William Nicol Biography

William Nicol

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Biography

William Nicol made two important contributions to science: he invented the first device that could conveniently polarize light, and he devised a method for preparing samples for microscopic study.

Jean Baptiste Biot (1774-1862) had first observed that a crystal of *calcite*, known as Iceland spar, had the effect of polarizing light that passed through it that is, the crystal forced the lightwave to oscillate in a particular direction. It was difficult, however, to isolate a single ray of this polarized light in order to study it.

In 1828 Nicol, then a lecturer at the University of Edinburgh, designed a polarizing prism from two pieces of Iceland spar. The crystals were cemented together using *Canadian balsam*, an adhesive also known to have light-refracting properties. A ray of light would enter the first crystal, splitting into two rays--one polarized, one not. As they hit the layer of balsam, one ray would be reflected out of the prism, while the other would pass through unchanged, eventually exiting the prism through the second calcite crystal. This device, called the *Nicol* prism, became an important tool for optical physicists.

A less noteworthy achievement at the time was Nicol's new method for examining crystal and rock specimens under a microscope. Previously, scientists were forced to study these large samples using light from a reflected source; this method only allowed them to examine the surface of the samples, not the interior. Nicol cemented the crystal to a slide plate and then ground the crystal down until it was thin enough to see through when a light was shone from below. Nicol could then observe both the surface as well as the inner structure of mineral samples. He also applied this procedure to the study of petrified woods, examining the cell structure of ancient fossilized plants. Unfortunately, the first publication of Nicol's method did not appear until 1831, and the technique was not commonly used by scientists until around 1853.

Due to the fact that he did not publish at all until he was fifty eight, Nicol has frequently been overlooked as a pioneer in the fields of optical physics and geology.