *Information Bull.* No. 83 (1965).
[2] Gower, J. F. R. (in preparation).
[3] Ryle, M., *J. Inst. Elec. Eng.*, 6, 14 (1960).
[4] Scott, P. F., Ryle, M., and Hewish, A., *Mon. Not. Roy. Astro. Soc.*, 122, 95 (1961).
[5] Crowther, J. H., and Clarke, R. W. (in preparation).

Lack of Effect of Io on Jovian 3·75-cm Emission

A RECENT investigation by Bigg[1] has shown that the recording of decameter wave-length radiation from Jupiter depends not only on the Jovian longitude which faces the Earth but also on the relative position of the satellite Io in its orbit. Since the decameter bursts are probably associated with the magnetic field of the planet, I decided to see if Io had any effect on the synchrotron emission generated within the radiation belts in Jupiter's magnetosphere.

The position of Io was plotted against the results of observations at 3·75 cm, which were taken with a polarimeter on the 85-ft. telescope at the University of Michigan. The original data were taken in 1963 (refs. 2 and 3). Variations observed in degree of polarization, flux density and position angle of the polarized radiation from Jupiter can be attributed to the rotation of the planet; no correlation was detected between the position of Io and the variations of the polarized emission. Fig. 1 illustrates the lack of correlation of the degree of polarization with the position of Io. In contrast, Fig. 2 shows the relation between the variation of the degree of polarization and the Jovian longitude.

The ratio of the degree of polarization at a given longitude to the mean value for the whole planet (5·8 per cent) can be used as a correction factor to remove from the data the effect of the change in degree of polarization with Jovian longitude. Division of each observed point by the correction factor leaves any residual variation to other causes. Fig. 3 is a diagram like Fig. 1 but with the foregoing correction for Jovian longitude applied to the points. The random scatter of points in Fig. 3 confirms the lack of correlation of the position of Io and the degree of polarization of the Jovian radiation.

The results for flux density and position angle of the polarized radiation show a similar lack of correlation with the position of Io.

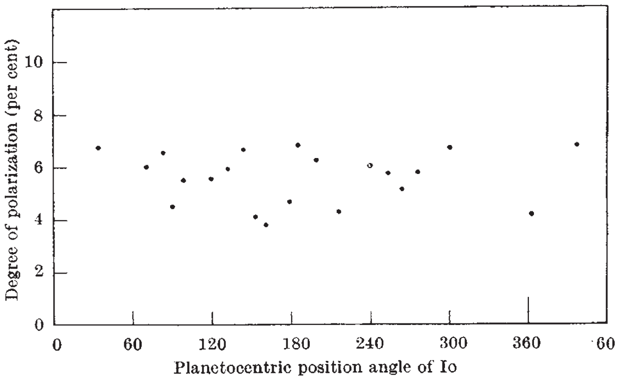

Fig. 1. Lack of effect of Io on the degree of polarization of Jovian radiation at a wave-length of 3·75 cm

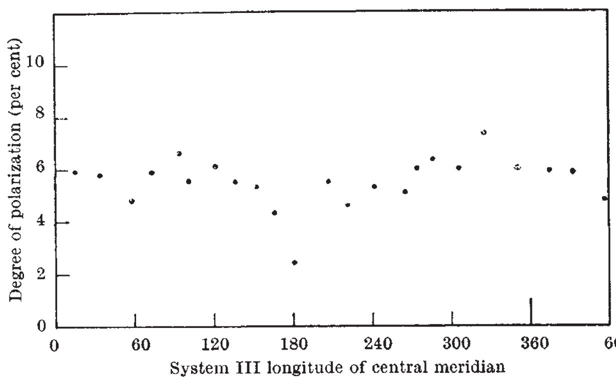

Fig. 2. Longitude dependence of the degree of polarization of Jovian radiation at a wave-length of 3·75 cm