The results may provide a step towards an understanding of coronal heating and evidence against some existing theories, notably accretion theories[6]. Full details will be published elsewhere.

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Distances of the Magellanic Clouds

THE distances of 26 and 23 kiloparsecs derived by Shapley[1] for the two Magellanic Clouds depend upon assuming the same absolute magnitudes for the Cepheid variables in the Clouds and in our own galaxy. The absolute magnitudes of the galactic Cepheids are still subject to considerable uncertainties, and it would be more satisfactory to use as distance-indicators the *RR* Lyræ variables (with periods less than 1 day) the absolute magnitudes of which are known more accurately and which are found in great abundance in our own galaxy. Very few such variables, however, have been found in the Small Cloud[2], and none so far has been reported in the Large Cloud.

A search for *RR* Lyræ variables in the Clouds was begun soon after the installation of the Radcliffe 74-in. reflector. *NGC* 1866, one of the largest and brightest clusters in the Large Cloud, was first selected as a region for investigation, but failed to reveal any variables of *RR* Lyræ type; instead, surprisingly enough, some classical Cepheids turned up[3]. It is now possible to report successful searches for *RR* Lyræ variables in three clusters as follows:

(1) Cluster	(2) Region	(3) No. of variables	(4) Short period	(5) m_{pg}	(6) Deduced distance (kpc.)
NGC 121	Edge of Small Cloud	4	3	18·6	44
NGC 1466	Edge of Large Cloud	28	21	18·7	44
NGC 1978	Within Large Cloud	4	2	18·7	42

NGC 121 lies within and *NGC* 1466 lies just outside the faint extension borders found by Shapley[4]. Column (3) gives the total number of variables so far found on Radcliffe plates apparently associated with these clusters; column (4) gives the number of variables so far shown to have short periods. Column (5) gives the mean apparent photographic magnitude of the stars in column (4) as derived from comparisons with the Selected Areas 68 and 94, at the same altitude. The comparisons are subject to uncertainties partly because of the large change in azimuth required, and partly because old magnitudes in Selected Area 94 had to be used. The deduced distances in column (6) depend on assuming $M_{pg}=0$ for these variables, and on a correction for interstellar absorption amounting to 0·31 mag. cosec b, as given by Oort[5].

These newly discovered faint variables therefore indicate that the distances of the Magellanic Clouds are larger than believed hitherto. A precise redetermination must await revised magnitudes in Selected Area 94. The uncertainty in the distances given in column (6) must be of the order of 25 per cent, mostly arising from the difficulty of comparison with the Selected Areas, but partly also from the uncertainty in the assumed absolute magnitude of *RR* Lyræ variables. The indications are that an error in the comparison is likely to have underestimated the distances. The conclusion supports the results reported by Baade for the Andromeda nebula at the International Astronomical Union meeting in Rome, 1952.

The increased distance, which has been supported by Shapley[6], implies an increased luminosity for classical Cepheids and hence a change in the shape of the period – luminosity curve. Such a change in shape, especially at about $P = 1$ day, was already suggested by the variables in the Sculptor System[7], which showed a difference of about 1 magnitude between $P = 1$ day and $P = 0·5$ day.

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Travelling Disturbances in the Ionosphere: Diurnal Variation of Direction

THE detection of travelling disturbances in the *F*-region of the ionosphere has already been reported[1]. In the last-mentioned paper, it was stated (p. 221): "It has not yet been possible with the limited data available to detect any definite diurnal variation". This has been interpreted in some more recent publications by other authors as implying that there is no diurnal variation.

Since the publication of the original papers, more observations of greater accuracy and extending over a greater part of the day have provided definite evidence of diurnal variation in the direction of horizontal movement. This is most marked in the month of June. The accompanying graph shows the median values of all directions observed for each hourly interval for all days of June in each of the three years 1950–52. Each point is the median of the appropriate number of values listed in the table.

It will be seen that there is a similar trend in the three years, the direction of movement changing from approximately 50° (E. of N.) at 0930 to 15° at 1430. In addition, some recent night observations, though not sufficient for definite conclusions, suggest that there is consistently an east–west component of

NUMBER OF INDEPENDENT OBSERVATIONS OF DIRECTION

	09h–10h	10h–11h	11h–12h	12h–13h	13h–14h	14h–15h
1950	2	15	28	44	30	14
1951	29	44	52	72	40	19
1952	39	70	74	81	41	27