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Elementary Physics Course
Volume Three
Particular Physics
Prosperi, Pisa 1832
(p. 229-231)

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1333. [...] **Professor Amici**, very renowned and extremely well-deserving in Optics no less for the depth of his theoretical speculations than for the usefulness of practical applications of every kind, has created a piece of equipment which is as ingenious as it is easy to use both for the experiments of polarization of light in general and for those of this type in particular. Here is a description of this device:

Box AB (*Fig*. 76) contains a pile of plane parallel glasses inclined at 35°, 25' to the axis of the hollow cylinder C; this pile reflects an intense shaft of polarized light vertically along the axis itself.

The substance on which one wishes to carry out the experiment, for example a crystal, is placed in the centre of the object holder D on an sheet of plane glass which closes the central cavity. The object holder moves horizontally on plane E, and the disk FG marks the incident angles that the polarized ray makes with the front face of the crystal. The graduated ring H, moving around the cylinder, indicates the azimuth of the incident plane compared to the plane of the greatest reflection. Besides these movements, the crystal can receive another by the rotation of the object holder on its own circular plane. In this way the incident plane can pass through a given section of the front face of the crystal.

All of this part of the tool resembles that used by Biot as well, but it becomes completely different from it in the way it analyses the light after it has come out of the crystal. Mr. Amici does not use doubly refracting prisms or tourmaline or mirror to this end, but rather an entire rhomboid of Icelandic spar applied to a microscope (everyone knows the microscope, and We will minutely describe it below). Its location is indicated as I, between the eyepiece L and the opening M, where one places ones eye. From this disposition it ensues that the rays which come out of the eyepiece divide in two parts, that they pass through two different openings, and one can place the eye in front of one or the other, thus seeing all the field of the Microscope illuminated by ordinarily or extraordinarily refracted light.

The body of the microscope turns around its axis, and the ring NP, which moves with it, indicates the angle that the principal section of the rhomboid makes with the plane of the maximum original reflection.

When we have to bring rays which have gone through the crystal at a perpendicular incidence and at a very oblique incidence (to which end Herschel created his ingenuous device using tourmaline, described at number 896 and sketched in fig. 178 of the article *Light* in the Encyclopaedia of Cambridge) at the same moment to the eye, the instrument which we are describing can do this very handily. To this end, a second objective Q, with three lenses, which is quite a bit more acute than the ordinary objective R, can be added to the microscope, and using a tube S which slides along the cylindrical walls of T the two objectives are separated by an interval equal to the sum of their respective focal distances. When set up in this way, the microscope shows, in a single glance, external objects distant among themselves as far as the considerable angle of 150°. And by consequence it can be used to study all at once the phenomena of a crystallized substance when the little beams of polarized light cross it in all the directions from 0 to 75° of inclination from the axis.

When needed a rhomboid O of crystal, called the Rhomboid of Fresnel, which we will describe further on, can be introduced into the cylinder C, placed over graduated disk Z and horizontally mobile to indicate the angle that the axis of the rhomboid makes with the plane of maximum reflection. And in this same cylinder one or more convex lenses can be placed in order to give the polarized light the convergence necessary for every need.

Now the Microscope combined in this way to the polarizer has made the experiments about these phenomena not only much less expensive and easier, but also more instructive. Any very small portion of a scale of crystal, or even any very small crystal can be observed; the smallest differences and irregularities cannot escape the examination of the Observer, who can in this way easily discover the effect of the action of each even very small group of particles of the crystal on the polarized ray. If one repeats the experiment with another instrument in order to have the rings over a scale of quartz, one cannot see the black cross which meets all the way in the centre, but only four brushes similar to the extremities of this black cross appear. But the above-commended Professor has seen that in a same scale of quartz, particularly of mountain crystal, points are sometimes found in which the phenomenon is formed which is perfectly identical to that which is found in other crystals.