The Earth's effect on the motion of the stream's node is found to be almost negligible, amounting to $0.0008/\text{century}$.

Jupiter's effect, $-0.3/\text{century}$, accounts for almost half the observed motion. In computing Jupiter's effect, the trapezoidal rule of mechanical quadrature was applied, the independent variable taken to be the eccentric anomaly of the stream; 144 points equally distributed with respect to the eccentric anomaly were considered in the quadrature.

As a numerical check for the small error of the quadrature, we compared two values of $[W_0 \sin u]_{00}$.

For E (eccentric anomaly)

$$\begin{aligned} 0^\circ, 5^\circ, 10^\circ, \dots &= -3.1097377 \\ 2^\circ.5, 7^\circ.5, 12^\circ.5, \dots &= -3.1097389 \end{aligned}$$

*Astronomy Department
Cairo University
Faculty of Science
Cairo, Egypt*

Harrower, G. A. *Distance and density of cosmic radio sources.*

Three different methods can be used to estimate the maximum distance reached in the survey of cosmic radio sources made by B. Y. Mills and his associates. The three results lie between one and two billion light years. Their measure of agreement supports the assumption that the extragalactic cosmic radio sources are colliding galaxies radiating about one per cent of the power emitted by the source Cygnus A. It is estimated that such collisions occur with a density of 2×10^{-25} per cubic light year, and this agrees well with the density of radio sources obtainable from Mills' survey.

The results of these calculations can be applied, as well, to the design of radio telescopes with regard to a good balance between sensitivity and resolution, and to the prediction of the number of sources which a given instrument will observe.

*Queen's University
Kingston, Ont., Canada*

Harwood, Margaret. *Distribution of variable stars in the Scutum Cloud.*

A paper on the variable Stars in the Scutum Cloud is ready for publication. It reports data on 419 stars: 354 new and 65 known variables. Spectra, identified by Dr. Victor Blanco of the Warner and Swasey Observatory, are

included for 183 of the long and irregular variables.

At maximum the photographic magnitudes of the majority of the new variables range between 14.0 and 16.0; minima as faint as 18.4 have been observed. Photoelectric magnitudes of stars in the Krieger sequences, obtained by Dr. Gerald Kron in 1957 with the Crossley reflector, have enabled us to correct all magnitudes to the standard of the International North Polar Sequence.

Omitting sixteen stars which are outside of the Cloud, the types of the variables are distributed as follows:

Type	New	Known	Total
RR Lyrae	66	20	86
Cepheid	11	17	28
RV Tauri	4	3	7
L.P. range $< 2^m.5$	70	13	83
L.P. range $> 2^m.5$	31	29	60
Irregular	83	17	100
Eclipsing	43	67	110
Novae	2	5	7
RW Aurigae	0	3	3
Doubtful	28	16	44
Total	338	190	528

Plots of the distribution in galactic coordinates of the RR Lyrae and of both kinds of long-period variables show a decided concentration of each type in an area centered at $l = 353^\circ$; $b = -6^\circ$.

Results from plots of frequency distribution are:

1. The most frequent period of long-period variables with a range > 2.5 mag. is 250 days; for stars with range < 2.5 mag. the most frequent period is 125 days.
2. The maximum apparent magnitude for the long-period variables, range > 2.5 mag. is 14.0.
3. The maximum median magnitude for L.P. variables, range < 2.5 mag., is 15.9.
4. The mean spectral type is M5 for irregular and long-period stars which have ranges < 2.5 mag. and periods < 250 days; the type is M6 for stars with periods > 300 days and ranges > 2.5 mag.

*Maria Mitchell Observatory
Nantucket, Mass.*

Herget, Paul. *Partial astronomical refraction.*

The advent of artificial satellites and methods of calibrating the radio devices which observe them have given rise to the problem of determining the atmospheric refraction correction