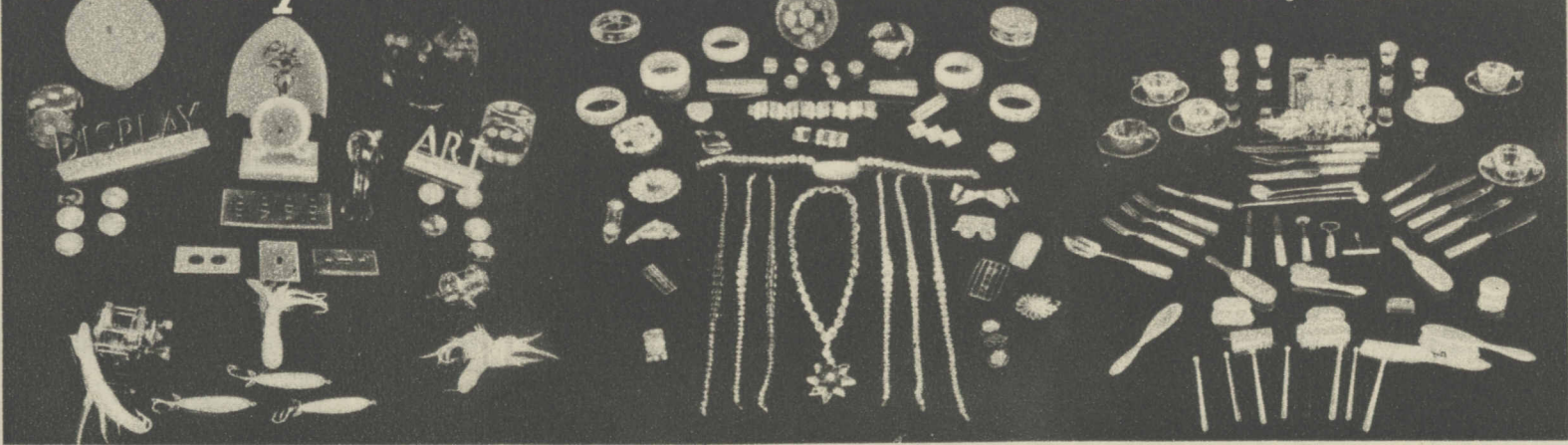


The Graphic Laboratory of Popular Science

By
Dr. Thomas M. Beck

Industry from an Accident

Last week Dr. Beck told of the search for synthetic rubber. Here is the picture story of catalin, a plastic discovered during that search.



1 Searching for synthetic rubber, scientists accidentally discovered the formula for phenolic resin, the commercial classification for plastics. Out of this accident has come the industry that turns out the diversified products above—everything from bowling balls and dental plates to jewelry and bookends—and all in a variety of colors.

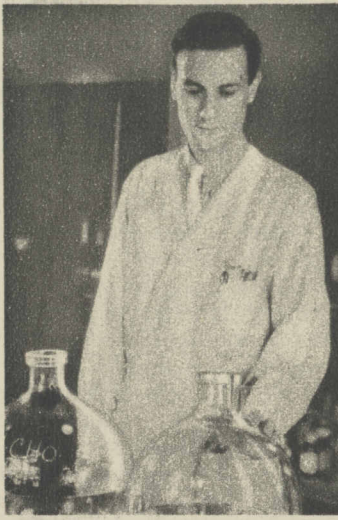
Harmless Fuel Gas

MOST fuel gases made from coal contain carbon monoxide, a colorless and odorless gas. The many advantages of carbon monoxide as a fuel are marred by the fact that it is a deadly poison, and one that is all the more dangerous because its presence is never detectable to human senses.

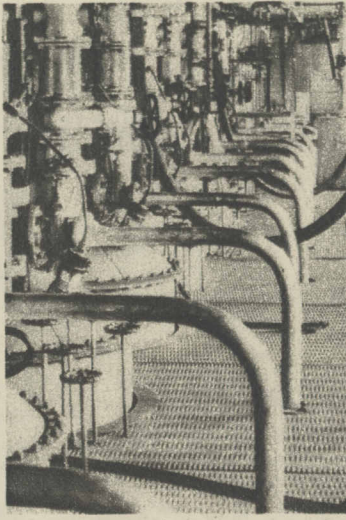
A recently developed German process shows a way in which the small but still dangerous amounts of carbon monoxide can be removed from coal gas without any loss of its heat value. The gas is mixed with enough steam to correspond to the carbon monoxide present and passed over a hot catalyst (reaction promoter) consisting of a special mixture of iron oxide, lime, and magnesia.

The resulting reaction is a simple one. Contact with the catalyst causes the steam (H_2O) to transfer its oxygen atom to the carbon monoxide (CO), so that the final products are hydrogen (H_2) and carbon dioxide (CO_2).

Since hydrogen possesses about the same amount of heat per cubic foot as does carbon monoxide, there is practically no change in the fuel value of the gas. The carbon dioxide, which is as nonflammable as water, is absorbed by the lime and magnesia present in the catalyst to form calcium and magnesium carbonates. When the catalyst has absorbed all of the carbon dioxide that it can hold, its absorptive capacity can be restored by heating it to a higher temperature, under which conditions the gas is completely driven off.



2 The ingredients in these jars form catalin. They are phenol, derived from coal, and formaldehyde, derived from wood pulp or cornstalks.

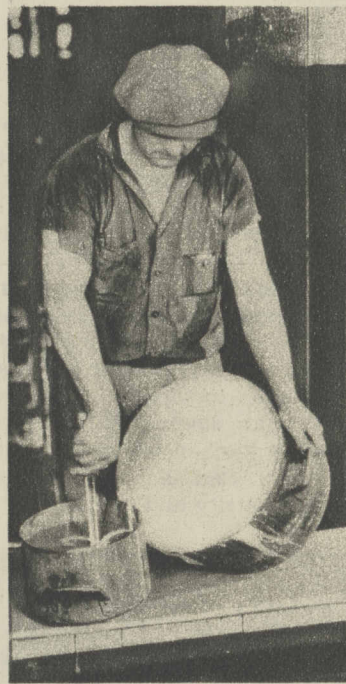


3 Cooking of the gas-liquid combination is done in these vessels, a process watched closely, since the substance begins to harden quickly.

(Photos © Acme Newspictures, Inc.)



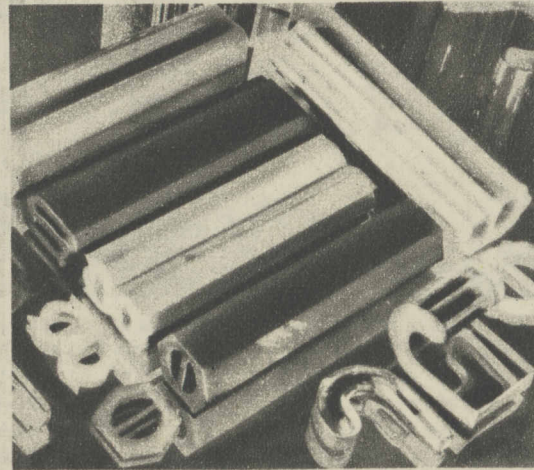
4 At the same time molds are made by dipping steel shaped to the desired form into molten lead, which "freezes" and is peeled off.



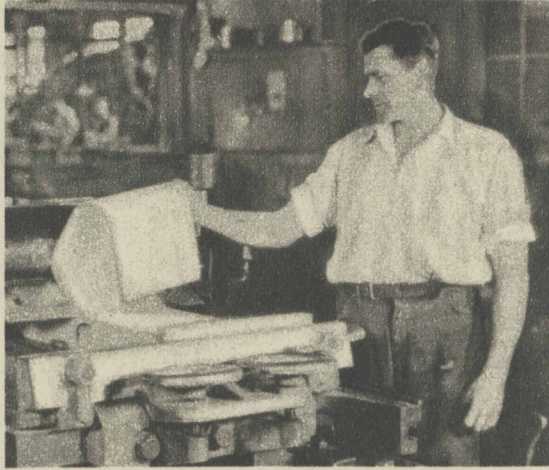
5 Molds ready, the cooked liquid is mixed by expert color blenders, who accurately judge color combinations without measuring.



6 From great 3,000-pound kettles the catalin is drawn off in ladles and poured by hand into the molds, where it hardens quickly.



7 The molded product looks like this. Notice how some of the bars have been sliced off, as simple a process as slicing cheese once the catalin bars have been immersed in hot water.



8 Another form of casting catalin is in sheets, between plate glass. When special thicknesses are wanted, however, the sheets are sliced in this machine while the material is still pliable.

Science Produces Chemicals from Seaweed

SEAWEED is a crop that is unaffected by drouth, erosion, or government regulation. It is a general name given to a group of plants whose varieties are almost as diverse as all the rest of the vegetable kingdom, varying in size from microscopic organisms to plants the size of a small tree.

They differ in one important respect from other plants. Taking their nourishment from the sea instead of from air and soil, they are freed from the necessity of being rooted in one spot. Moreover, the difference in food requirements has resulted in profound differences in both the physical and the chemical structures from those of other plants.

Seaweeds are usually rubbery rather than fibrous in structure. They contain no cellulose, the fibrous substance that accounts for about half of the matter in land plants. Instead they contain related substances of a gelatinous nature. These seaweed gelatins and cellulose both are derived from sugar. The various sugars are relatively simple compounds of carbon, hydrogen, and oxygen that the plants synthesize from carbon dioxide and water. When a few sugar molecules, of the order of a half dozen, are linked together chemically, the resulting compound is a dextrin (the sticky

stuff on stamps). A joining together of still more sugar molecules forms starch. Cellulose, in spite of its apparent dissimilarity to sugar, is actually a compound of a thousand or so sugar molecules.

Lying somewhere between starch and cellulose in complexity are the gelatinous materials of seaweed. These substances have been used for human food for thousands of years. Less needed for food now, they have found other uses, particularly as adhesives and sizing materials for paints, plasters, and textiles.

Probably the best known of these seaweed jellies is agar, which is made in Japan. The

plant is boiled with water, and the resulting broth, after being strained from the solid residue, "jells" on cooling. The jelly is then frozen. The freezing disrupts the structure of the jelly, and after melting the agar is left as a spongy solid which dries to a horny solid.

Agar is highly important in bacteriological work because of its property of forming jellies that solidify at around body temperature but which then do not liquefy until heated to considerably higher temperatures. The dried material is also used in medicine as a laxative because of its ability to swell to a bulky jelly on contact with water.

Mostly About Dogs

By BOB BECKER

Friendship Is Vital to Puppy

IF A DOG owner just getting acquainted with his new dog will remember that canine creatures have practically all the emotions possessed by a human being it will help both the owner and the pup to get off on the right start in their partnership. Fear, shame, joy, anger, affection, impulsiveness, and other emotions are in your dog.

For example, an extremely loud noise in the house several hours after your new pup has arrived may scare him so much that he will be shy for a long time. It's difficult for a young pup to be taken from a kennel where he has lots of canine pals, placed away in a strange automobile for his first ride, introduced to a new home with new masters, and get adjusted to surroundings which are completely different from his kennel home.

Here are a few things to remember about caring for a new puppy in your home:

1. Give the pup a few days to get used to his new surroundings. Let him roam through the house as he pleases to explore every nook and corner. Let him walk around the house and use his eyes and nose to find out what's what.

2. Try not to scare your puppy in his first few days in your home. Advise the children not to play too roughly with a young puppy, don't let doors slam near him, and don't handle him too much.

3. Don't expect an eight-week-old pup to come into your house and sleep the first few nights without getting lonesome and possibly frightened. It is unreasonable to expect a very young dog to spend his first or second night away from his family without feeling their loss and



(Etching by Walter Bohl.)

This etching of an Irish water spaniel by Walter Bohl shows the breed in a pose that is quite typical of the season. With the waterfowl season under way in many states, the Irish water spaniel and other retrievers delight their owners by retrieving ducks in lakes and marshes.

continuing this practice until the new pup was at home around the house the dog owner moved the pup and his bed to another part of the house where the dog was to sleep every night.

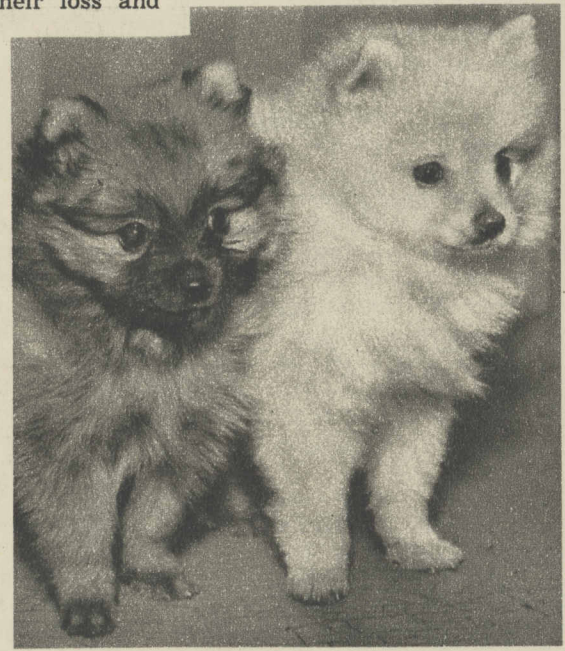
4. Give the pup something to chew. Naturally the young dog wants to chew on things, because in the first place a dog has no hands, so he makes his mouth and teeth take the place of hands. Secondly, puppies have the desire to chew things because they feel good to their teeth. During the first weeks

a ten-week-old terrier a short time ago I put him in a box at night. He couldn't get out of it to run around and make a nuisance of himself. Just as soon as any one was up and around in the morning the puppy was taken outside for a romp as one of his lessons in house-breaking.

Later, when the terrier was too large to be kept in his box and had acquired the fundamentals of house manners, he was kept each night in a certain place in the house that from then on was his "corner." Here he slept.

DOG NOTES

In some cases the dog owner finds it quite a problem to house-break a puppy. Puppy owners will find complete directions on house-breaking in "The Dog Book," an inexpensive but thorough handbook on dog care which costs but 30 cents by mail. "The Dog Book," by Bob Becker, which is now in its second edition, is a 94-page guide on dog care. It is beautifully illustrated and tells how to house-break and feed puppies and how to solve many of the problems of ownership. Orders for the popular little "Dog Book" should be sent, with remittance, to this department or to the Tribune Public Service Office, 1 South Dearborn street, Chicago.



Although they are just twelve weeks old, this pair of Pomeranians already have begun to win ribbons. At the left is Gold Blackacre, best toy in a recent puppy match. At the right is Gold Puff. The smart little Pomeranian is one of our most popular toy breeds.

realizing that he is very much alone in the dark. Above all, don't whip the puppy for whining or crying. The pup is whining because he is lonesome and a little scared, and whipping him won't dispel those reactions. A friend was telling me (with a smile) the other day that he and his wife couldn't stand this whining of a new pup for the first night the dog was in their home, so they brought the little pet in his box into the bedroom near the bed. A couple of pats on the puppy's head, a few reassuring words, and all was well. The pup went to sleep immediately. He was near somebody and he wasn't scared. After

you have your pup the training must teach the dog that he can have things of his own to chew on, but that there are many other things absolutely taboo. A solid beef bone, a rubber bone, or other things can be provided for the pup to chew on. If he picks up a slipper, call him, say, "No, no, no!" in a firm voice as you take it from him, and then hand him something that is not taboo for the chewing exercises.

5. It's a good idea for the new pup to learn quickly that he has a bed where he is supposed to sleep every night instead of being permitted to sleep wherever he pleases. When I was concerned with the education of

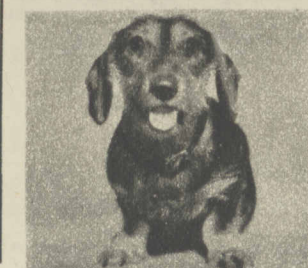
Modern Game Breeder magazine reports an incident in which dogs served their owners in an unusual way. Near Seward, Alaska, an enraged bull moose attacked two guides with their sled and dog team. In his first charge the moose knocked one guide into a ditch and the other into the snow ahead of the dogs. The bull then smashed the sled and again turned upon the men. At that moment the lead dog and four others threw themselves at the moose. After a brief skirmish the animal fled.

If a dog is very excited and nervous, as, for example, during a severe thunderstorm, reach for a bottle of brandy and pour him a little drink. This is the surprising advice given by a professor of the Royal College of Veterinary Surgeons in England. Another veterinarian said that dogs which are frightened by thunder should be given a dose of bromide, especially if they are highly strung or have weak hearts.



(Tribune photo.)

Three little schnauzers that are rather puzzled about this business of posing for a camera. They are eight weeks old and were photographed when they made their debut in show circles at a puppy match.



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