Specific rotation or rotary power :-

The rotation produced by 10 centimeters (1 decimeter) column of a liquid containing 1 gram of optically active substance per cc of the solution is called the specific rotation or rotary power of the solution. Symbolically it is written as

$$S = \frac{\theta}{\left(\frac{l}{10}\right) \cdot m} \quad \ldots \ldots \ldots (i)$$

Polarimeter :-

Collimator   Ground Glass plate   Nicol prism polarizer   half shade   Tube for solution   Nicol prism analyzer   Telescope
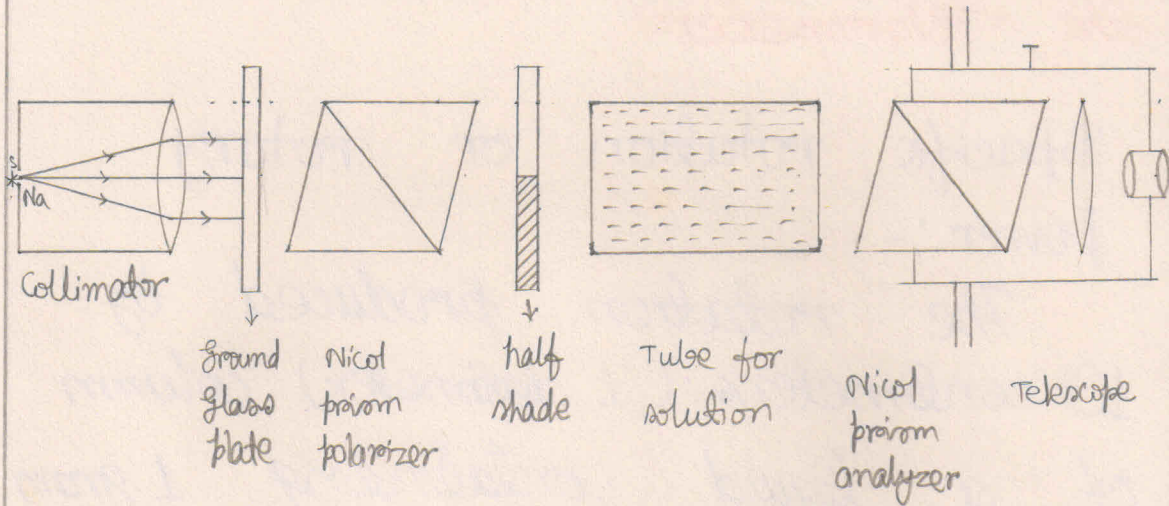
Fig 1 Schematic for
Laurent's half shade polarimeter
each port is named. whole
arrangement in a steel tube
mounted on stout metal stand
in the middle.

A polarimeter is schematic-
ally shown in Fig 1 with the
name of the invantor (Laurent).
Source slit is circular such
that collimator lens gives para-
llel light with uniform illumination

This is further secured by
arranging ground glass plate.

The half shade, as the
very name suggesed has two
parts one semi circle is quartz
indicated by shading. It is
of such thickness that

$$(\mu_e - \mu_o)\, t = \frac{\lambda}{2} \quad \cdots\cdots (ii)$$

The other semi circle
consists of equivalent circle of
glass. The quartz portion has
it's optic axis in the plane
of the semi circle, therefore
there will be double refraction.
Therefore, light coming from
quartz portion will have diff-
erent intensity from that
given by glass portion. In

actual experiment with polarizer fixed by construction, the analyzer is so adjusted that the intensity of the two halves of the field of view is nearly equal. This position of analyzer Nicol prism is read. Now, the tube (10 cm long) containing solution is placed. The plane of polarization of light is rotated through angle θ. This is read by new position of Nicol analyzer when the field of view becomes the same as it was without the tube. This value of θ used in equation (i) gives the specific rotation for a given concentration.