appreciable amount. It is probable that the emission lines originate at the bulges because of the deviation from normal equilibrium due to these currents.

There are six binaries of spectral types G5-K0 with rather well known parallaxes, which show emission lines of Ca II; it is shown that for these stars there is a correlation between absolute magnitude and period. It is probable that this relation corresponds actually to a relation between density and radius of the relative orbit.

1. *Contr. Oss. Astr. Milano-Merate*, n.s. No. 17, 1944.
2. *Pub. A. A. S.* **10**, 312, 1943.
3. *Pub. Astr. Obs. Univ. Minnesota* **2**, No. 1, 1934.
4. *Ap. J.* **106**, 481, 1947.

*McDonald Observatory,
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Hall, John S. A photoelectric polarimeter.

A photoelectric polarimeter may be defined as a photoelectric photometer designed to measure the intensity and plane of that fraction of light from a given source that is polarized. The fundamental principle used in the device developed at Amherst is similar to that employed by Öhman.¹ The principal differences lie in the nature of the analyzer used and in the method employed to make the observations.

The analyzer in the Amherst polarimeter is a Glan Thompson prism. This prism permits measurements to be made over an extensive spectral region.

The method employed to make the observations is such that both the plane of polarization and the intensity of the polarized light are indicated on an automatic recorder once every two minutes.

Bench tests have indicated that 0.1 per cent of polarized light can be easily detected when a 1P21 is used as the photosensitive element. With a PbS cell this limit can be extended to one or two parts in 10,000. The same limits can be achieved when the sun is used as a source and the seeing conditions are favorable.

Tests with a 1P21 and the 18-inch Amherst refractor indicate that it would be possible to detect $\frac{1}{4}$ of one per cent of polarized light from stars of the seventh magnitude under average seeing conditions. Plans are being formulated for the observation of some eclipsing stars of special interest.

This work has been supported in part by a grant from the Research Corporation of New York City.

1. *Ark. Mat. Astr. Fys.* **29B**, No. 12, 1943.

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Hamid, Salah. Prediction of theoretical radiants from very short periodic comets.

Jupiter's secular perturbations on certain comets cause a rotation of their lines of nodes in the plane of the ecliptic and a periodic motion in their inclinations while the aphelion and perihelion distances of the comets are very slightly affected. Therefore, it is possible for such comets occasionally to cross the ecliptic at the intersections with the earth's orbit and give rise to showers of meteors, provided that the comets' perihelia lie inside the earth's orbit and provided their aphelia lie inside Jupiter's orbit.

An application of Brouwer's theory of secular perturbation of Jupiter on comets, which is valid for comets of inclination less than 36° , has been made by the author. Encke's comet and Comet Grigg-Skjellerup are the only two periodic comets that satisfy the necessary criteria.

Encke's comet gives rise to known night showers, the Taurids, as shown by Whipple, while calculation indicates that it can give rise also to two daylight showers: June 12, $\alpha = 65^\circ.7$, $\delta = +26^\circ.1$ and May 19, $\alpha = 43^\circ.5$, $\delta = +13^\circ.2$. The first appears to be detected with radar by Lovell.

Comet Grigg-Skjellerup gives rise to two night showers: January 21, $\alpha = 107^\circ$, $\delta = +9^\circ$; February 9, $\alpha = 131^\circ$, $\delta = +26^\circ$; both of which seemed to be observed visually by Öpik and the American Meteoric Society. Also it produces two other daylight radiants, June 21, $\alpha = 105^\circ$, $\delta = +15^\circ$; May 31, $\alpha = 83^\circ.5$, $\delta = +37^\circ$; both of which appear to be detected with radar by Clegg, Huges, and Lovell.

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Hoffleit, Dorrit. International Business Machines for spectroscopic absolute-magnitude reductions and results for 500 A5-G stars.

In resumption of the war-interrupted Harvard program for the determination of spectroscopic absolute magnitudes of bright southern stars, provisional results have now been obtained for approximately 500 A5-G2 stars, most of them 5-7 visual mag. and south of -20° . The spectra were obtained at the Harvard Southern Station with the 13-inch Boyden refractor and an ob-

jective prism giving a dispersion at $H\gamma$ of 45 A/mm. The estimates of line intensities were carried out at Harvard, two-thirds of them prior to 1942. The reductions were performed on the International Business Machine equipment of the Ballistic Research Laboratories, Aberdeen Proving Ground, through the generous permission of Colonel Leslie E. Simon. The advantages of punch cards in the reduction of data for "normal" stars are discussed.

The spectroscopic absolute magnitudes are compared with absolute magnitudes computed from trigonometric parallaxes, reduced proper motions, and spectroscopic results obtained at other observatories. The relative scale and zero-point errors of the Harvard reductions for the main sequence stars are within the natural uncertainties of the various systems. A total dispersion in absolute magnitude of ± 0.7 – 0.8 is found of which ± 0.5 mag. is apparent observational error. This leaves ± 0.5 mag. as the indicated dispersion of the true absolute magnitudes, a result not inconsistent with published results from various statistical investigations.

The list of stars contains numerous peculiar objects, namely:

- 6 "Strontium stars"
- 1 "Chromium Europium star"
- 39 "Metallic-line stars"
- 9 Cepheid variables
- 1 Star with probable variable spectrum, HR 7055
- 23 Other supergiants.

The Harvard absolute magnitudes for the supergiant stars are poorly determined. This is primarily because these stars were not separated from the others in the automatic machine reductions, and it is well known that all the criteria for the run of the stars are not applicable to supergiants. Also, too few data are available for an independent calibration of the supergiants. They are, however, included in the discussion in order to demonstrate the consequence of ignoring luminosity class before calibrating supergiant luminosities.

About 40 of the stars have "ambiguous" spectral classes. On the basis of Miss Cannon's Henry Draper criteria they are A stars while Mount Wilson's metallic-line criteria place them in the F groups. The absolute magnitudes estimated for both types indicate no definitive preference for either. Color data (Cape photographic magnitudes) indicate a slight preference for the

F-types. On the other hand, in a comparison of Victoria (classified on the Draper system) and Mount Wilson spectral classes for northern stars, the colors of stars with discordant spectral classes appear to favor the earlier class.

For 50 of the stars the Yale Bright Star Catalogue has listed variable radial velocities: 7 Cepheids, 17 possible binary stars, the rest undefined. For 30 of these more than one Harvard spectrum each was available. With the exception of the plates for one Cepheid, the plates showed no variations in line intensities beyond the differences attributable to diverse quality and exposure.

The reduction and analysis of data such as those described require a large amount of sorting, listing, averaging and re-sorting of data. A moderately experienced operator would find I.B.M. equipment advantageous except in the analysis of those peculiar stars which are not amenable to statistical methods.

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Hynek, J. A. The Russell-Moore discordant parallax stars.

The discordance between the trigonometric and spectroscopic parallaxes of 52 giant binary pairs first pointed out by Russell and Moore¹ is found to remain when the study is extended to additional visual pairs and to 47 spectroscopic binaries. A similar discordance is observed between the dynamic and spectroscopic parallaxes of 103 pairs, thus corroborating the trigonometric results. The failure of the mass-luminosity law for, at least, the brighter members of giant binary stars is strongly indicated.

The evidence presented by all three types of parallax is consistent with the hypothesis that, as a class, the binary stars of the giant sequence are more than a magnitude brighter than normal giants, of nearly twice their radius, and of more than twice their mass. Excessive mass is indicated both by spectroscopic evidence and by direct determination by the usual double star method. There is some possibility that these stars are members of "population II."

1. *Masses of the Stars*, p. 60, 1940.

*Emerson McMillin Observatory,
Cleveland, Ohio*

Lampland, C. O. Notes on some planetary problems.

The memorable event of the joint meeting of the American Astronomical Society and the