makes possible the projection of three-dimensional pictures in natural color, either motion or still, with the use of standard motion picture projectors. Thousands of amateur photographers will soon be producing snapshots with real depth, and millions of moviegoers in the future will have the screen of their theaters disappear and become a stage before their eyes.

Solves Engineering Problems

To the engineer, polarized light brings the possibility of solving difficult engineering problems. Little models of bridges, buildings, airplanes, gears and other mechanical structures are built, and the stress within them can be determined by still another application of polarized light.

Solving the problem of glaring automobile headlights seemed imminent when the invention of Polaroid light-controls was first announced about four years ago. This invention which might very well save thousands of lives a year is not yet ready for application to America's millions of automobiles. There are a good many problems involved, not the least of which is the fact that every windshield and every headlight on all cars must be equipped with polarizing screens if all motorists are to receive protection all the time. Polaroid is finding other uses, meanwhile.

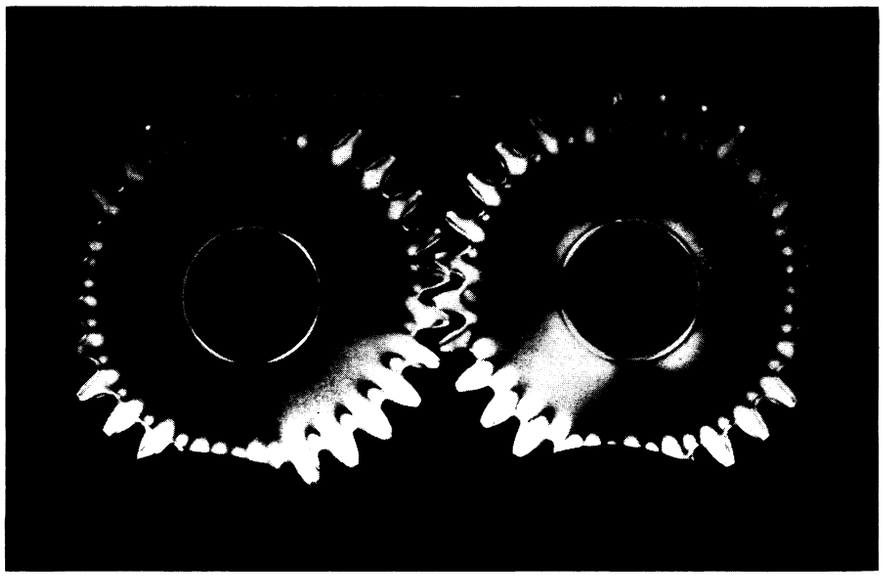
Colorful for Advertising

It does a colorful advertising job—literally. By placing colorless sheeting, like cellophane, between two polarizing screens colors are produced like those of the wings of a butterfly, or oil slicks on water. This phenomenon is being used practically in advertising displays, murals and stage sets.

Polarizing filters do for the camera what polarizing glasses do for vision. They reduce unwanted surface reflections and eliminate the "hot" spots of reflected light. Scattering of molecules in the atmosphere produces at least partial polarization of blue skylight. Since this is the case, polarizing filters can be made to darken a blue sky in a snapshot when attached to a camera, and photographing in a direction at right angles to the sun.

The scattering of particles under water produces partial polarization of the subsurface light. Hence, under-water photographers are able to create a dark background against which foreground objects stand out in sharp clarity and contrast.

Polaroid light-control material has an ever growing list of practical applications.



PRACTICAL APPLICATION

Models of gears are made with transparent bakelite and examined between polaroid screens. Dark lines indicate areas of strain in the model gears which would also occur in actual steel gears. Strain points are observed where the gears mesh.

Marksmen use it in gun sights to ease the eyestrain of target shooting. Amateur motion picture cameramen use it to get smooth professional "fades." Draftsmen use it to take the glare from drafting boards. Engineers use it to build giant telescopes. Textile experts to foretell the wearability of cotton fibers. It is used to study the corona of the sun. Sound engineers use it to determine the grain of crystals in phonograph pickups. In thin film research it is used to determine the presence of layers only one molecule thick. It is used as an aid in research for the cure of cancer. It makes three-dimensional X-ray pictures which can be viewed simultaneously by many doctors.

These and many other applications are made possible by Edwin H. Land's invention of the first polarizing screen made synthetically in almost limitless areas. With polarized light as a raw material, the scientist fashions new tools and the manufacturer makes new machines and products.

Science News Letter, November 9, 1940

ASTRONOMY

Theories of Spiral Galaxies Questioned by Astronomer

CURRENT theories of the evolution of the huge spiral galaxies, star systems that look like pinwheels and are really similar to our own Milky Way but outside its limit, are questioned by Dr. Gunnar Randers. He is a Norwegian astronomer now at the Yerkes Observatory of the University of Chicago.

In a paper in the *Astrophysical Journal* (October), he says that there is no observational evidence for the idea now held that the "old" spirals are formed from "young" elliptical nebulae.

"Many spirals," he says, "suggest that the greater part of their material may be in the arms. If the arms were ejected from a system originally densely packed, the almost complete dissolution of that system would have been accomplished against the pull of the system's gravitational force."

He suggests that "the nebular patterns are formed by the redistribution of the matter inside the originally 'smooth' nebula. This redistribution would take place early in the evolution of the nebula while it is still young and stars have not yet been formed from the gas of which it is composed."

Science News Letter, November 9, 1940