bediasites were last melted about 30 million years ago. Hence, the helium and neon have probably diffused in. The oxygen may have been trapped from the upper atmosphere at the time of formation of the tektites as droplets, or it may have been produced by reduction of Fe_2O_3 to FeO , as E. C. T. Chao has informally suggested.

New Survey of the Variable Stars in the Small Magellanic Cloud. CECILIA PAYNE-GAPOSCHKIN, *Harvard College Observatory*.—Almost 1600 variable stars have been announced in the Small Magellanic Cloud, but although 969 of them were announced by Miss Leavitt over 50 years ago, they have never been systematically studied. We have begun the measurement of all these stars on all available Harvard plates, of which over 500 are generally available for each star. The measurements are being carried out by, or under the supervision of, Sergei Gaposchkin. Some of the measurements have been made by Kenneth Janes. The preliminary reductions are made by the writer, and Edward Gaposchkin, Chief of Computations at the Smithsonian Astrophysical Observatory, is programming the final reductions for the IBM 7090.

The Small Cloud is being divided for study into about 80 regions of equal area. Results for six of these regions have been completed, as shown in the tabulation.

Number of variable stars			Number of Cepheids		
Known	New	Total	Known period ^a	New period	Total
73	10	83	24	40	64

^a In many cases the published periods have been improved.

No special search for new variables was made; the new discoveries are stars that obtruded themselves on the observers. We may expect that the number of variables will be augmented by about 10% in this way during the investigation.

The new periods are for stars that have hitherto been unstudied. In addition to the Cepheids, there are a number of eclipsing stars, both of known and new period, a few long-period and semiregular red variables, and a few stars that have hitherto defied analysis. However it is evident that the majority of the known variables are Cepheids. On the basis of the fact that 77% of the stars studied at present are Cepheids, we may expect that there are about 1300 Cepheids in the Small Cloud—twice the number now recognized.

As the material accumulates, it will be applied to a redetermination of the period–luminosity curve, and to a study of the relationship between the brightness and other characteristics of the Cepheids in the Small Cloud.

Spectroscopic Observations of VV Cephei.

BENJAMIN F. PEERY, JR., *Indiana University*.—A photoelectric position-setting device has been used to measure 260 spectrograms of the peculiar eclipsing binary system VV Cephei, covering one and one-quarter periods. The objectives have been (1) to improve the poorly known orbital elements, and (2) to follow and interpret some of the peculiar spectral features. The orbital elements of the M component are:

$$P = 7450^d, \quad \omega = 26^\circ, \quad a_1 \sin i = 1.84 \times 10^9 \text{ km} = 12.3 \text{ a.u.}, \\ \epsilon = 0.34, \quad T = \text{JD } 2430445, \quad K = 19.1 \text{ km/sec}, \quad \gamma = -18.9 \text{ km/sec}, \\ \text{Duration of ingress} = 30^d \quad \text{Duration of totality} = 521^d.$$

Balmer emission lines with unique “reversed P Cygni” profiles disappear during eclipse of the B-type component, and evidently these originate in a shell about the B star. H_β varies approximately 180° out of phase with the radial velocities of the M star, and is identified with the motion of the B star. There follows a mass ratio of 2.05 and 41.3 and 84.4 solar masses for the B star and M star, respectively.

The orbital elements and duration of eclipse lead to an estimate of the size of the M star that agrees with its luminosity class, Ia-Iab (Keenan, P. C., and Wright, J. A. *Publs. Astron. Soc. Pacific* 69, 457, 1957).

Forbidden $Fe \text{ II}$ emission, which is always present and shows no orbital motion, evidently originates in an extensive envelope about the entire system. Thus, the picture of a system of supergiants is indicated by the spectroscopic data, in striking contrast with the recent astrometric conclusions of Fredrick (Fredrick, L. W. *Astron. J.* 65, 628, 1960).

An extinction curve of growth of the lines strengthened during the atmospheric phase of ingress leads to a density gradient in the “chromosphere” of the M star somewhat smaller than that from observations of 31 Cygni (Larsson-Leander, G. *Stockholm Obs. Ann.* 19, 1, 1957). The M star appears to be overflowing its lobe of the inner Lagrangian surface; the B star may be accreting some of the ejected matter, causing the “reversed P Cygni” profiles of the Balmer lines.

The O-Type Spectroscopic Binary, 14 Cephei.

R. M. PETRIE, *Dominion Astrophysical Observatory*.—14 Cephei is a spectroscopic binary composed of two stars of spectral type O9. Orbital elements have been determined from radial velocities of both components. The period is 3.07051 days and the orbits are practically circular. The amplitudes of the radial velocity curves are 99.5 and 200.7 km/sec. The “projected” masses are $5.8M_\odot$ and $2.8M_\odot$. Spectrophotometric estimates give the light ratio of the components