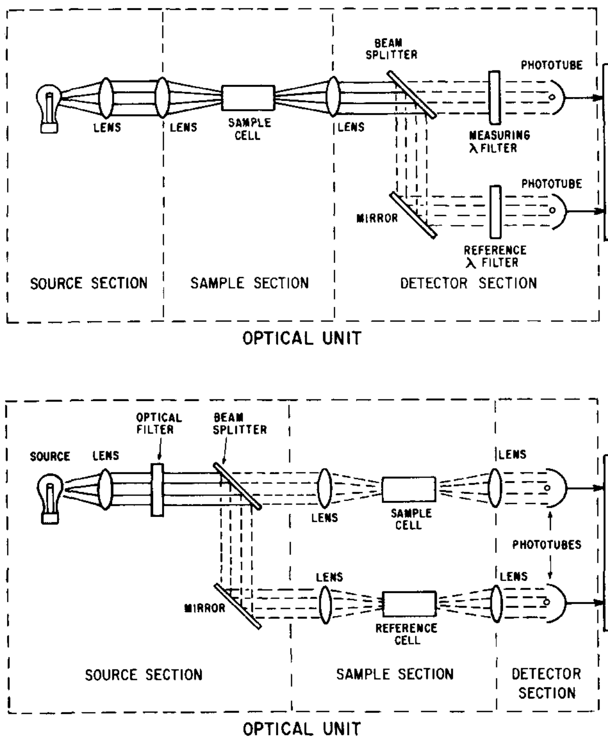

Figure 1. Schematics of DuPont 400 precision photometer. Upper: Split beam arrangement. Lower: Dual beam arrangement

able for monitoring the effluent from ion-exchange columns after reaction with ninhydrin in the chromatographic analyses of amino acids. Phototube outputs are converted to voltages in logarithmic amplifiers, further amplification is provided, and the final voltages are subtracted yielding log I^o—log I values [or log (I_0/I)] which are proportional to concentration. In one arrangement, the absorbance can be measured at 4400 and 5700 Å. A split beam arrangement allows two levels of sensitivity to be recorded independently and simultaneously, each to any degree of attenuation below maximum so that a wide range of concentration can be accommodated. The range is 0–1.5 absorbance; at 2.5 absorbance the departure from linearity is 2.2%. Drift and noise for the absorbance range 0 to 0.01 is approximately 2% of full scale, equivalent to 0.0002 absorbance. This paper should be consulted for interesting details such as design of small flow cells, calibration, and other applications such as bacterial counts and rate of bacterial growth and reaction kinetics.

Another paper contributing to further developments of the 410 photometer is that of J. J. Kirkland, Anal. Chem., **40**, 391, (1968) which is entitled "A High Performance Ultraviolet Photometric Detector for Use with Efficient Liquid Chromatographic Columns." This paper in addition to instrumental details gives examples of determinations in which nanogram amounts of substances are easily detectable.

A close-up of the control station module and optical module of this photometer is shown on the top of page 124 A of this issue. More informative are the schematics shown in Figure 1. In the upper schematic a beam splitter allows the measurement of the difference in absorbance at two wavelengths, thus providing compensation for interfering materials or particulates. The dual beam arrangement (lower schematic) measures absorbance at a single wavelength through two beams (reference and measuring) to give precise differential absorbance.

With appropriate filters, any wavelength between 380 and 650 mμ can be selected, using a quartz-iodine light source. The 253.7 mμ mercury line can be obtained from a low pressure Hg lamp. Other regions are promised from 1000–210 mμ at a later date. The unique logarithmic amplifiers provide outputs which are linear in concentration over a 10,000:1 range. Output is standard at 0–10 mV. Two outputs are provided in 10:1 sensitivity ratio.