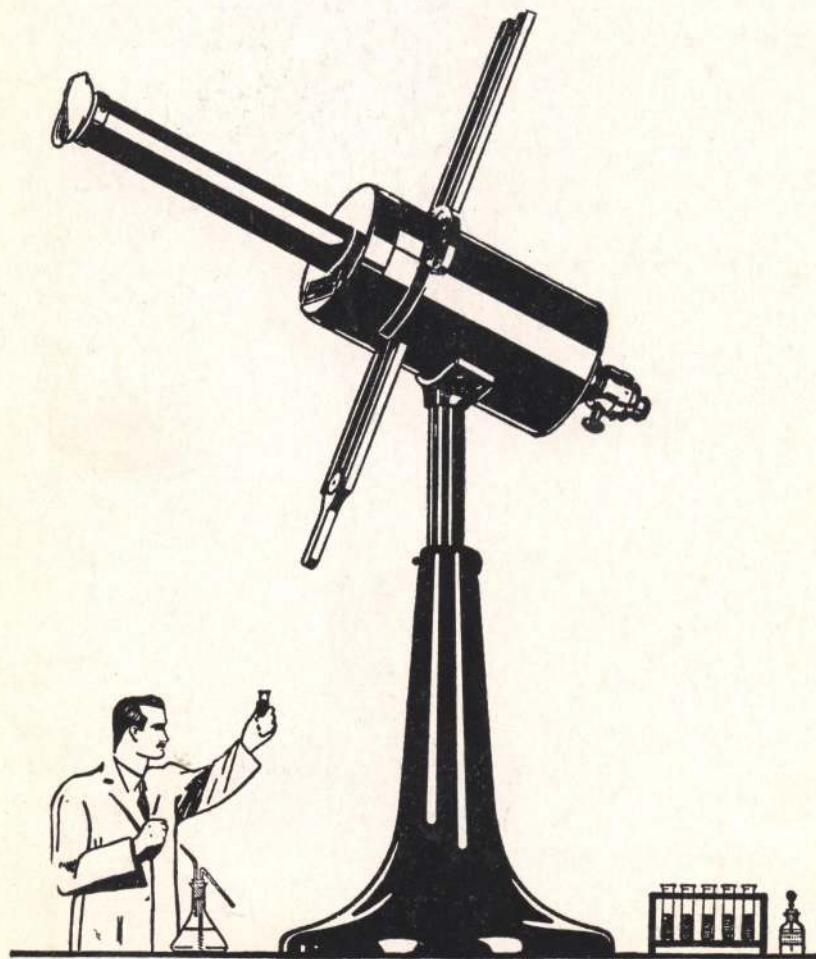


Simplify-
speed up your work with
SCOPOMETRY



BAUSCH & LOMB OPTICAL CO.



The Exton Junior Scopometer

The Improved Exton Junior Scopometer

SCOPOMETRY is the name applied to a new method of colorimetric and turbidimetric measurements. The method and the instrument by means of which it is to be carried out were originally developed, in conjunction with the Technical Staff of the Bausch & Lomb Optical Company, by Dr. William G. Exton, director, laboratory and longevity service of the Prudential Insurance Company. Recently Bausch & Lomb has so improved the instrument that it is now the most accurate of all visual methods for measuring turbidity. It can unhesitatingly be recommended for the following purposes:

1. Colorimetric and turbidimetric determinations of all kinds, in clinical laboratory work, biochemistry, etc.
2. Turbidimetric determination of sulphur in coal, cement, boiler water, etc.
3. Determination of turbidity, as such, in boiler and drinking waters.

The method is universal in that the same technique is used for both turbid and colored solutions. It has the advantage of speed and the absence of necessity for maintaining standard solutions. Though not as accurate as the more refined Duboscq method, it offers a standard method which is quick and repeatable within the accuracy required for a great deal of clinical colorimetric work, and has not the disadvantages of many of the low accuracy methods which are ex-

tensively used. The criterion used is the matching of an illuminated line against a field of constant intensity. The match is brought about by adding to the density of the sample to be measured a second density derived from a variable neutral wedge.

The method is extremely simple also. The scales (N, N') are calibrated against solutions of known concentration. The reading is made on the sample in the test tube in which the final reaction has been carried out. The test tube is placed in an opening in the instrument directly behind the wedge. A V-shaped support within the casing is so constructed that the tube will automatically come into position when placed in the instrument. The filters (S) are used when colorimetric determinations are being made, but are thrown out of the field for turbidimetric determinations. The observer looks into the eyepiece at the target image and moves the neutral wedge vertically until the line disappears. The reading may then be made directly from the scales.

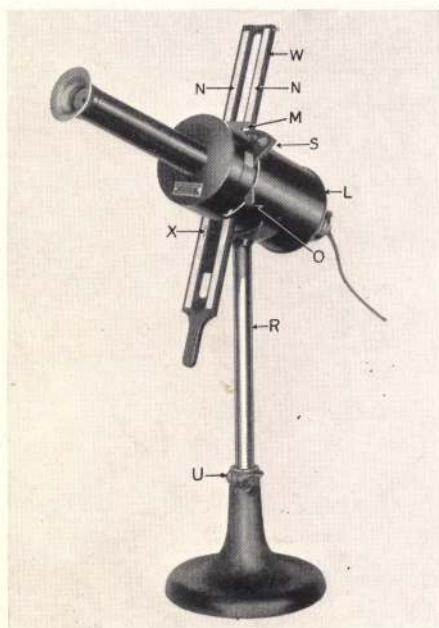
As normally used the instrument stands about 18" high. The casing is supported on a rod which can be raised or lowered to suit the convenience of the observer. The clamp holds it any desired height. The lamp, of the 15 watt, 115 volt type, is held in the unit which threads into the lower end of the casing. Interchange of lamps can thus be made without disturbing any part of the apparatus other than the threaded cap. The

mounted neutral wedge travels in vertical ways and is held in place by springs in the ways. The spring tension is adjusted to prevent falling and yet to give easy movement. Two scales are mounted on either side of the neutral wedge and are read by an indicator on the upper side of the instrument and in the direct line of the observer's vision. One scale is in millimeters and reads from 0 to 195. This is equivalent to a density change from $D=0.0$ to $D=6.0$. The other is blank and is intended to be used for any direct reading scale that the technician may desire to use. This scale may be easily removed and another substituted by loosening a single screw through the scale. The scales are strips of pyralin on which the operator may print any desired scale.

The filters are held in a rotating sector which is so adjustable as to

throw any desired filter into the light path. Provision is made for four filters and a blank opening for direct observation. The two filters supplied with the instrument are a blue-green (Wratten 74 E) and a red (Wratten No. 27). The former isolates the spectral region between 5200\AA and 5600\AA and the latter the region between 5900\AA and 6200\AA . These filters are used for colorimetric determinations, blue and green solutions being studied through the red filter, and yellow and red solutions through the green filter.

Heretofore one of the serious disadvantages with the methods using the disappearance criterion has been that the eye was compelled to work at the point of complete darkness. The new instrument removes this disadvantage and allows the eye to work under conditions of normal adaptation. This is the only instrument that provides a means of adjusting the illumination level. The brightness of the matching field is very simply altered by removing the back plate and adjusting the light channel plate. In this instrument the target also serves as a field reflector which furnishes an adaptation field of constant illumination. Light for the illumination of this reflector is brought from the source through a channel at the side of the casing and into the chamber in which the reflector is mounted. The diffused light from the wall of this chamber is brought into the eyepiece as a first surface reflection, maintaining the eye at a point well above the threshold of vision. The more brilliant target image is seen through the plate, a combination reflector and target giving the appearance of a brilliant line against a weakly illuminated background. An-

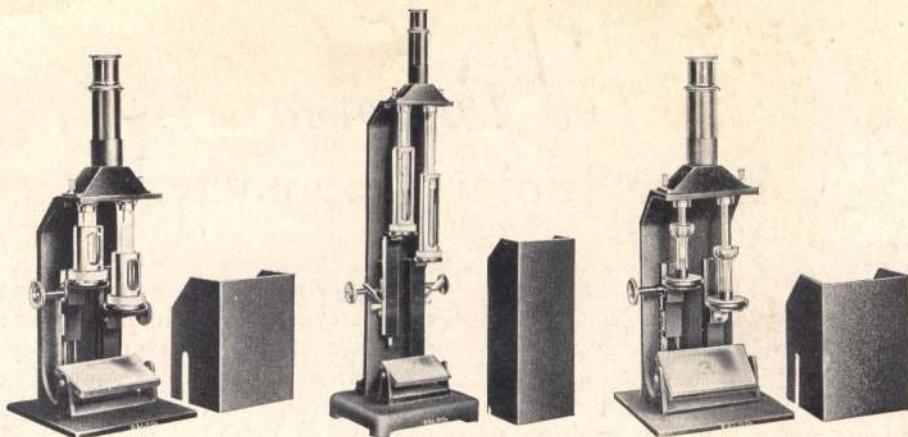


other novel feature is that all readings, either for colorimetry or turbidimetry, are made in the test tube in which the final chemical reaction has been carried out. The test tubes used must be selected so that the diameters are reasonably close to each other, otherwise liquid thickness would be variable. The directions which accompany the instrument give a simple method for selection with regard to diameter.

Calibration of the scales is a simple matter, fully covered in the directions for use which accompany the instrument. When solutions of the proper density have been prepared, known standards are made in varying concentrations and a calibration of the wedge for the particular test is carried

out. This curve may be utilized in two ways: (1) The values may be plotted on ordinary graph paper with concentration and millimeters as co-ordinates. The readings will then be made on the universal scale and concentrations obtained from the graph. (2) The values may be marked on auxiliary pyralin scales and placed directly along the side of the wedge, in which case direct readings will be made for the particular test. The instrument is so designed that the scales can be easily removed and replaced by others. Auxiliary blank strips of pyralin can be supplied so that the operator may make as many direct reading scales as he desires. It is only a matter of loosening a screw to replace one scale by another.

| Code Word | Cat. No. | Specifications | Price |
|--------------|-------------|------------------------------------------------------------------------------------------|---------|
| <i>Kasut</i> | 33-29-01-01 | Scopometer, as described, with 15 watt, 115 volt lamp and cord and plug <i>net</i> | \$80.00 |
| <i>Acufv</i> | 31-31-20 | 15-watt, 115 volt Bulb <i>net</i> | .75 |



DUBOSCQ COLORIMETERS

Superior design renders B & L Colorimeters unique in the greater accuracy and comfort they afford the user. For example: The 2.5 mm eye-point aperture corresponds closely to the aperture of the eye pupil, enabling the user to make observations for longer periods without fatigue. Of great importance is the wide angular field, which increases the comfort of the operator as well as greatly increases the accuracy of the results obtained. Then, too, the eyepiece is focusable on a sharp dividing line to compensate for those who wear glasses or have a slight aberration. These features are of great help to the operator in obtaining consistent accuracy through reduced eye fatigue.

Into the construction of Duboscq Colorimeters, as made by the Bausch & Lomb Optical Company, are built such refinements as optically inactive

tube bottoms, plungers of optical glass matched for color, adjustments of microscopic precision and a dust proof housing for the prism system.

There are several different models of Duboscq Colorimeters suited to different purposes. Above are shown three of these models. The Biological Colorimeter is the most popular for general work in biochemical laboratories, etc. The 100 mm Colorimeter has gained great favor in water works laboratories, and in others where faint color requires greater depth of fluid. The Micro Colorimeter is suitable for use in micro determinations, where only a small amount of the solution is available or wherein it is necessary to concentrate the color in order to get it into a small quantity of solution. A catalog describing all models of Bausch & Lomb Duboscq Colorimeters will gladly be sent on request.

**BAUSCH & LOMB OPTICAL COMPANY
ROCHESTER, N. Y.**

New York

San Francisco

Chicago

Boston

London

Frankfurt a/M