

CHEMURGY

Peanuts Do a Big Job

Besides their many food uses, peanuts give glue for bookbinding, silky fibers and a cork substitute. All parts of the plant and nut can be used.

By MARTHA G. MORROW

➤ THOSE CRUNCHY peanuts have some industrial brothers out of the same shells:

Glue for bookbinding, flexible and light-colored.

Cork substitute, made from the ground hulls.

Silky fiber for clothing.

And peanuts are still peanuts, even roasted in the shell for circus eating!

There are new developments in peanut products for your table:

Salted peanuts that are fresh after many months of storage.

Peanut butter from which the oil does not separate.

Peanut oil that does not get cloudy when kept in the refrigerator.

Peanuts, large quantities of which are marketed each year as peanut butter, salted peanuts and peanut candy, were once grown exclusively for sale roasted in the shell and for feeding to hogs. Many millions of pounds today are used in the form of oleomargarine, vegetable shortenings and salad oil. Tomorrow it may appear in a variety of forms ranging from glycerol to pocketbooks.

Excellent tacky glues have been made from the protein left after oil is extracted from the peanuts with a solvent. These re-wettable "goober glues" hold things together almost as tenaciously as animal glues. Light in color, they are particularly good for gumming white paper.

Paper gummed with this protein paste is not likely to stick when stored in a hot humid atmosphere. Particularly suited for use on cardboard or other products that must be bent when glued, these glues were prepared at the Southern Regional Research Laboratory. They are good for gluing paper-covered boxes and for bookbindings.

Silky Yarn from Protein

Both wool-like and silky fibers have been made experimentally from peanut protein. A sticky alkaline solution of the protein is forced through a rayon-type spinneret into an acid bath where it thickens into a yarn. The yarn is treated with formaldehyde to harden the protein and is stretched to bring the molecules into line.

Most of the research on the wool-like fiber was conducted in England. This yarn is suitable for use with rayon, cot-

ton and wool. Fiber with many silk-like properties was produced in the United States.

A way of stabilizing peanut butter so that the oil does not separate and rise to the top, leaving the bottom extremely dry, has been developed at the Georgia Experiment Station with the cooperation of the National Peanut Council, active in coordinating research on peanuts. An effective way of overcoming oil separation has long been sought because the oil floating on top of peanut butter becomes rancid more rapidly than when in contact with the ground peanuts. With little change of existing machinery, all peanut butter can now be protected against having the oil rise to the top.

The peanut butter with which we are familiar is made of finely ground, freshly dry-roasted, blanched peanuts with salt added. Flavored with orange, chocolate, malt and sweet pickle, peanut butter is now being wrapped as a confection. Firm enough to be put in block form, it can be sliced like cheese or meatloaf for use as a sandwich filling.

Oil Has Many Uses

Peanut oil has long shown promise as an excellent product for use in manufacturing mayonnaise and salad dressings, except for the fact that it becomes cloudy at low temperature. As this tends to make mayonnaise separate into layers of oil and water on long storage in the refrigerator, peanut oil has not been used commercially in mayonnaise.

It has recently been found that peanut oil can be dissolved in an organic solvent or mixture of solvents, chilled, and the undesirable portion removed by filtering. Taking only an hour and a quarter to "winterize," a yield of 80% of oil that does not become cloudy can be secured for use in mayonnaise, salad dressings and at the table. Through use of this same process, a modified oil has been developed that is reported superior to olive oil as a textile lubricant.

Control of the moisture content of peanuts and peanut products has been found to be of paramount importance in increasing the length of time they can be kept fresh. Rooms in which peanuts are stored should have a relative humidity of about 60%. Study has also shown that the moisture content of pea-



BY THE PECK—Peanut picker in operation on a farm. The vines and nuts go into the back of the picker with the shelled nuts pouring out the side into a tub. Hay is baled for livestock feed.

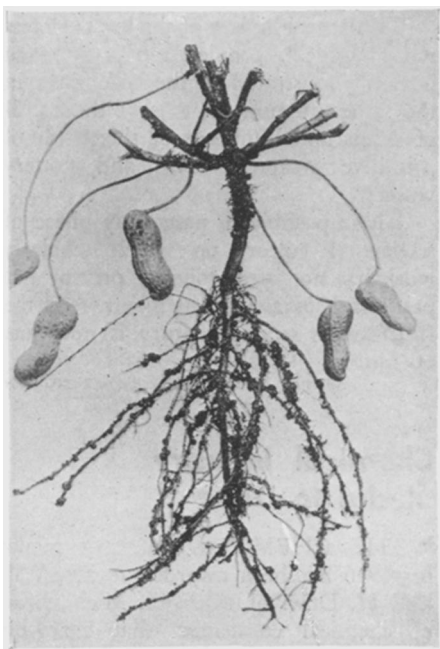
nuts should be kept about 1.5% for roasted peanuts, slightly higher for hard peanut candies, and around 5% for cured nuts.

Approximately 90% of America's peanut oil production goes into edible products, vegetable shortening and oleomargarine accounting for most of it. Non-food uses include the manufacture of soap, shaving cream, cosmetics and pharmaceutical preparations. Highly refined oil has been found to be a good carrier for important drugs such as penicillin and adrenalin. Other possibilities include the use of peanut oil in oil sprays and insecticide emulsions.

Peanut hulls, now burned as fuel at the processing plants, may some day be the source of wood alcohol. Grape and wood sugars contained in the hulls can be fermented by a novel process worked out at the Northern Regional Research Laboratory to produce alcohol and other organic liquids for use as motor fuel.

Peanut Is a Legume

Because of its peculiar growth, peanuts are usually sown and harvested by hand. Instead of being a nut, the peanut is really a legume like a pea or bean. Its fruit or pod, however, matures beneath



LEGUMES—Peanuts are not nuts at all. The stems or "pegs" on which the flowers appear elongate above ground, bend down and bore into the earth, and the pods develop underground. Photo by Bureau of Plant Industry, Soils, and Agricultural Engineering, U.S.D.A.

the surface of the soil.

The small yellow flowers are borne at the joints where the leaves are attached to the stems. As soon as pollination takes place, the flowers fade, the stem bends down, and the "peg" elongates and goes into the soil where the pod develops. Hence peanuts must be grown on soil with a loose surface.

Peanuts are usually planted in rows two or three feet apart, the individual plants being set at four-inch intervals to keep them from spreading too much and producing many poorly filled pods. After digging, the peanuts are stacked around poles for curing. They usually remain on the curing stacks three to six weeks before the nuts are picked from the vines. Better methods of harvesting are being studied and a planter of new design was tested this spring.

About 750 pounds of peanuts are harvested per acre as an average for the United States. In Virginia and North Carolina, 1200 pounds per acre are produced, while in Texas and Oklahoma only about 450 pounds are obtained from each acre. This difference is partly due to the fact that peanuts are usually harvested mechanically in the Southwest; in Virginia and the Carolinas it is done by hand.

Peanuts are one of the leading crops in many of the Southern states. Twice as many are grown in Georgia as in the other peanut-producing states. When hay, which is sold like alfalfa, is included, the total farm value of peanuts last year was around \$285,000,000. The lower grades of peanuts are crushed for oil, the top grades are kept for use in candy, salted peanuts and peanut butter.

Peanuts are harvested early in August in South Texas; they can be left on the ground until November or December in North Carolina and Oklahoma. Around 1,500,000 tons of peanuts are expected to be harvested this year.

Rotating Crops

Raising peanuts soon exhausts the soil, so this crop is usually grown on the same plot only every third year or so. Investigations conducted at the Alabama Polytechnic Institute show that blue lupine is an excellent legume to use as a winter cover crop to restore the soil.

A top-notch soil builder is believed to consist of the following three-year rotation—one-third of the area planted in peanuts which are harvested. The barren peanut fields are protected during the winter by lupine with its rapid growth. The second year corn is grown. The third

year peanuts are produced, but instead of being harvested, hogs are turned in to fatten on the crop. The next year the soil is again ready to produce a bumper peanut crop.

Peanuts are exceptional among southern farm crops in that every part of the plant and all by-products resulting from the factory processing through which peanuts pass can be utilized in feeding stock. Peanut hay and light or inferior pods can be fed to the hogs on the farm. Meal from which the oil has been squeezed, red skins and "hearts," the embryo of the plant, all can be used to fatten hogs.

The hulls, besides being fed to stock, are utilized in insulation, paper board,

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Do You Know?

The cost of a *medical education* ranges from \$8,000 to \$12,000.

Malaria is a disease of the mosquito; man is an intermediate host.

Water-resistant *matches*, developed for soldiers, are now available for civilians; they will light after hours of soaking.

The *fungus* responsible for white pine blister rust cannot spread the infection from pine to pine, but lives one stage of its life on currant or gooseberry plants.

"Quick" *oatmeal* has a nutritional advantage over the old fashioned kind, it is claimed, since the content of vitamin B₁ or thiamin, decreases after the first 30 minutes of cooking.

A *shipping canal* to by-pass the Suez is said to be under consideration in London; it would be located in southern Palestine, connecting the Mediterranean near Gaza with a northern arm of the Red Sea close by Aqaba.

The strain of *mold* now used for most of the nation's penicillin production can be traced back to a mold on a Peoria, Ill., cantaloupe; with the help of X-rays or ultraviolet rays the yield of penicillin has been doubled.

YOUR HAIR AND ITS CARE

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plastic filler and explosives. Cork substitute containing ground peanut hulls will probably be produced commercially soon. Plastic molding powders may also be made from the hulls.

The edible portion of the peanut contains major proportions of three primary dietary necessities: protein, carbohydrates and fat. Because of its relatively low moisture content and high percentage of fat, it is one of the most concentrated of foods. One gram supplies 5.8

calories, as compared with 2.3 for beef-steak, 3.6 for whole wheat, 2.6 for white bread and 4 for pure cane sugar. In addition, it contains significant amounts of vitamins and minerals.

India ranks first in world production of peanuts, Africa second, China third and the United States fourth. Whereas the others use the peanut only as oil seed or to feed livestock, the United States alone has built up an edible food industry based on peanuts.

Science News Letter, August 10, 1946

GENERAL SCIENCE

Smithsonian Century Old

See Front Cover

► THE SMITHSONIAN Institution, America's most venerable research organization, is having a birthday—a very important birthday. It is exactly a century old today.

As part of the celebration, a special postage stamp has been engraved, the first sheet of which was delivered to the Institution's Secretary, Alexander Wetmore, by Postmaster-General Robert T. Hannegan at a special ceremony in the auditorium of the National Museum. The stamp, which is of three-cent denomination, shows the many-turreted old building on the Mall in Washington, D. C., that houses the executive offices of the Institution and part of its exhibits. A view of the building as it appears on the new stamp is shown on the front cover of this SCIENCE NEWS LETTER.

The Smithsonian Institution, which owes its origin to a bequest made by an Englishman, James Smithson, who never saw America, has charge over the U. S. National Museum, the National Zoological Park, the National Herbarium, the National Gallery of Art, the Freer Gallery of Art, the National Collection of Fine Arts, the Bureau of American Ethnology and the Astrophysical Observatory. Closely associated with the government and administering certain government-supported agencies, the Institution is itself not government-controlled.

Collections in its various museums are in themselves a record of the Institution's long service to America's cultural, scientific and technical development. Here are housed the original models of Morse's telegraph, Whitney's cotton-gin, Howe's sewing-machine, Bell's telephone. Here is the flying-machine built by its secretary at the turn of the century, Dr. Sam-

uel P. Langley, with many another aircraft of later date. Here are some of the first steam locomotives to run on American rails.

Stowed in the great loft of the Smithsonian's administration building are scores of thousands of botanical specimens, many of them recording the travels of hardy souls who "saw the West first." On the other side of the Mall, in the National Museum of Natural History, are the massive skeletons of dinosaurs dug out of the rocks in the same West, decades later.

The natural history of the human races who originally peopled North America is richly illustrated in the collections in the same museum, in tens of thousands of skulls and hundreds of thousands of primitive weapons, tools and pottery vessels.

It is impossible to name any phase of science or culture on which scholarly work has not been done by present and past Smithsonian staff members. And the Institution's second century is now just opening.

Science News Letter, August 10, 1946

CHEMISTRY

Chemical Industry Medal to Dow

► THE CHEMICAL Industry medal for 1946 has been awarded to Dr. Willard H. Dow, of Midland, Mich., head of chemical companies that bear his name. He pioneered in production of bromine, magnesium, and other products from sea water, and during the war made styrene for synthetic rubber.

Science News Letter, August 10, 1946

The average *person of 70* has slept enough throughout his life to total 20 years.