

The Graphic Laboratory of Popular Science

New Plastic Substitutes for Glass

By DR. THOMAS M. BECK

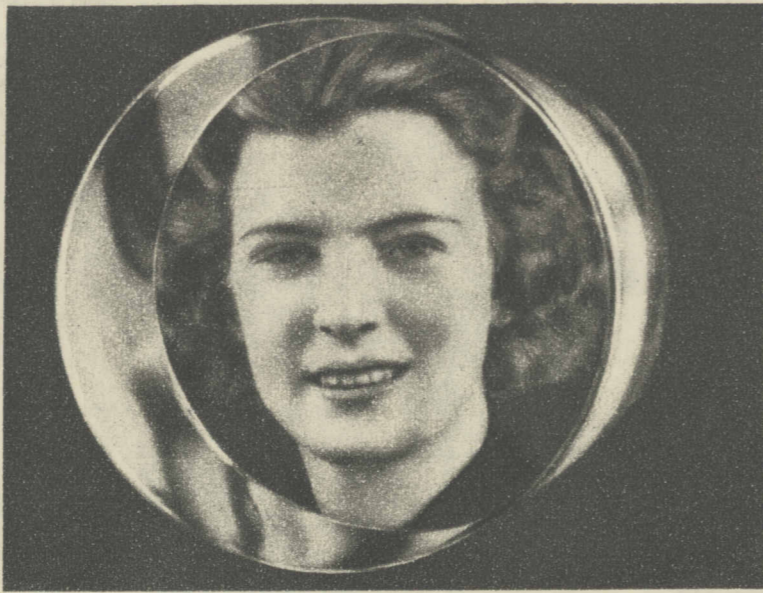
SPECTACLE lenses are made of glass and therefore have two faults. Glass cannot be cast or molded with any great degree of accuracy, so that lenses must be ground by hand. This adds to the original cost of the article. Moreover, they usually break when dropped.

Two British inventors, A. W. Kingston and Peter Koch De Gooreynd, have recently developed a process which they claim will eliminate these troubles. By means of it lenses may be stamped out by machines at a rate of several thousand an hour and at a cost of less than 25 cents apiece. In addition the lenses are practically unbreakable.

However, the process at present has been applied to the making of nothing more complicated than the lenses of cheap cameras and opera glasses, for which it appears to be quite satisfactory. There are still serious engineering difficulties to be solved in molding the accurately curved surfaces needed for spectacles.

The essential feature of the invention is the use of a synthetic resin instead of glass. This resin, known in England as perspex, in Germany as plexiglas, and in America as lucite, is a hard, tough, water-clear solid at ordinary temperatures, which softens to a sirupy liquid at temperatures above that of boiling water. It is known technically as polymerized methyl methacrylate.

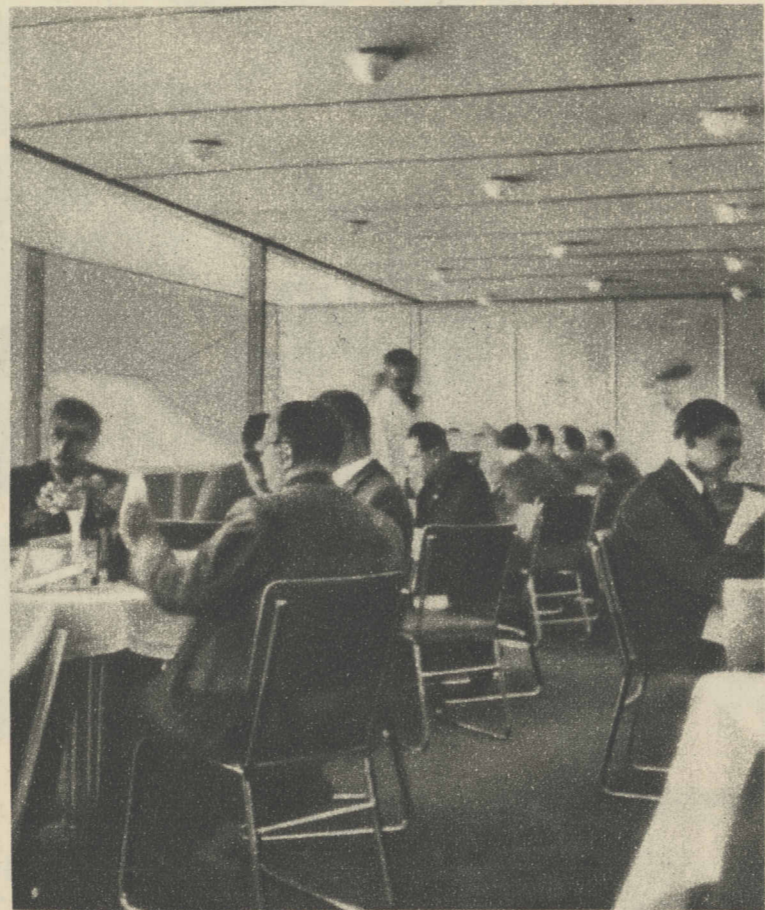
Its advantages over glass, in addition to its low softening temperature, which permits it to be molded, are its toughness, which makes it difficult to break; its lightness (it is about half as dense as glass), and the fact that if broken its fragments are not so dangerously sharp as those of glass. Its faults are the facts that it will soften and lose its shape when accidentally exposed to hot water and that, because of its relative softness, it is far more easily scratched than is glass.



Not through a porthole, but through 3/4 inches of water-clear plastic, is this young lady photographed. The glass substitute is manufactured in this country.



Etched glass such as this European piece may some day be made from the new plastic material.



The dining salon of the ill-fated Zeppelin Hindenburg was fitted with plastic material windows because of its lightness. The use of it had nothing to do with the disaster.

Of course, even if the process is successful it is hardly likely that eyeglasses will be turned out as quickly as are cigarettes or automobiles or other such products of the machine age. Nevertheless, since any combination of molds can be used to shape the front and back of a particular lens, a thousand standard molds means that about a million different lenses are possible, which provides a choice that should fit almost any case of faulty vision.

If the process can be used to make good spectacles it should be equally useful in the manufacture of high-grade lenses for cameras, binoculars, and other optical instruments where some degree of standardization is possible. Unfortunately, a serious fault is found here. It is impossible to make a lens out of any one material that will focus all colors at the same spot.

This means that the images

formed from these resin lenses will have their edges marred with blurred fringes of color. This would not be noticeable in spectacles, but it would seriously detract from the value of a lens for other uses. When glass is used this fault can be largely

Question Box

What new invention may revolutionize the making of optical instruments? The rapid molding of lenses from synthetic plastics.

What are the advantages of such a process? The material is more easily shaped and is lighter than glass.

What is the chief fault of such lenses? The inability to correct for their dispersion of color.

What is zein? A protein obtained from corn, characterized by its solubility in alcohol.

How is it used? It shows promise as a raw material for synthetic plastics.

These and other interesting questions are discussed in detail by Dr. Beck in the accompanying article.

Mostly About Dogs

By BOB BECKER

Ear Trouble Is Result of Neglect

APPARENTLY many dog owners do not understand that their pets not only need a certain amount of care for their coats but also that a dog's ears should be cleaned to prevent infections of the hearing mechanism. Nature gives the dog two ways to protect its ability to hear. First, there is a growth of many short hairs that prevent dust and dirt from getting deep into the ear. The second protection is the ear wax secreted by a dog.

Unless you remove some of this wax from your pet's ears it will accumulate in too large a quantity and possibly cause an infection. Although some dog owners neglect their pets by never cleaning their ears, it is also possible to keep the pup's ears too clean. The wax should not be removed oftener than once every three months. Unless examination indicates that it is necessary we rarely ever clean the middle ear and remove the wax oftener than once in six months. But dogs vary as far



The smile on this boy's face must be one of both pride and affection, because Klodo of Black Forest, the handsome German shepherd dog at his side, is about as good-looking and intelligent a pet as any boy could ask for. Klodo is a son of the Int. Ch. Benz v. Cross-Welsin.



Wire-haired terriers are popular as pets and as show dogs in many parts of the United States and England as well as in Hollywood. Here is Della Lind, the Viennese actress, with her wire, named Heidi.

to determine how their hearing is. But take the puppy and you soon find out if his hearing is normal or not. We have hunted behind deaf dogs that otherwise were efficient in the field. The principal trouble with such dogs is that you must watch them and adapt your program to their movements while hunting instead of having them under your control through their response to whistle and word commands.

DOG NOTES

The American Kennel club has found that America's average judge of pure-bred dogs can judge 17.5 dogs an hour in a dog show.

The poodle might be called "the breed nobody knows," according to an official of the American Kennel club. The country appears to be under the impression that a poodle is a small lap dog. Actually the standard poodle measures around 21 inches at the shoulder and weighs about 45 pounds. The tiny dog which most persons call a poodle may be the toy poodle, which weighs only about 12 pounds, but it is usually a shaggy cross-bred dog. There are very few pure-bred toy poodles in the United States.

Can dogs think? This is one question which has often been debated by scientists and dog owners. The following incident provides an argument for the persons who believe that dogs can reason:

C. W. Brown, Seattle, Wash., owns a German shepherd named Sindbad. The dog's ear became sore, and Brown took him to a nearby veterinarian for treatment. His master had to take him to the hospital only once, however. Now when Sindbad's ear pains him he goes to the veterinarian alone. The dog goes to the door, scratches for entrance, then goes straight to the operating room where he was first treated. After the veterinarian has washed the ear and treated it with antiseptic the dog goes home.

A medicated soap that will kill fleas; cedar shavings, pine oil disinfectant, and even a spray gun loaded with an anti-fly dope are handy summer accessories for the owner who keeps his dogs outside in a kennel. Good liquid flea soaps as well as bar soap are available. We use pine oil disinfectant on the runs of our kennel, and also put some of the oil in the bath water of the dogs.



A Chihuahua of excellent type that weighs exactly three pounds. It is Champion La Oro Jenybro, a dark fawn color with white markings.

For attractive offers of dogs, turn to the Dogs, Cats, Birds and Poultry column in the want ad section of today's Tribune.

(ADVERTISEMENT)

New Food Combats Summer Itch, Helps Keep Coats Healthy



Prevention of skin trouble is worth a pound of cure. Don't wait for those raw spots to appear on your dog. The nourishing, New Red Heart Dog Biscuits, or Kibbled Red Heart, will enrich your dog's diet with Vitamins B and G, which are essential for a healthy skin and glossy coat.

This economical new food is actually 24 foods in 1. It supplies all 5 of the vitamins your dog needs, as well as the proteins and carbohydrates. And it provides the gnawing necessary for healthy teeth and gums. Ask your grocer for Red Heart Dog Biscuits today. If he hasn't them he can get them for you quickly. John Morrell & Co., Ottumwa, Iowa.

Zein—Something New from Corn

WHEN strong alcohol and raw egg white are mixed the latter is "cooked" as thoroughly as though it had been dropped into boiling water. This does not mean that the alcohol has released heat, but rather that alcohol, far from being a good solvent for the egg white protein, throws it out of its solution in water. This behavior toward alcohol is by no means limited to ovalbumin, the egg white protein. Mentally alert drunkards may have observed that mucin, the protein that makes saliva viscous, behaves the same way. This tendency to be precipitated by alcohol is also shown by certain other lesser known proteins.

It is an almost general rule that alcohol, while one of the best organic solvents available, is totally lacking in power to dissolve proteins. Consequently the discovery more than a century ago of zein, a protein of corn, attracted wide attention from chemists of the time. For zein is readily soluble in dilute alcohol. This fact led to its early identification, since, being the only alcohol-soluble protein, it could be easily separated from other proteins by an alcohol extraction.

For more than a hundred years after its discovery zein remained only a laboratory curiosity to those few scientists who were well versed in the complex behaviors of biological products. Recently, however, attention has been turning toward it again as a chemical raw mate-



Tall corn, long a staple food and producer of many by-products, may provide even further uses under a new chemical process.

rial of many interesting commercial possibilities.

A grain of corn contains about 10 per cent by weight of protein substance, about half of which is zein. These materials are normally recovered as one of the steps in the manufacture of cornstarch and corn oil. The germ of the grain, which contains most of the oil, is first mechanically separated from

the starchy part, and the starch then separated from the proteins and fibrous matter by washing. Heretofore these residual proteins of corn have been regarded as a by-product of comparatively little value.

The zein, which is obtained by dissolving it out of the above protein mixture with dilute alcohol, is a light-colored powder which resembles dried shellac or colloid in many of its properties. It is insoluble in water or many of the common organic solvents. It is not affected by oils. It does dissolve in dilute alcohol, as mentioned above, and also in dilute alkaline solutions.

The chemists are interested in the fact that it can be molded when subjected to relatively mild temperatures and pressures, that it is a good electrical insulator, and that it does not deteriorate under prolonged exposure to heat and light. These facts indicate that zein by itself might make a fairly good plastic or coating material.

More important still, it can be mixed with the plastics derived from cellulose, as well as with some of the ingredients used to give strength and toughness to synthetic plastics. Such mixtures are clear, light-colored solids resembling celluloid, capable of being molded into solid objects or rolled into sheets as is cellophane. Further research will be necessary before the usefulness of zein can be completely established, but these preliminary tests indicate it to be a promising material.