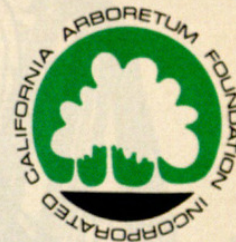


Vanilla: Flavor From An Orchid



IF YOU HAPPEN to visit Papantla, a small town in the north of the state of Veracruz in Mexico, you are greeted with a heavy fragrance that fills the air, comes in the car, and lingers in the clothing. It stays with you as long as you remain in the area. When you leave you can even buy it and take it along, bottled and labeled as "Extracto de Vainilla."

Papantla is the leading vanilla growing district of Mexico. Papantla vanilla is sold all over Mexico and even in some stores in Los Angeles. Its flavor is so pure and so strong that you need only one-third to one-half as much as other vanillas. It is considered to be the world's finest.

Practically the entire vanilla production in the Papantla area is carried out by the Totonac Indians. Totonacs seem to have an inherited knowledge of the conditions needed for growing and curing vanilla. According to a Totonac legend one of their goddesses, Xanath, fell in love with a Totonac but could not marry him. To be close to her lover and to benefit his people she turned herself into a flowering vanilla vine which twines around trees in the Totonac jungle and produces the vanilla beans which have made the tribe prosper.

Vanilla is a genus of the orchid family. About 50 species have been described, only three of which (*Vanilla planifolia* Andrews, *V. pompona* Schiede, and *V. tahitensis*

J. W. Moore) are of commercial importance as sources of vanilla.

The most important species is *Vanilla planifolia* Andrews, also known as *Vanilla fragrans* Ames. It is a vine that, by aerial roots, climbs to the tops of tall trees. The leaves are elliptic to lanceolate, entire, short-petioled, alternate, glabrous, thick and somewhat succulent. They are up to ten inches long and three inches wide. The flowers are greenish-yellow, occur in many-flowered clusters and have a delicate fragrance that, however, is not at all reminiscent of the fragrance of vanilla that we are accustomed to. They are approximately three inches across. Each flower has three sepals, three petals, one stamen and one pistil. The lower petal is larger, three-lobed, and is known as the lip. The stamen and pistil are united and form an organ known as the column. The fruits are narrowly cylindrical, indehiscent and contain countless tiny seeds. The species is, or at least is thought to be, indigenous to southeastern Mexico, Guatemala, British Honduras, Honduras, Nicaragua, Costa Rica, El Salvador, Panama, the West Indies, Colombia, Venezuela, Surinam, Guyana, French Guiana, Ecuador, Peru and Bolivia.

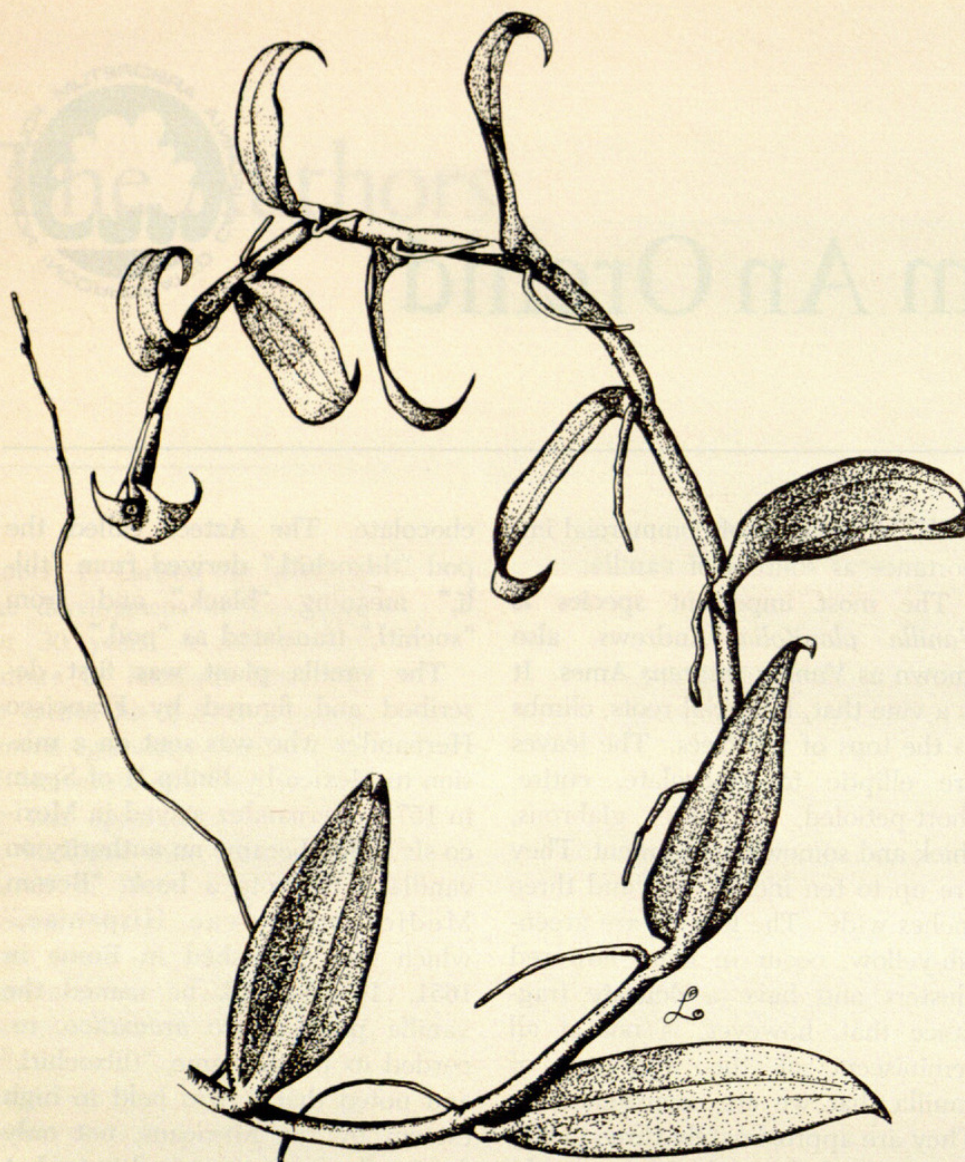
VANILLA PODS were harvested by the Aztec Indians before the discovery of America and were used after fermentation to flavor their

chocolate. The Aztecs called the pod "tlilxochitl," derived from "tlili," meaning "black," and from "xochitl," translated as "pod."

The vanilla plant was first described and figured by Francisco Hernandez who was sent on a mission to Mexico by Philip II of Spain in 1571. Hernandez stayed in Mexico six years, became an authority on vanilla and wrote a book, "Rerum Medicarum Novae Hispaniae," which was published in Rome in 1651. In his book he named the vanilla plant *Araco aromatico*, recorded its native name, "tlilxochitl," and noted that it was held in high esteem by the Mexicans, not only for its pleasant aroma and taste, but also because of its supposed healing qualities.

The vanilla plant was brought from the West Indies to Europe in 1800, and distributed to many parts of the Old World tropics. Although several of them flowered in a few years no fruits resulted. The question was, why?

The mystery was finally solved by the Belgian botanist Charles Morren, who in 1836, obtained two crops of vanilla pods by pollinating the flowers artificially by hand. Morren attributed the failure of the plants to produce fruit in the Eastern Hemisphere to the absence of the particular insect or insects which pollinated the flowers in their native region. In the vanilla growing areas of Mexico the melipone bees and



Vanilla planifolia.

certain species of hummingbird not present in tropical Asia were proved to be pollinating agents.

The operation of pollinating the vanilla flowers is artificially performed with the aid of a small bamboo splinter, a sharpened match or a toothpick. The object is to move the flaplike partition (rostellum) that separates the male and female elements out of the way so that the overhanging anther can be pressed against the stigma and thus smear the pollen on it. On commercial vanilla plantations this operation is done mostly by women and children because of their nimble fingers.

A vanilla vine may bear as many as 2000 or more flowers, but only 40

or 50 blossoms are hand pollinated because too many fruits weaken and exhaust the plant. The flowering period may extend to two months or more, but each blossom lasts only one day, from early morning to late afternoon. Therefore, the pollination must be carried out early in the morning on which the flowers open.

Following fertilization the pods mature in four to nine months and are ready to be picked when they turn yellow at their tips.

THE PODS have no fragrance when picked. It develops during a rather involved curing process taking several months. In Mexico, curing consists of bringing the plucked

Pods into a room where they are spread on racks for 24 hours and allowed to wilt. On the second day, they are spread on mats or blankets on a cement platform and exposed to the sun. In the afternoon they are prevented from drying too much by the mats or blankets being folded over them and at night they are put into airtight cases to sweat. During the following days they are similarly treated. If rainy days interfere with the process, an oven is used to maintain the temperature and continuity of formation of vanillin.

When the curing has been completed the pods, or the beans, as they now are known, are sorted and graded. The most desirable beans are about seven to ten inches in length, highly aromatic, dark brown, fleshy, supple, somewhat oily in appearance, shaped like a long, slim cigar and free of blemishes, mildew and insect infestation. After being sorted and graded they are tied in bundles and packed in tin containers or in boxes lined with tinfoil for export.

White, needle-shaped crystals that accumulate on the outside of the beans when they are stored after curing is vanillin. Chemically 4-hydroxy-3-methoxybenzaldehyde, vanillin is the compound chiefly responsible for the particular fragrance and flavor of the cured vanilla beans. The vanillin content of the beans has been found to vary according to where they are grown, from 1.5 percent in Mexico to 2.7 percent or higher in Java. The percentage of vanillin content, however, is not necessarily proportional to the quality of the beans and does not determine their ultimate value, nor are the most strongly aromatic beans always those with the highest vanillin content. The subsidiary compounds inherent in beans greatly influence the aroma of vanilla.

Most of the vanilla flavoring is marketed in the United States in the form of vanilla extract. It is obtain-

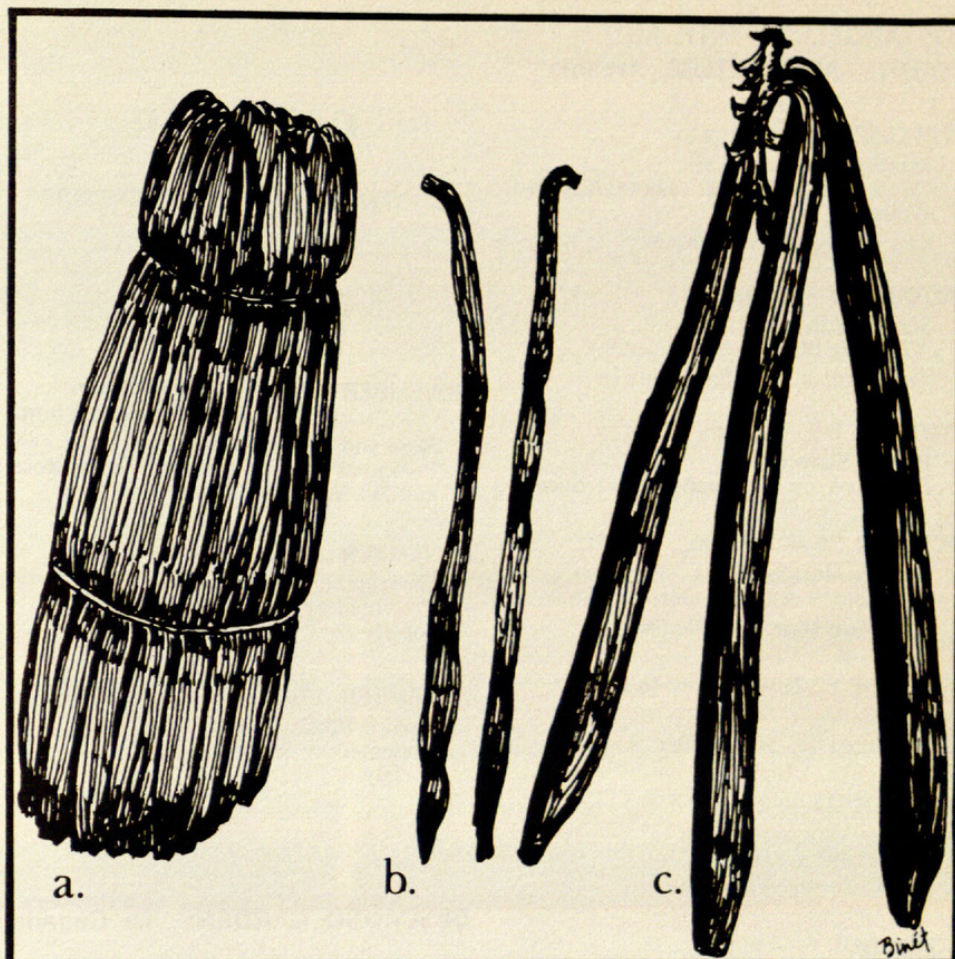
ed from the finely chopped cured beans by hydroalcoholic extraction in much the same way that coffee is percolated. Authentic vanilla extract is the extract of 10 grams of cured unripe beans of *Vanilla planifolia* Andrews or *V. tahitensis* J. W. Moore in 100 milliliters of solution. The solvent is usually 35 percent ethyl alcohol, but it may also contain sucrose, glycerine or propylene glycol. Tenfold vanilla extracts used in the dairy and baking industries are supposed to be ten times more concentrated than the regular extracts. Because of the high price of vanilla beans, some manufacturers market products which are adulterated with foreign botanicals.



Vanilla plant with two beans.

VANILLA extract is widely used as a flavoring for ice creams, egg-nogs, chocolate, puddings, cakes, cookies, etc. It seems to be America's favorite flavor: in 1976, 339.3 million gallons of ice cream out of 805.8 million gallons produced was flavored with vanilla.

The natural vanilla extract has a rival in an alcoholic solution of chemically prepared vanillin to which is added coloring matter and



Mexican vanilla: (a) bundle of cured beans; (b) cured beans, and (c) green beans.

sugar. The two main sources of the synthetic vanillin, discovered in 1890, were eugenol, derived from oil of cloves, and guaiacol, obtained from coal tar. In more recent years most of the synthetic vanillin has been prepared from lignin, a compound derived from wood pulp in paper manufacture. Extract of vanilla, made from the beans, may be twenty times more expensive than the flavoring of comparable strength made with synthetic vanillin. It, however, possesses a pure, delicate, spicy flavor and peculiar bouquet that cannot be duplicated exactly by the synthetic product. This helps to maintain the demand for natural vanilla against its substitutes.

In the United States the Food and Drug Administration standards require that the label read "Imitation Vanilla" if the product contains any synthetic ingredients. If the label

states "Vanilla Extract" the product must be derived from vanilla beans.

Vanilla is now grown commercially in a number of tropical countries with high rainfall, though a dry season is desirable for the best ripening of the pods. The plants are propagated by stem cuttings, and support of them is usually provided by planting small trees of various kinds up which they can grow.

Today, the Malagasy Republic (Madagascar) grows about 80 percent of the world's crop of vanilla beans. The remaining production comes from Mexico, Tahiti, Reunion, the Seychelles, Indonesia and other countries. In 1974, the Malagasy Republic produced 2.8 million pounds of vanilla beans.

At the Los Angeles State and County Arboretum, vanilla plants can be seen in the Orchid House and the Tropical Greenhouse.



Enari, Leonid. 1977. "Vanilla: flavor from an orchid." *Garden* 1(4), 5–7.

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