Naval Ordnance Test Station with a photometer similar to that described by C. T. Elvey.¹ The purpose of the program is to serve as a control on the aircraft project.

The interpretation of zenith to horizon sweeps in terms of the height in the upper atmosphere to the emitting layer is possible if the contributions of star light and zodiacal light can be estimated and if the effect of extinction and scattering in the lower atmosphere can be evaluated. Preliminary results of the analysis of our observations are reported.

This project has been supported by the Office of Naval Research.

1. *A. J.* 54, 36, 1948.

Pasadena, Calif.

Phillips, John G. An extension of the Swan System of the C_2 molecule.

The analysis of the Swan system ($A^3\pi_g - X^3\pi_u$) has been extended to higher vibrational levels, through the study of the Swan "tail" bands, at $\lambda\lambda 4395, 4734, 4770, 4836, 4911$, and 4997 . Detailed analyses have been carried out on the bands at $\lambda\lambda 4395, 4734$, and 4770 . The first two of these, at $\lambda\lambda 4395$ and 4734 , are headless bands that have not been previously mentioned in the literature. The following vibrational numbering was found for the six bands:

Band	v', v''
$\lambda 4395$	8-6
4734	9-8
4770	10-9
4836	11-10
4911	12-11
4997	13-12

In addition, the (0-2), (1-3), (2-4), and (3-5) bands of the $\Delta v = -2$ sequence at $\lambda 6191$ have been analyzed, in order to complete the analysis for low vibrational levels. All of the available material on the Swan bands was then used to obtain improved molecular constants for the two electronic states. The following equation gives the band origins for those bands with $v' \leq 3$ and $v'' \leq 12$;

$$v_0 = 19378.44 + 1771.40 v' - 17.20 v'^2 - 0.507 v'^3 - (1629.68 v'' - 11.67 v''^2) \text{ cm.}^{-1}$$

This equation is not true for those bands with $v' > 3$. This is on account of a rapid decrease in the separations between successive vibrational levels of the upper state ($A^3\pi_g$) that sets in above the $v' = 3$ level. An equation that would accurately represent all observed vibrational levels of the upper state would have to include as many terms as there are quanta.

A linear extrapolation of the vibrational quanta of the upper state gives 5.30 electron volts as an upper limit for the dissociation energy of this electronic state. Depending upon whether the upper state dissociates into ($^3P + ^3P$) atoms or ($^3P + ^1D$) atoms, the upper limit to the heat of dissociation of C_2 is 5.30 or 4.04 electron volts.

*Yerkes Observatory,
Williams Bay, Wis.*

Roberts, Walter Orr. Association of solar corona and prominence.

A coronal spectrogram taken on 14 June 1947 showed a striking association between $\lambda 6374$ of the corona and $\lambda 6563$ of an active prominence. At the same position, the rarely-observed unidentified coronal line $\lambda 5694$ showed clearly. The positions of sharp maxima of the prominence spectrum and of the coronal spectrum coincided precisely for the two brightest parts of the prominence. There is some likelihood that the occurrence of $\lambda 5694$ is generally associated with the occurrence at the same place on the sun of rapidly moving prominences of the "sun-spot" type. On at least one occasion, significant line-of-sight velocities have been observed in the coronal line $\lambda 6374$, associated with such "sun-spot type" prominences.

*High Altitude Observatory
of Harvard University and
University of Colorado,
Climax, Colorado*

Stephens, Jessica Young. Study of the orbits computed for Comet 1889 VI.

Comet 1889 VI (Swift) was discovered on November 16, 1889 and was observed until January 21, 1890 (85 observations). The comet was described as a very faint nebulosity without any, or with very weak, condensation. Elliptic orbits were computed with periods ranging from 6.9 to 8.9 years. A very detailed least-squared orbit was computed by Coniel of Paris, the resulting period being 8.92 years.

The purpose of this paper is (1) to find the range of solution of the orbit caused by the range of residuals of the individual observations used by Coniel in forming his normal places I, IV, and V, and (2) to investigate the possibility of the identity of this comet with either Comet 1916a or an unidentified comet found by Barnard on plates made on July 22, 1905.

The period was found to have a range of from 7.82 years to 10.03 years, this range including the periods of most of the orbits computed for the