

The Graphic Laboratory of Popular Science

By Dr. Thomas M. Beck

Cotton That Dissolves in Water

COTTON CONSISTS of cellulose, as do linen, wood pulp, and most of the rayon now used. As every one has observed, none of these forms of cellulose is soluble in water, although a slight affinity for water is indicated by the fact that fabrics of these materials are weakened somewhat by prolonged immersion.

Even less water-soluble are the cellulose esters, formed by combining cellulose with acids. Guncotton, celluloid, and acetate rayon are examples of this type of substance. While more soluble in other solvents, they are almost impervious to the action of water.

Most chemists would predict that cellulose ethers, compounds of cellulose with alcohols, would be similarly water-insoluble. Surprisingly, when more than a certain minimum proportion of alcohol is combined with cellulose the resulting ether exhibits the same kind of water solubility that is shown by gelatin. A small quantity of it placed in cold water slowly swells and eventually dissolves to form a sirupy solution.

This property of cellulose ethers has been recognized for the last fifteen years, and one of them, ethyl cellulose, the ether of cellulose with ordinary grain alcohol, has been produced commercially during the last year or so. To produce ethyl cellulose, cotton linters or a high grade of wood pulp is cooked with a solution of caustic soda, then treated with ethyl sulphate, a compound



Picking cotton on a Dixie plantation. Natural cotton is one of the sources of cellulose ethers.

of alcohol and sulphuric acid. A recently developed method uses in place of the caustic soda solution a solution of quaternary amines, highly alkaline organic derivatives of ammonia.

Because of this water solubility, cellulose ethers cannot be used in making textile fibers, as can both cellulose and its esters. It has limited possibilities in making films similar to cellophane. Its chief fields of usefulness are those in which advantage is taken of the fact that small amounts of it form thick sirups when dissolved in water.

Ethyl cellulose, while as devoid of nutriment as the cotton from which it is made, is harmless when taken internally and therefore has been suggested as a thickening agent for various emulsions and pastes intended for food, drug, or cosmetic purposes. One novel suggestion is that of adding a little of it to beer to produce a nonshrinking foam. Having no food value, ethyl cellulose pastes could be



Cellulose ethers have been suggested as a means of making the white collar (foam) on beer more lasting. (Tribune photo.)

used to replace adhesives of starch or casein, which are subject to attack by bacteria or insects.

Find a Way to Dye Rayon Internally

HERETOFORE the process of dyeing has consisted of applying dyes to the outer surface of various textile fibers. In the cases of the natural fibers, cotton, wool, silk, and linen, this has been necessary because the dyes have had only the finished fiber with which to work. This limitation does not hold in the case of the rayons,

which are subject to human control at all stages in their conversion from formless liquid to silky fiber.

It might be supposed that the first investigators of rayon would have tried to color the liquids from which the fiber was to be spun, in order to produce a fiber that was colored clear through. In this, as in other textile problems, however, there are far more difficulties than an outsider realizes. Only recently has a more or less promising means been found of imparting color to the whole fiber.

The rayon for which the process is suited is of the viscose type; that is, cellulose that has been converted to a sirupy liquid by treatment with alkali and carbon bisulphide, then drawn into fibers and reconverted into solid cellulose by treatment with an acid. A colorless material capable of oxidation to a dye is



A scene in a rayon mill. Rayon is a fabric that is spun from a liquid.

added to the liquid before spinning, and after the fiber has been solidified it is subjected to an oxidizing treatment to bring out the color.

Although the process is being extensively tried in Germany, it

is still in an experimental stage and no information is available at present as to its merits or faults. Presumably, however, fabrics dyed in this manner should be extremely color-stable toward both wear and washing.

And Now—Lether from Seaweed



Hides from live stock, principally from beef cattle, supply the principal source of natural lether. (Acme photo.)

AFACTORY is being built in England to manufacture imitation lether from a certain kind of seaweed found at the mouth of the Thames river. It is a well known fact that gluey or gelatinous materials can be extracted from seaweed in large yields, and these form the starting materials for the lether. The seaweed material is first coated on a fabric base and then hardened by a

secret chemical process. The product is said to compare favorably with many other imitation lethers, which may or may not be a compliment.

In England, as in America, imitation lether is manufactured solely for decorative purposes. The surfaces of expensive lethers are copied by means of plastic coatings on heavy fabrics, and the wearing qualities of the finished product are of second-

ary importance. On the other hand, because of the shortage of raw materials in Germany the chemists of that country are trying to produce an artificial material with the texture and strength of genuine lether.

One of the most recent German efforts in this direction is the production of a lether substitute consisting of a vinyl resin (a synthetic resin made from acetylene and organic acids) and a fibrous material such as wood pulp. Ordinarily such a combination would be expected to give a hard, strong mass, but by suitable treatment it is claimed to be possible to make the resin-fiber combination into a tough, pliable, and porous substance resembling lether. It is doubtful, however, whether this product is a good enough imitation to replace genuine lether in countries that have a sufficient supply of the real thing.

Mostly About Dogs

By BOB BECKER



A pair of champion Yorkshire terriers, Petite Wee Wee and Petite Baby Gill, owned by G. V. Stone of Columbus, O. This toy breed was introduced into the United States around 1880. The long, silky coat of the Yorkshire is quite distinctive.

The Toy Breeds Provide Intelligent Pets

IF THERE is any one group of dogs that has given man much satisfaction and intimate companionship it is those known as toys. Such breeds as the Pomeranian, Pekingese, toy Manchester terrier, Maltese, toy poodle, Yorkshire, Chihuahua, papillon, and others have been developed in an atmosphere of close companionship with humans over a period of many centuries.

This background has made these little pets sympathetic, intelligent, and understanding. Invariably you will find dogs of breeds such as mentioned very alert and intelligent—the result of their getting much attention from their owners and living close to them throughout their lives.

Sometimes you hear persons quite unqualified to criticize breeds of dogs make the comment that the toys are rather unnecessary members of the canine family and serve no useful purpose. These critics are intolerant, as you may surmise. As a matter of fact, the toy breeds have an appeal and charm which enables them to give no end of pleasure to thousands of people. Those who have to lead a shut-in existence, with human contacts rare, especially are able to testify to the pleasure that toy breeds bring to their owners.

When you consider that the value of these toy dogs as canine members of a home has been tested down through the ages you realize that they must have certain attributes which are invaluable. We always are intrigued by the perky, alert manner of the toy breeds. Last winter we became intimately acquainted with the Maltese terrier, one of the toy breeds that is pert and active. We were quite impressed with its obvious qualities as a small companion dog that is able to adapt itself to people and limited living quarters where chances for exercise are restricted.

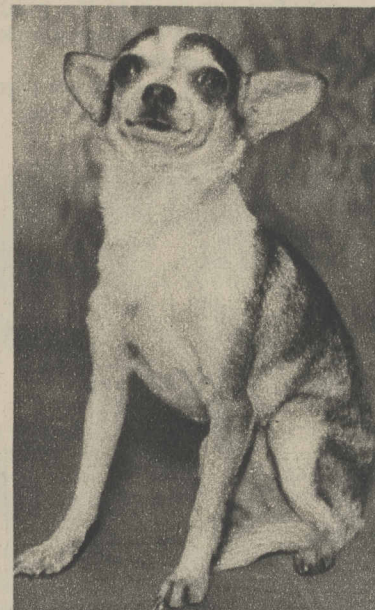
Toy breeds come from all corners of the globe. The Pekingese, the seventh most popular breed, according to A. K. C. registrations in 1936, is the aristocratic little lion dog of China. If any toy can be said to have an imposing appearance this old breed is the one. It also has

courage and a real personality. The Pomeranian, from old Pomerania, Germany, which runs a close second to the Peke in popularity, is a perky, vivacious little animal. This vivacity makes the Pom an interesting pet. A good one with lots of poise and the typical merry action of the breed is an attractive picture in a show ring. There is no lack of bold-



(Tribune photo.) This head study of International Champion Sand Boi of Iwade O'Ceylon Count shows the dignity and regal expression of the Pekingese. The Peke is a very popular member of the toy breeds.

something of a disadvantage because of its coat (which requires much care), the Yorkshire is nevertheless a spirited little dog. The Affenpinscher is a rather new addition to the toy group. It's a German breed, commonly called the monkey pinscher. The pug dog, another toy breed, used to be very popular years ago; then it lost favor among fanciers. Now it is staging a comeback. It is believed that this companionable, intelligent little dog originated in China. Toy Manchester terriers are among the oldest of the modern toy breeds. As the "black and tan terrier" it was mentioned in a dog encyclopedia written in 1570.



(Tribune photo.) The Chihuahua comes from Mexico. The standard of the breed calls for a dog that is alert and swift moving, with terrier qualities.



Peter Blackacre Again and Blackacre Orange Blossom, a pair of Pomeranians. The Pom is a very popular toy breed. It is a vivacious, intelligent little dog with an affectionate disposition. (Tribune photo.)

ness in Poms, so they often make good watchdogs to sound alarms around the home.

Mexico gives us the Chihuahua and the Mexican hairless, two toys that show some terrier traits. It is believed that the Techichi, a breed of dog much liked by the Toltecs of Mexico centuries ago, is one of the ancestors of the modern Chihuahua. In fact, legend and history are rich in stories of the ancestors of the modern Chihuahua. It is believed to have been a popular pet as well as a religious symbol among the Toltecs and Aztecs. Today the Chihuahua is known as an alert and intelligent member of the toy dog family.

The Yorkshire has real terrier instincts, because there is a terrier strain in the breed. At



(Tribune photo.) The Affenpinscher, a rather new member of the toy breed group. The breed originated in Germany. The dog pictured is Mucki von Charlottenhobe.

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