APPARATUS NOTES

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This department will welcome the submission of brief communications reporting new equipment, techniques, or materials of interest to teachers of physics. Notes on new applications of older apparatus, measurements supplementing data supplied by manufacturers, information which, while not new, is not generally known, procurement information, and news about apparatus under development are suitable for publication in this section. Neither the American Journal of Physics nor the Editors assume responsibility for the correctness of the information presented.

Cesium Vapor Lamp

THE Westinghouse CL-2 lamp is an efficient source of near-infrared energy with most of the radiation associated with two strong emission lines at 8521 and 8944 A. The lamp was developed for infrared signaling and can be modulated at frequencies up to 10 kc at a level up to 100% modulation. Surplus lamps are available currently from Barry Electronics Corporation, 512 Broadway, New York 12, New York, at a cost of $7.50 each.

The lamp consists of a large tubular glass envelope surrounding a sealed capsule, about 10 cm in length and 3.5 cm in diameter, which contains the cesium and which has a filament electrode at each end. The lamp can operate from a 115-v ac or dc line and must be connected in series with a ballast inductor or resistor to limit the current to 5.5 amp. The arc potential drop is 18 v, a rated power of 100 w. Prior to operation, the filaments are heated for about 1 min with 6 amp from two separate 2.5-v transformers. The heating current is not needed after the main power is turned on and the arc strikes.

A photograph of the spectral emission characteristics as displayed on an oscilloscope is shown in Fig. 1. Approximate relative intensity is plotted as a function of approximate wavelength, the graph extending from about 4500 A on the left to about 10 000 A on the right. The predominance of the two infrared lines is very evident.

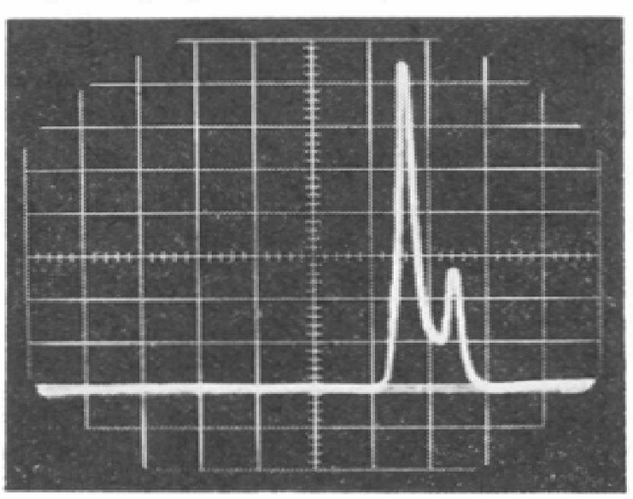

FIG. 1.

The spectrogram was obtained with a slit about 1 mm wide, a focusing lens, and a transmission grating.[1,2] A 917 phototube with slit aperture was used as a detector. Since the lamp operated on 60-cycle power, the photocurrent was modulated at 120 cycles. This was amplified, rectified, and filtered to give a dc y-axis signal for the oscilloscope. The dc x-axis signal was obtained from a 20-in. tubular potentiometer and battery, the potentiometer being placed along the focal plane of the spectrum and the phototube clamped to the slider. The latter was moved manually to scan the spectrum and to vary the x-axis potential approximately proportionally to variation of wavelength position. The camera shutter was open during the time the curve was slowly traced. The x-axis line shown in the photograph was traced with the phototube aperture covered, but with other arrangements unchanged.

The ordinates of the curve have not been corrected for the variation of spectral sensitivity of the 917 type S1 photocathode. The graph is misleading in that the eye perceives many emission lines in the visible portion of the spectrum which are not above noise in the electrical detection. The lamp has a surface brightness estimated as about $\frac{1}{5}$ L, comparable to that of a frosted 25-w tungsten bulb operated at 80 v.

[1] S. N. Natapoff and J. Giordano [Am. J. Phys. **28**, 502 (1960)] suggest the use of a lead sulfide ("Ektron") photoconductive cell as detector.

[2] Most optical glass transmits in the infrared to about 2.7 μ.