stars. The ratio appears to decrease with increasing galactic latitude.

1. *Ap. J.* **109**, 391, 1949.

Warner and Swasey Observatory,
Case Institute of Technology,
Cleveland, Ohio.

Wilson, Albert G. Dynamic parallaxes of extra-galactic nebulae.

Because of the uncertainties in the photometric method of determining the distances of extra-galactic nebulae, it is desirable that checks based on independent methods be made. For example, because of unknown absorptions, it is useful to have a method of distance determination which is free of all luminosity considerations.

A method of determining distances to Sa and Sb systems which does not require any luminosity measurements can be derived from the assumption that the principal parts of such galaxies can be approximated by Maclaurin spheroids. From an equilibrium condition in Maclaurin spheroids, an expression for the distance of a galaxy may be derived in terms of its ellipticity, rotational velocity, and density. Ellipticities and rotational velocities may be directly observed, but it is necessary to introduce the assumption that giant Sa and Sb galaxies have densities equal to that of our own galaxy. This assumption is found to be *a posteriori* valid.

The Maclaurin equilibrium condition when applied to M 31, using Babcock's rotations from emission nebulosities and Oort's value of the density of our own galaxy (principal spheroid), gives a distance of 487 kpc, which is within three per cent of Baade's corrected photometric value of 501 kpc.

Another example of interest: The equilibrium condition applied to Slipher's rotational data in NGC 4594 leads to a distance of 5.2 megapc to the Virgo cluster. There is at present no definitive photometric parallax for the Virgo cluster, but the above value is in accord with Baade's tentative correction of -2.1 mag. for galaxies beyond the local group. This would suggest that the -1.4 correction and the 1952 doubling of the scale of the universe is not final and that larger corrections are most likely going to be in order.

The mean value of the red shift of the Virgo cluster is 1100 km/sec. From the dynamic distance, we derive for Hubble's constant the value $211 \text{ km sec}^{-1} \text{ megapc}^{-1}$, corresponding to $4.6 \times$

10^9 years. This value lies in the interval 125 to 276 given by Sandage as the probable bounds for Hubble's constant based on present photometric data.

Lowell Observatory,
Flagstaff, Ariz.

TITLES OF ADDITIONAL PAPERS PRESENTED AT THE MEETING IN ANN ARBOR, MICH.

- Aller, Lawrence. The composition of NGC 7027.
Chamberlain, Joseph W. The formation of auroral arcs.
Code, A. D. and T. E. Houck. Features of the inner spiral structure of the galaxy.
Dodson, Helen W. and Leif Owren. Flares associated with the onsets of 200 mc/sec noise storms.
Donn, Bertram. On the chemistry of the interstellar grain.
Edmondson, Frank K. Summary of five years of minor planet observations at the Goethe Link Observatory.
Fan, C. Y. Observations of aurorae.
Fricke, W. Intensity and color distribution in the Andromeda Nebula.
Goldberg, Leo. The temperature of the low chromosphere.
Haddock, Fred T., C. H. Mayer and R. M. Sloanaker. Radio detection of the Orion nebula and other sources at 9.4 cm.
Hall, John S. Polarization of light from stars behind filamentary structure.
Hosfeld, Roger. Scintillation, stellar shadow bands and winds aloft.
Humason, Milton L. and Hugo D. Wahlquist. The solar motion with respect to the local group of nebulae.
Jacchia, Luigi. Anomalous deceleration in faint meteors.
Kraus, J. D. and H. C. Ko. Detailed structure of the cosmic radio background.
McKellar, Andrew. Spectra of the cool carbon stars in the wave length 9,000 to 11,000 region.
McMath, Robert R., Helen W. Dodson and E. Ruth Hedeman. Photometry of solar flares.
Miller, Freeman D. Stellar spectra; wave length 9,000–11,000.
Mohler, O., L. Goldberg and R. R. McMath. Line widths of He 10830 in the solar spectrum.
Nassau, J. J., V. M. Blanco and S. W. McCuskey. M stars in the vicinity of NGC 6522.
Petrie, R. M. A period-luminosity relation for the β Cephei variables.
Preston, George W. Photoelectric observations of occultations.
Sandage, Allan and Merle Walker. The unusual globular cluster NGC 4147.
Schluter, A. A model for hydromagnetic waves in the solar atmosphere.
Sharpless, Stewart. The distances and dimensions of IC 1805, IC 1848, and IC 410.
Tayler, R. J. Evolution of massive stars.
Van de Kamp, Peter and Edith Flather. Masses of visual binaries.
Warwick, Constance S. Flare height and SID occurrence.
Warwick, James W. The polarization of D_3 in prominences.
Whipple, Fred L. Comets and the zodiacal cloud.
Wildt, Rupert. Radiative equilibrium and irreversible thermodynamics.
Wrubel, Marshal H. Evolutionary sequences of stellar models.
Zirin, Harold. Theoretical spin-orbit constants for p^2 configurations.

December 1953 A. A. S. Meeting

MacRae, Donald A. and Jurgen Stock. Spectrophotometry of planetary nebulae. (See *Nature*, **173**, 589, 1954.)

REPORTS OF OBSERVATORIES, 1953-1954

Allegheny Observatory, University of Pittsburgh, Pittsburgh, Pa.

Personnel. Wallace R. Beardsley joined the staff in September. Kiewiet de Jonge received the Ph.D. degree from Harvard in June.

Thaw Refractor. Average observing conditions prevailed during the year, the fortieth for this telescope. A total of 1934 plates was obtained on 151 nights. Evening observations were made on 128 nights, morning observations on 98, with 81 nights of both evening and morning observations. The telescope was used a total of 725 hours. All plates were for the parallax and double star programs with the exception of three planet and satellite plates. In addition, 12 plates were made of the transit of Mercury. Observers were Wagman, Kemper, Rachuba, Winterhalter, Schwartz, Robert L. Scherer, William D. Nanstiel and Jay F. Kunze.

The number of plates measured was 1016. Ten parallaxes were computed and about 100 are now finished but unpublished. Volume X of the *Allegheny Observatory Publications* is to contain details of the parallaxes of 800 stars. The main section, occupying 126 pages, has been typed and proof read.

The nearby red dwarf, BD + 43° 4305, was photographed during a flare, the first recorded for this star, the evening of October 1 (*Sky and Telescope* 13, 54, 1953). The August 23, 1952 plate of the flare star, Luyten 726-8, has been measured. The third image, the brightest of the four, was shifted 0".97 east and 0".55 north with respect to the first two quite normal images. The flare evidently occurred on the B component which is almost exactly east of A. The shift to the north must be due to the blue light of the flare. About 130 plates of Krueger 60 taken, except for three plates in 1914, from 1933 to date, show no certain indication of a flare. The plates have three or four exposures, many of the exposures being 210 seconds.

Spectrographic Laboratory. Burns's work on Cd 114 spectrum in the region 6438-2144Å is nearly finished. The 550 plates taken during the year are practically all measured and computed. Observations were made with the Michelson tube under standard conditions at temperature 310°C, and at a temperature of 150°C in order to obtain sharper lines.

The vacuum chamber constructed by Kenneth B. Adams of the Westinghouse Research Labora-

tories for the Fabry-Perot interferometer has proved to be very convenient.

Results for about 250 lines of argon may be found in "Interference Measures in the Spectrum of Argon I" by Keivin Burns and Kenneth B. Adams, *J. Opt. Soc. Amer.* 43, 1020-1024, 1953.

Mellon Spectrograph. Beardsley and Kiewiet de Jonge began the complete renovation of the Mellon Spectrograph which is to be used in conjunction with the recently reconditioned Keeler telescope. All parts have been cleaned, polished, or painted. The four supporting tubes of the spectrograph were found to be cracked and have been replaced. The camera lens was coated with a non-reflecting film and the prism was refigured and coated. A new mounting for the prism, a new temperature control case, and a new comparison spectrum source are being constructed at present. Also planned are a Cassegrain field eyepiece and a slow motion drive in declination. Considerable repair work has been done on the telescope domes.

Instruction. A total of 32 students took the introductory courses taught by Beardsley and Wagman. Wagman had 2 students in a graduate course.

In the Frick Public Evening Service there were 2541 visitors on 114 nights. The regular lecturers were Robert F. Kemper and Jay F. Kunze. There were 510 daytime visitors.

Miscellaneous. Several papers based on his thesis, "On the Absolute Magnitudes of A-type Stars," and other work, are being prepared by Kiewiet de Jonge.

Beardsley has been making identifications of lines in McDonald spectra of ρ Cas.

Kemper, Kunze, and Scherer, along with Adam L. Ott, Jr., manned the Air Force "Eclipse Site 6" near the northern edge of the June 30 eclipse track on the coast of Labrador. They had an overcast sky but obtained a photoelectric record of the changing illumination.

N. E. Wagman, *Director*

David Dunlap Observatory, University of Toronto, Richmond Hill, Ont.

Personnel. Miss Ruth J. Northcott has been promoted to the rank of Assistant Professor.

Radial Velocities. The program involving the determination of the radial velocities of 1050 stars of type G and later down to 9th magnitude photographic in the Yale zone +25° to +30°