PHYSICS

"Plating" With Thin Films Makes Glass More Transparent

Fluorine Compounds and Insoluble Soaps Make Reflected Light Cancel Itself by Interference

SHOW windows may in future become invisible, and camera lenses and filters may let through more light, as a result of the discovery that the addition of a thin surface film will make glass more transparent.

At first sight it seems impossible that the placement of anything on a transparent optical surface, be it a film ever so thin, could possibly increase the transmission properties of the glass surface. Yet from two independent sources and from highly reputable laboratories have come announcements of such a scientific discovery.

At the meetings of the American Physical Society Drs. C. Hawley Cartwright and A. Francis Turner of Massachusetts Institute of Technology described their method of evaporating on to glass surfaces thin films of fluorine compounds which make light reflected from glass surface cancel itself out by destructive interference. The light energy thus eliminated in reflection appears as increased energy in the transmitted beam and transmissions of 99.6 per cent were reported.

On the day previous to the M. I. T. report, Dr. Katherine B. Blodgett of General Electric's Schenectady research laboratory announced essentially the same optical feat by the use of monomolecular films of insoluble soaps; films with which she and Dr. Irving Langmuir have long worked in studies of intermolecular forces. Her films are obtained, not by evaporation of materials in a vacuum, but by dipping of the glass plates in the thin-film solutions.

.000004 Inch

The secret of both the M. I. T. and G. E. achievement is the application of films to both surfaces of glass which have a thickness of one-quarter a wavelength of light. In more common units of length the film thickness is about four millionths of an inch.

Such thin films are themselves invisible and can only be seen, in slightly greater thickness as the brilliant colored patterns which they produce by interference. Oil films on mud puddles are examples.

Potential uses of the films are in all places where reflection from glass would be undesirable and where light losses, due to reflection, are unwanted.

Show windows, cover glasses on pictures and elaborate "trains" of optical parts in telescopes and periscopes are places of immediate application. In some cameras three or four lenses are used, the surfaces of each of which reflect appreciable amounts of valuable light. In some cases the light losses amount to 25 per cent. In some periscopes losses of light by reflection from the many optical parts amounts to 75 per cent.

Almost Perfect

In tests at G. E. the transmission of a piece of glass was increased from 92 to 99.2 per cent. by the application of the film.

Major interest of scientists in the new films lies in the unanswered question of their permanence. One suggestion is that while they may not last long enough to make them permanently useful on the outer surfaces of elaborate "trains" of lenses it might be possible to employ them on inner, protected surfaces.

Science News Letter, January 21, 1939

AVOIDS REFLECTIONS

The strip in the center shows how addition of the film prevents the glass from sending reflections into the eye of the camera. The portrait is of Dr. W. R. Whitney, vice-president of the General Electric Company.

MEDICINE

New Chapter in Germ Hunt Now Being Written

A NEW chapter in germ-hunting is being written. It may solve the mystery of the outbreaks of infectious, sometimes fatal diarrhea among new-born infants which have recently occurred in hospitals in various American cities, to the consternation of doctors, health authorities and hospital superintendents no less than parents.

This particular chapter on germ-hunting goes back to 1934 when there was an outbreak of food poisoning among American soldiers in Panama.

Blood cultures from these soldiers were sent to a Danish authority, Dr. F. Kauffmann in Copenhagen, who was able to identify the offending bacterium as belonging to the paratyphoid or Salmonella group. Because the organism had distinct serologic characters, it was declared a new type and was listed as *Salmonella panama*.

Salmonella panama has now shown up in New York City where five babies seriously ill with diarrhea were found infected by this specific bacterium. Two of them died.

Dr. Fritz Schiff reported the occurrence of *Salmonella panama* in New York to the American Medical Association.

No conclusions as to the frequency of the organism in New York or elsewhere in the United States can be drawn from such limited material, Dr. Schiff stated. The five cases he reported occurred in succeeding years, 1936, 1937 and 1938.

Dr. Schiff believes that some of the recent outbreaks of infectious diarrhea in infants may have been caused by this Panama germ.

One of the New York babies probably became infected from its mother.

However, in this instance as well as in the other cases, the question of suspicious food could not be studied, for when the bacteriologic diagnosis revealed the true nature of the disease it was too late to study the food.

Science News Letter, January 21, 1939

Avocado oil is used in soap making on a limited scale in Guatemala.