difficulty presented itself until Professor Pickering offered to hold the 1898 conference at the Harvard College Observatory, beginning on Thursday, August 18, and continuing until the following Saturday. The advantages of this plan are so obvious that a large attendance may confidently be expected. On Monday, August 21, the Fiftieth Anniversary Meeting of the American Association for the Advancement of Science opens in Boston, and members of the conference can thus be present on this important occasion. By joining the American Association those who are not already members can take advantage of the low rates offered by the railroads. It is hoped that the attendance of the conference may greatly exceed that of last October, and that the meetings may be so successful as to warrant their repetition in future years.

G. E. H.

VARIABLE STARS OF SHORT PERIOD.[1]

WHOEVER will make a careful examination of the brightness of a large number of stars either in the sky, or better, as photographed upon different plates, will be impressed with the vast number which show no perceptible variation. The discovery of variable stars is greatly aided when we are able to make a suitable selection for examination, either from their spectra or from their presence in clusters. Visually, we can never be sure that all the variables in a given region have been found, however carefully we may study them. Photography brings this problem more nearly within our reach, and a partial solution of it is illustrated in the accompanying figure. A photographic telescope was constructed having as an objective a Cooke Anastigmatic Lens, with an aperture of $2^{cm}.6$, and a focal length of $33^{cm}.3$. This telescope was mounted equatorially and the lens was alternately exposed and covered for intervals of exactly 10 and 50 minutes by an electrical attachment. The polar axis of the mounting was displaced and the rate of the driving clock was increased, so that the successive images should be slightly separated. An 8×10 photographic plate was exposed in this instrument on April 21, 1898, and eight successive images were obtained, the Greenwich Mean Times of the middle of the exposures being $13^h\ 49^m$, $14^h\ 49^m$, $15^h\ 49^m$, $16^h\ 49^m$, $17^h\ 49^m$, $18^h\ 48^m$, $19^h\ 48^m$, and $20^h\ 48^m$. The plate covered a region

[1] *Harvard College Observatory Circular* No. 29.

about 33° square, whose center was R. A.=1^h 2^m, Dec. =+76°.6. The images of the stars in the corners of the plate were sufficiently good when visible to show very slight variations in light, but owing to their increased size the faintest stars were not shown. The greatest

FIG. 1.

loss amounted to about one magnitude. If now any variable star having a period of less than fourteen hours was contained in this region it is probable that at least one maximum and one minimum would be photographed. The figure represents a portion of the plate described above, enlarged ten times to a scale of 60″=0^{cm}.1, and covers about one square degree. It therefore represents one-thousandth of the entire plate, the size of which on this scale would be two meters, or nearly seven feet square. The entire sky, from the north to the south pole, could be covered by forty such plates, and it is proposed to do this as soon as the best method of taking the plates has been determined. The arrow indicates the variable star U Cephei, and its photometric magnitudes at the times the eight images were taken were 7.5, 8.1, 8.9, 9.1, 9.1, 8.3, 7.6, and 7.2. The three stars above it are +81°30, +81°27, and +81°29, which have the photometric magnitudes 7.9, 8.5, and 8.6. To separate the successive images various methods have been tried. The best of these seems to be stopping the

driving clock for a few seconds every hour. By the above plan we hope to secure a complete list of all variable stars of short period brighter than the ninth magnitude at maximum whose variation exceeds half a magnitude, and whose period is less than a day. Doubtless many other variable stars of longer period, and stars of the Algol type may also be incidentally found.

EDWARD C. PICKERING.

MAY 21, 1898.

THE SUPPOSED VARIABLE STAR, Y AQUILAE.[1]

MEASURES to determine the light curves of variable stars of short period, north of declination —40°, are now in progress with the meridian photometer. Four sets of four settings each are ordinarily made when the star to be observed is about half an hour east of the meridian, and again about an hour later. These measures are repeated on twenty or thirty nights. The principal error is that due to the unequal transparency of the air in different portions of the sky, the stars compared being often far apart. The accidental errors of measurement are small, owing to the number of settings. Smooth light curves have been found for all the stars thus measured, with the exception of +10°3787. The designation Y Aquilae was given to this star by Mr. S. C. Chandler, and in his catalogue of variable stars he states that it varies from magnitude 5.3 to 5.7 in a period of 4.986 days. Also, that it was "Suspected by Gould, confirmed by Chandler, 1894; also by Yendell." It will be noticed that the period is so nearly five days that for several months the same phase will recur at about the same hour angle, thus permitting errors to occur in visual observations by Argelander's method, such as are mentioned in *Circular* No. 23, and which led to such wholly erroneous conclusions in the case of U Pegasi.

The star +10° 3787 was observed with the meridian photometer on nineteen nights, from August 25 to October 13, 1897. Placing together the observations having the same phase, we find, corresponding to the phases $0^d.0$, $1^d.0$, $2^d.0$, $3^d.0$, and $4^d.0$, the mean residuals —0.09, 0.00, +0.02, +0.02, and +0.03. We might infer a variation with a range of a tenth of a magnitude, but the first value, —0.09, depends on observations on a single night, and the range of the other four is only 0.03. This star is No. 39, of the standards selected by

[1] *Harvard College Observatory Circular* No. 30.