2. Before the color-chopper is a 1×6 -inch Corning No. 5330 color-wedge which is deep blue at the thick end (7 mm) and nearly colorless at the thin end (0.25 mm). Any filter glass can be used which normally has a high transmission for one of the chopper-colors and a considerable "leak," 5 to 10 per cent for the other.

The colorimeter is used by sliding the wedge into the light-beam until the brightness of the yellow light of the star is reduced to that of the blue, as judged by the phototube. The signal passed by the tuned amplifier is then zero, and the color equivalent of the star is read from a calibrated millimeter scale on the wedge-carrier.

Electrically this is a null method. The wedge scale is calibrated permanently. The nature of the a.c. amplification is immaterial. Rectification for a d.c. meter is unnecessary; a standing wave on an oscilloscope may be used instead, for the wave inverts its phase as the wedge passes the null point. No optical system is required. The photometer is set as usual in the blunt $f:5$ Newtonian beam.

For testing, the colorimeter was calibrated as an optical pyrometer, measuring the color of a distant 40-watt incandescent lamp. At very moderate amplifier gains a single setting of the wedge establishes the null point within 0.2 mm and the filament temperature (2700°K) within $\pm 3^\circ\text{K}$. A stellar calibration is based upon Hall's² spectrophotometry. For brighter stars a single setting of the wedge is reliable within 0.2 mm, or 0.02 mag. of conventional color-index. With carefully chosen chopper-filters this method should reach the same limiting magnitudes as a.c. polarimetry.

The wedge colorimeter is comparable to the polarizing colorimeter of Öhman.³ The polarizing colorimeter uses two polarizers and two quartz plates to find two spectral regions of constant $\Delta\lambda$ and equal brightness. Thus it establishes an effective wave length. The wedge colorimeter measures simultaneously the ratio of brightness at the fixed "photographic" and "visual" spectral regions.

The successful effort of the Corning Glass Company to make a satisfactory large color-wedge is gratefully acknowledged.

1. *A. J.* **54**, 182, 186, 1949.

2. *Ap. J.* **94**, 71, 1941.

3. *Stockholm Obs. Ann.* **15**, No. 8, 1949.

Steward Observatory,
University of Arizona,
Tucson, Ariz.

Chamberlain, Joseph W., Lawrence H. Aller and Roscoe F. Sanford. Curves of growth for A-type sub-dwarfs.

Studies of equivalent widths of metallic lines and of the profiles of lines of hydrogen and ionized calcium (K-line) have been made upon coudé spectrograms of 95 Leonis and two sub-dwarfs, HD 19445 and HD 140283, classified at Mt. Wilson as A4s, A4sp, and A5sp, respectively.

The confluence of the Balmer series suggested an electron pressure in the neighborhood of 40–60 dynes. The hydrogen-line profiles in the sub-dwarfs are narrower than in 95 Leonis, α Persei, or Procyon, suggesting a lower excitation temperature, or surface gravity than main sequence A stars. The K-line is narrower than in F stars.

Curves of growth for *FeI* and *FeII* are based on empirical strengths determined by Greenstein for τ UMa, and ν Sgr, and the *FeII/FeI* ratios are estimated for the 3 stars. The ionization equilibrium is nearly the same for calcium as for iron. A consistent picture is obtained if we assume an ionization temperature of 8400°K and an electron pressure of about 100 dynes for 95 Leonis, and an electron pressure of around 60 dynes and a temperature of 6500°K for the subdwarfs. The tentative character of these results is to be emphasized. A careful study of the profiles of the hydrogen lines is being made.

University of Michigan,
Ann Arbor, Mich.,
and Mount Wilson Observatory,
Pasadena, Calif.

Cook, Melvin A. and Richard N. Thomas. A surface mechanism analogy between meteors and explosives.

The initial process in the current picture of both the meteor and explosive reactions consists of a vaporization of the surface layer before appreciable heat reaches the interior of the body by conduction. The current meteor theory calculates the vaporization rate in terms of the energy supplied the surface, while the explosive theory considers the vaporization rate to be fixed by the reaction rate of the phase change from solid to gas. This last process depends upon a quasi-equilibrium state between surface layer and surrounding gas bath. If the reaction rate method could be applied to the meteor case, it would permit the determination of the efficiency of heat transfer to the meteor surface. The problem involves the fixing of a surface tempera-