C O P I A !

THE POLAROID CORPORATION

Boston Mass.

Casa Lohner S.A.
Rua São Bento, 22
São Paulo, Brazil

Gentlemen:

Your letter of April 24 addressed to Arthur H. Thomas Company of Philadelphia has been referred to this corporation which is handling the distribution of Polaroid.

Practically every user of a microscope is a prospective buyer of Polaroid, for with a pair of our standard four centimeter discs it is easy to convert a standard microscope into a polarizing instrument equivalent, in most respects, to a polarizing microscope selling for $300.00 or more. Biologists, botanists, crystallographers, mineralogists, and many other microscope users have a definite need for a polarizing instrument, a need which can now be filled at very low cost.

All teachers of Physics are excellent prospects, because with Polaroid they are now able for the first time to demonstrate the phenomena of polarized light simply and at low cost. The demonstration of these phenomena, handicapped until now by the complexity and high cost of the Nicol prism with its rigid limitation as to size, fragility, and awkwardness, become the most dramatic and simple in the field of Physics.

Other important classes of prospects include glass blowers and glass manufacturers who are using Polaroid to detect the strain in glass products, research workers in many fields who use Polaroid for the analysis of crystal, for measuring and controlling the intensity of light, for building Kerr cells used in television, and for many other purposes.

We are enclosing catalog pages describing our standard Polaroid Demonstration Set which is for sale at $10.00 for classroom demonstration, experimental work, and other applications in educational and industrial laboratories. There are two other standard sizes: a 6 cm. disc set in a metal rim at $10.00 each, and a 25 cm. disc set in a metal rim, list price $125.00.

Sincerely yours,

signature

POLAROID STRAIN DETECTORS

Applications - Visual inspection for internal strains and other defects in bottles, jars, tubing, light bulbs, envelopes and seals of electronic tubes, glasses, lenses, laboratory glassware, plate and window glass and other glass products. Determination of the axes and detection of twinning in crystals.

Equipment Required - An extremely effective and simple device for detecting strains and defects con be set up with these three elements:

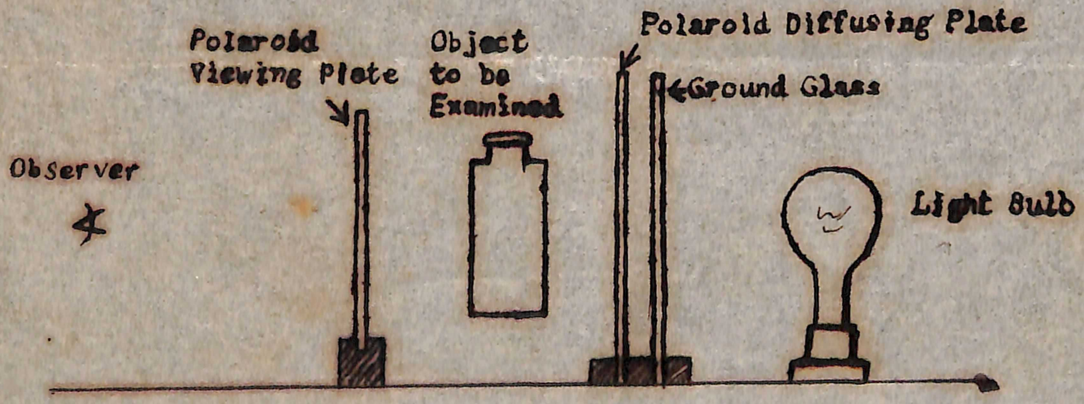
1) An ordinary light bulb, 150 watt or brighter.

2) A Polaroid Plate, Diffusing type, for polarizing and at the same time diffusing the light.

3) A Polaroid Plate, Viewing Type, set with its polarizing axis crossed with the polarizing axis of the Diffusing Plate.

Where the objects to be examined are large, it is often desirable to place a piece of ground glass or opal glass between the light bulb and and the Polaroid Diffusing Plate in order to obtain a more uniform distribution of the light.

The arrangement, shown diagrammatically:



Operation - The glass to be examined is simply placed between the POLROID plates, and tilted through an angle of forty-five degrees. With the Polaroid Plates in the "crossed" position, with their polarizing axes at right angles, practically no light whatever will pass through them from the light source (somewhat less than one-half of one per cent). For this reason the Polaroid Diffusing Plate will appear black.

When a piece of glass, free from internal strain, is placed between the plates, it is only faintly visible, its outlines clearly defined but the rest of the object dark. If strains exist in the glass, however, the areas whre they occur show up in color or in white light.

The areas of light correspond exactly with the areas of strain. "Stones" or unfused particles, bubbles, scratches, pits, dust and dirt also appear as brilliant points or lines of white against the dark field.

The operation of the device is instantaneous. Articles can be examined as rapidly as they can be passed between the Polaroid plates.

Advantages to Users - Polaroid Strain Detectors offer an easy low-cost means of locating strains in all types of glass products, in the laboratory or in regular factory production. Strains and blemishes appear instantly and unmistakably. Simple detection and location of strain requires no skill or training on the part of the operator. The Detector is as effective for finding strains caused by the application of outside forces as it is for those caused by faulty annealing or peculiarities of design.

As compared with previous devises using polarised light for strain detection, the Polaroid Detector offers a tremendous simplification in set-up, great flexibility, a useful area many times as great, a uniformly dark field (because of the absence of the lenses which in previous devices partially depolarize the light and destroy the darkness of the field), brighter and more definite Strain-colors, easy portability, far lower cost, strong and foll-proof polarizing elements, freedom from the need of technically-trained operators - advantages which convert the photo-elastic analyser from a laboratory curiosity into a profitable working tool for industry.

Manufacturers tho may be expected to make the most profitable use of Polaroid Strain Detectors include:

Bottle Manufacturers - for detecting hidden strains that may cause the failure of the container when it is subjected in service th mechanical shock or internal pressure (as in beverage bottles) or to haeting and coling (as in preserving jars, nursing bottles, milk bottles).

Plate and Window Glass Manufacturers - for detecting strains, "stones" and other blemishes.

Lamp and Tube Manufacturerms - for detecting strains in the envelopes and stems of electronic tubes, examining metal-glass seals, light bulbs.

Radio Manufacturers - for determining the twinning of quartz crystals used in frequency control. (This application, not described in the preceding sections, depends upon the characteristic patterns produced by single and twinned crystals in polarized light. Large sections of quartz may be examined at once; colors are brilliant and twinning is immediately and the operating methods are identical with those used in examining glass.)

Recommended Equipment - For objects smaller than 12" x 12"

1	Polaroid Viewing Disc, Metal Rim, 10" clear diameter	$125.00
1	Polaroid Diffusing Plate, rimless, 12" x 12"	50.00
1	Ground glass, 12" x 12"	1.00

This equipment allows two or three people to observe the object in its entirety at the same time, if they group themselves together.

Recommended Equipment - For objects larger than 12" x 12"

An assembly of 12" x 12" Polaroid Diffusing Plates, mounted in a metal framework with narrow munions, ground glass to be incorporated in the mounting.

1 Polaroid Viewing Disc, Metal Rim, 10" in diameter $125.00

(Where there is no objection to making a piecemeal observation of a large area, the inspection can be carried out by moving the single 12" x 12" Polaroid Diffusing Plate from point to point over the object.)

Special Installations - A number of other techniques are available: Projection of the image of the article being tested upon a screen, for group study - conveyor belt installations - use of sensitive plates and immersion liquids for ultra-sensitive inspection, etc.)

Brief Technical Explanation - When homogeneous, non-crystalline materials (like strainfree glass) are interposed between two sheets of Polaroid, they have no effect on the character of the transmitted light. If the Polaroid sheets are so oriented as to cut off the transmitted light entirely, the interposition of the material between them leaves the field of view uniformly dark, as before. The effect of crystalline materials is different. Ordinarily, when polarized light enters a crystal, it is broken up into wtwo beams whose vibrations are at right angles to each other. The directions of these vibrations are identified with the directional physical properties fo the crystalline medium. Moreover, these two components travel through the crystal at different speeds, and on this account they are, in general, out-of-phase with respect to each other when they emerge from the crystal. Furthermore, this disparity in relative phase is different for different colors. The compounded light is then viewed through a second polarizing sheet which transmits vibrations only in one direction inclined at an angle to the two directions of vibration of the light emerging from the crystal. The second polarizing sheet will then transmit a contribution from each of the two components. But these contributions are variously out-of-phase. Hence, there will be interference between the contributions from these components; and the interference will be different for different colors. Certain bands in the spectrum will be obliterated entirely, others only partially in varying amounts.

If the initial light is white light from an incandescent bulb, the effect of the crystalline sheet interposed between crossed polarizers is to remove some of the colored components of the white light by destructive interference. The residue will then also be colored.

The action of the Polaroid Strain Detector depends upon the fact that strained glass acquires a pseudo-crystalline character in the regions under stress. In these regions, the effect on polarized light is similar to that described above in the case of real crystals. Hence, in these regions, colors are removed from the white light which entered the glass, and they are identified by the residual colored light that is transmitted.

"Stones" may be regarded as real crystals embedded in the glass. As such they have a characteristic effect on the polarized light.

Scratches and particles of dust have an equally useful but quite different effect on the polarized light. Striking them, the polarized light is diffused, loses its directional properties and reacquires the characteristics of ordinary light. As ordinary light, it passes through the single plate of Polaroid which stands between the articles being examined and the observer.