CHEMISTRY

Cinderella of the Forest

Modern chemists are finding the bark of forest trees valuable in insecticides, glue, plastics and even fabrics. Barks also furnish medicine and flavoring.

By MARTHA G. MORROW

➤ CHEMISTS AND foresters seeking new uses for bark are not barking up the wrong tree. The thick bark of almost any forest tree, be it redwood, pine or Douglas fir, has been found valuable raw material for glues, plastics and insecticides.

Bark, which may compose up to 40% of the total volume of a tree, has long been considered worthless in logging. When poles, piling, saw logs and pulpwood are harvested, the bark is usually wasted. With little additional effort it can be saved if economically worth while to remove before milling.

Recent research may transform the bark of the great forest trees from a manufacturing nuisance into valuable raw materials. Already the bark of these gigantic conifers is being used commercially, with an increasing demand foreseen for the future.

Using Waste Bark

Bark has been reduced to its three principal components in a search for possible uses for this waste material. One resembles flaked cork. Another is a hard, fibrous tissue. The third is soft and powdery. They differ in chemical make-up and give promise of commercial possibilities.

A powder from bark has proved practical as a conditioner in many types of insecticide dusts, research conducted by the Weyerhaeuser Timber Company of Longview, Wash., showed. This bark dust is specially useful in insecticides that tend to become lumpy, making them flow more freely.

Combination of cork and fiber, another bark product, is used as an ingredient in molding compounds, base of modern plastics. When subjected to pressure and controlled temperature, it produces strong, hard shapes in a durable, inexpensive plastic.

Another bark product, combination of cork powder and fiber, has been found adaptable for use in a new, low-cost resin-base glue. It is used in manufacturing plywood and laminated wood. Following its release to manufacturers of plywood glue, demand for this bark product has exceeded production capacity of the plant.

While other uses for forest tree bark are still being investigated, findings to date are promising enough to justify installation of a bark processing plant, states Clark C. Heritage, technical director of the timber company.

No Finished Products

Here a carload of bark-based forest products will be produced daily. No finished products will be manufactured, however; the raw materials are to be sold to producers of glue, plastics and insecticides.

Finding uses for this waste material makes it feasible to remove bark before logs are sawed, with consequent savings in sawmill operations. At present the bark frequently is processed through the entire mill, only to end up in refuse burners. But practical uses are being developed for the bark to justify the expense of removing it before milling.

BARK FOR BACKS—Fiber from redwood bark, held by the young lady, was used in making the jacket she wears.

Unlike such timber trees as hemlock, pine, spruce and Douglas fir, a few trees are specially valued for their bark. The bark of one is used for insulation. Medicine is extracted from another and spice is made from the bark of a third.

Quinine, important ingredient in many remedies, is obtained from the bark of the cinchona tree, native to the Andean region of South America. The bark is always collected during the rainy season, when it is stripped more easily from the wood. The importance of this anti-malaria bark was emphasized during the recent war when our troops were forced to operate in malaria-haunted tropics.

The earliest well-authenticated instance of the medical use of cinchona bark was in 1638 when the Countess of Chinchon, wife of the Viceroy of Peru, was cured of an attack of fever after taking the powdered bark. The genus was named for the Countess, whose name was misspelled in the process.

Cultivation of the cinchona tree has been attempted with varying degrees of success in Algeria, Ceylon, India and Java. The Java plantations, due to the industry of the Dutch planters and the chance discovery of a high-yielding strain, have been so successful as to enable the Dutch producers to establish a virtual monopoly in the field.

Cork Is Bark

Cork, used in bottle stoppers, is the outer bark of an oak closely related to the native liveoaks of our South and Southwest. The tree is native to the mountainous regions on both shores of the western Mediterranean—Portugal and Spain on one side, Spanish and French North Africa on the other.

The first crop of cork bark can be stripped off when the tree is 15 to 20 years old. Thick shells of bark are pried off in slabs from the trunk of the tree. A new crop may be removed about every ten years for at least a century.

The raw bark is put in big kettles or vats, weighted down and boiled vigorously for half an hour to soften it and remove water soluble materials. Next the rough outer surface of the bark is scraped off and the slabs stacked up to dry. The cork is then ready to be made into cork blocks needed for life belts and fishing net floats; corkboards for insulation in refrigerators and house walls;

composition cork for crown cap liners; and ground cork for heavy-duty linoleum.

Cinnamon, among the oldest spices known, is the inner bark of a tree native to the island of Ceylon. The natives cut down the tops of the trees that are still young. New slender stems grow out from the stump season after season, making them look like shrubs.

Only after the tree is about six years old are the branches peeled. This is done just after the heavy rains, when the trees are full of sap, so the workers can easily separate the bark from the stems without breaking it.

The branches to be peeled are cut close to the trunk, then scraped and the bark removed in long sections. As these dry, they curl and form the familiar cinnamon sticks.

Sassafras Bark

The first cargo of barks ever exported from what is now the United States included a large quantity of sassafras bark. This is used today, much as it was 300 years ago when shipped from Jamestown, in perfuming soaps and preparing scents and toiletries.

Fiber from redwood bark is blended with wool in making blankets, jackets and even felt hats. This reddish fiber is already widely used as insulation in houses and refrigerators, but its use in fabrics is relatively new.

In lumbering on the West coast where the redwoods grow, balls of felted redwood fiber were discovered in the bark shredding machines. This led to experiments to produce a "wool" fabric from redwood bark. The short, kinky fibers blend readily with sheep's wool and can be handled, napped and brushed. Separated by a machine, these fibers are blended with natural wool. The mixture is carded, combed and spun into yarn. Redwood fiber can replace 15% to 60% of the wool in some fabrics.

The earliest industrial use of any kind of bark was in tanning. The rough bark of oak, hemlock and chestnut was put right into the tanning pots with the raw hides. The tannic acid diffusing out into the water acted directly on the hides. Only within recent decades has tannic acid been extracted from the bark before using.

Today sumac bark also is used for tanning fine leather. In Australia tannic acid is extracted from eucalyptus and acacia trees.

Bark accumulating in large quantities at plants where tannin is extracted led to a search for uses for the fiber. It has been found useful as a filler in paper, cardboard, wallboard, roofing felt, composition shingles and for ornamental purposes in some types of wallpaper.

The search for new uses for bark continues. Bark, that may be ten inches or so thick on some trees, is expected to become the Cinderella of the forest as research points to new uses.

Finding new outlets for forest products is but one phase of the industrial program now under way for increasing the permanent usefulness of American forests. First, there is the growing of trees in greater abundance. Second, there is protection of forest growth against destruction by fire, insects and disease. Third, there is greater utilization of each tree. It has been generally accepted that less than half of a log delivered to a sawmill emerges as lumber. For the remainder there has been little or no economic use. Today this part of the picture looks increasingly bright.

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AERONAUTICS

Pusher Type Airplane Has Two-Bladed Propeller

See Front Cover

➤ A PUSHER TYPE of airplane, pictured on the cover of this SCIENCE NEWS LETTER, with its two-bladed propeller at the rear tip of its fuselage, is now ready for its first test flight. It is a five-passenger craft, with two engines inside the body to the rear of the passenger cabin, both of which operate the single eight-foot propeller working together, or either can do so working alone.

The new plane, still in experimental stage, is a product of Douglas Aircraft Company, and will be known as the Cloudster. It is an all-metal monoplane with a range of 1,100 miles and a speed of about 200 miles an hour. Its tricycle landing gear retracts into the nose and wings.

Power for the plane is furnished by two 250-horsepower Continental engines, mounted to use the aerodynamics principle of center-line thrust. Either engine can be cut in or out without affecting flight control. With one engine, the 35-foot long plane with a 40-foot wing span, can climb 600 feet per minute; with both in operation, the rate of climb is approximately 1,500 feet a minute.

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Two thin coats of *paint,* varnish, enamel or shellac are better than one thick coat when finishing furniture.

LOGGING—These logs are in a millpond headed for the saws. Some logs give up their bark easily during logging operations due to rough handling, but the majority cling to their coarse outer skin, making the job of "barking" no easy matter.

EVOLUTION

Smoky Industrial Cities Are Factor in Evolution

➤ SOOTY, smoky cities of the industrial age are apparently factors in evolution, Dr. E. E. Ford of the University Museum, Oxford, England, reported to the Conference on Genetics, Paleontology and Evolution. He has found two dark-colored variants of a common moth is the neighborhood of British cities, one of them nearly black, the other dark brown.

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