previous results and the cause for that is the large radial velocities in this group.

It is interesting to analyze our results in the way suggested to us by Dr. Vyssotsky, as outlined in his summarizing article (1957, *Publs. Astron. Soc. Pacific* 69, 109). The position of subgroup 2 in the Haas-Bottlinger diagram indicates a high eccentricity of the orbits the stars in this group are describing. In addition, this group lags behind the galactic rotation much more than any of the other subgroups. Further, the projections of velocity-vector points on the galactic plane indicate a high orbital inclination for variables with periods <300 days and a low inclination for those with $P > 300$ days. Also, the deviation of vertex and smaller group velocity indicates that the variables with $P > 300$ days stay closer to the galactic plane. However, the division at 300 days is only an approximate one, as we do not know whether there is any sudden break in periods of high and low inclination Mira variables. A more definite answer to this might be sought in the spectra of variables with periods between, say, 275 and 325 days. Another task is to affirm or disprove the large radial velocities in the 150–200 day period-group by selecting as many variables as possible with periods from the shortest ones up to 225 days and determining their radial velocities.

Space Velocities of Mira Variables. V. OSVALDS, *Leander McCormick Observatory, University of Virginia*, AND A. MARGUERITE RISLEY, *Randolph-Macon Woman's College, Lynchburg, Virginia*.—Table I summarizes the results obtained from combining radial velocities by P. W. Merrill (1941, *Astrophys. J.* 94, 171); periods, apparent mean maximum magnitudes and the spectra at maxima as given in *General Catalogue of Variable Stars* (1958, Moscow); and the proper motions derived at McCormick Observatory as well as the corrections for TiO absorption derived by J. Gabovits (1936, *Publ. Tartu Obs.* 28, No. 5, 5).

The absolute mean maximum magnitudes in column 6 of Table I were used to obtain the photometric parallax and tangential velocities for individual variables. These velocities were combined with the radial velocities (Merrill, 1941) which we corrected for galactic rotation.

As the final results we obtained the mean velocity components $\dot{x}$, $\dot{y}$, $\dot{z}$ along the three axes: x —in direction of galactic rotation, toward longitude 58° , y —away from the galactic center, toward longitude 148° , z —toward galactic N pole. These components are still referred to the sun. To refer them to the point of the most probable velocity, we add the components of the basic solar motion (Dyer, E. R.,

TABLE I.

Sub Grp	No. of Stars	$\bar{P}$	$\bar{m}$ max	r pc	$\bar{M}$	Av Sp	$\Delta\bar{M}$ (TiO)	$\bar{M}$ corr
1	14	131	7.76	770	−1.67	M1.9	−0.27	−1.94
2	29	176	7.83	1300	−2.74	M2.7	−0.42	−3.16
3	55	223	8.38	1250	−2.10	M3.7	−0.70	−2.80
4	65	273	8.18	1100	−2.03	M4.2	−0.87	−2.90
5	73	324	8.05	625	−0.93	M5.3	−1.32	−2.25
6	42	376	7.69	560	−1.05	M6.2	−1.8	−2.85
7	23	419	7.70	400	−0.31	M6.5	−2.0	−2.31
8	18	508	8.06	700	−1.17	M6.0	−1.65	−2.82
C	26	404	7.75	700	−1.44			
Se	22	364	7.78	740	−1.57			

1956, *Astron. J.* 61, 233), so that

$$\begin{aligned} a &= \dot{y} - 9.8 \text{ km/sec,} \\ b &= \dot{x} + 10.2 \text{ km/sec, and} \\ c &= \dot{z} + 5.9 \text{ km/sec.} \end{aligned}$$

In addition, the dispersion along the axis has been computed.

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Outline of a Mechanism for the Emergence of Spiral Arms from the Nucleus of a Galaxy. PARIS PIŞMIŞ, *Tacubaya and Tonantzintla Observatories*.—The formation of spiral arms as a result of ejection of matter from a rotating galactic nucleus was discussed in a recent publication (Huang, S. S., and Pişmiş, P., 1959, *Boletín Obs. Tonantz. Tacub.* No. 19). However, no explanation was advanced for the mechanism of ejection and for its symmetry. The attempt is now made to account for these.

(1) It is shown that the loss of matter from the central region at the observed rate of about one solar mass per year may be partly replenished by the Population II stars which are in the stage of shedding material; 20% of these stars are probably in transit through the nucleus. The infall of gas from the corona must also be appreciable.

(2) Assuming the central region in steady state, the kinetic energy lost through the outgoing matter should be replenished also. Part of this energy may be provided by the Population II stars in particular by those that transit through with near-parabolic velocities. However, to account for the total loss of energy it is necessary to assume a high density of cosmic ray particles.

(3) The novel feature of the present report consists primarily in the hypothesis that the magnetic field, expected to exist in the galactic nucleus, where a nonthermal radio source is observed, is essentially a dipole with its axis normal to the axis of rotation