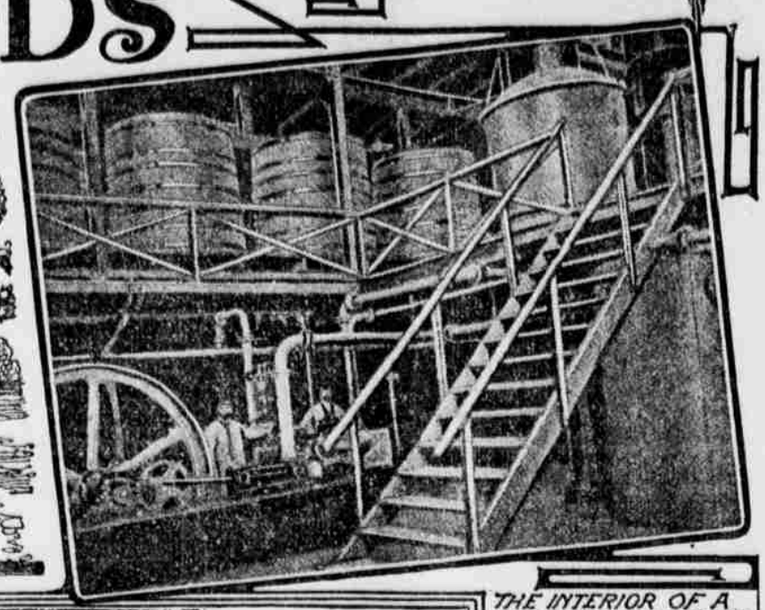
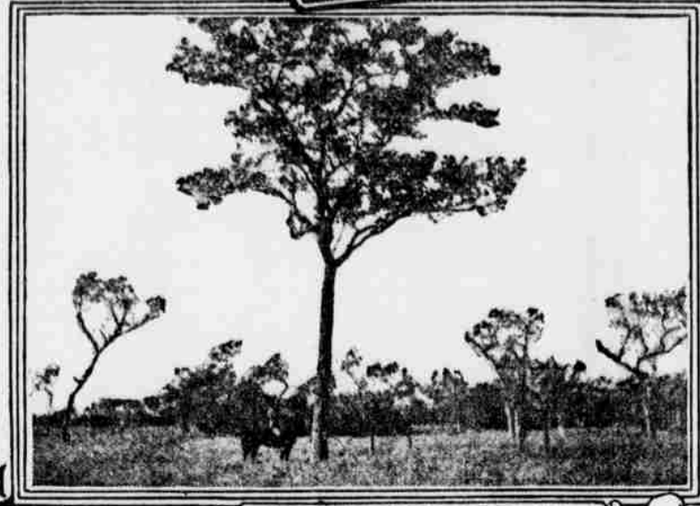
HARDEST OF ALL WOODS



THE INTERIOR OF A QUEBRACHO EXTRACT FACTORY



A QUEBRACHO TREE IN "THE CHACO"

A SAWMILL BETWEEN "THE CHACO" AND CIVILIZATION

THE BARK OF THE QUEBRACHO TREE

TWO of the greatest industries in the world are railway building and the preparation of hides and skins into leather. For the former the sleepers on which the rails are laid are essential and costly factors; for the latter nothing can take the place of some vegetable extract which is the tanning substance of the trade. Sleepers can be made of glass and metal, but these do not give the satisfaction of those made of wood. The oak and the hemlock have for ages supplied tannin by which leather is cured; in fact, the very word tann implies by its derivation its relation to the oak, by which name the tree was called in old Breton language. Railway sleepers have been made from the oak, but the expense grows higher year by year. No wonder, therefore, that the earth is scoured for trees to furnish either the one or the other or both of the substances, and no wonder also that manufacturers and builders hailed with delight the announcement a few years ago of the availability for both purposes of the South American tree called "Quebracho."

Quebracho is a contraction of the colloquial Spanish and Portuguese term quiebra-hacha, originally applied to many trees in Latin America. It means "ax breaker," and the character is implied in this meaning. The wood is hard, fine grained, and tough and had been used by the natives for ages in their primitive construction work. Of recent years, however, quebracho is restricted in the arts and industries to a particular tree found only in South America, and even here only within broad limts of the drainage basin of the River Parana. In Cuba there is a "quebracho," so-called locally, which is a member of the Copaiba family. In Chile a quebracho is rather of the Cassia family, and probably in other parts of Latin America the name is indiscriminately given to any hard wood that has tested the metal of the native's ax. No such indefinite use of the word, however, can be permitted today, because the tree of the South American Chaco has become so commercially important that it must be understood to signify only that one tree and nothing else.

The genuine quebracho tree is found in Brazil, Paraguay, and the Argentine Republic. There are two important varieties and a third has been distinguished, although it has no great significance botanically or value commercially. Locally and in the trade the names given are Quebracho colorado (red), and Quebracho blanco (white). Quebracho colorado has the scientific designation of Loxopterygium lorentzii, and belongs to the order of Anacardiaciae. This is the particular tree from which both the sleepers and the better quality of tanning extract are derived. The other, Quebracho blanco, is neither so straight nor so serviceable as the red variety, but is nevertheless of definite commercial value, as it furnishes some tanning extract and the logs can be used for fence posts and axles. From it is taken also a drug extensively used for bronchial diseases; in fact, as a plant it was studied for this purpose long before its other advantages were exploited. The scientific name is Aspidosperma quebracho.

Railways must have sleepers on which to lay their rails. In some instances wooden ones are imported at great expense, or substitutes therefor are used if climatic conditions are favorable. As a rule, however, it is preferred to take supplies from native timber whenever procurable. This was the case in the Argentine Republic when railway building away from the coast had begun, and no more fitting wood could be discovered than that recommended by the natives, both by the name and by the experience of those who had used it. The quebracho wood proved by far the most serviceable for sleepers on South American railways, and its reputation grew so steadily that today many miles of European rails are supported by sleepers brought from the River Plate.

In one respect quebracho resembles rather mahogany than oak or pine. The trees do not grow in clumps or groves, but are dispersed through the forests and the less dense woods, singly or in groups seldom more than four or five to the acre. The tree itself is tall, about two or three feet in diameter, and is crowned by a rather thin, oval, or V-shaped, mass of branches and leaves. The white quebracho is somewhat smaller than the red, and begins to branch lower to the ground, so that it is not hard to distinguish them from each other. The leaves are oval, or lance shaped, smooth, somewhat shining and leathery; they do not fall completely in the winter, but cling to the branches in company with the fruit. The tree seems to thrive best on a sandy soil, where the atmospheric moisture is not very great, but where abundant water is provided for the roots, either by dews or sufficient rain. It is neither a mountain nor a river growth, but lives best in the subtropical stretches between water courses. Although the age of the tree has been given as measured by hundreds of years, it is well enough established that at ten years from planting the first small shrubs are big enough to use for posts. The future promises, therefore, an opportunity for the actual cultivation of quebracho, because, although savage inroads have been made into the supposedly inexhaustible forests of the Chaco, it is not too late to restrict the cutting of the tree, or even to adopt modern forestry methods of planting and conservation for the supply of coming generations. In fact, the Argentine Republic has already passed suitable laws in this direction, and it is more than probable that under the wise administration of that government there will be developed an arboricultural industry to proceed hand in hand with the preparation of quebracho posts for fences and construction work, sleepers for railways, and of tanning extract, the three industries for which this unique tree is at present utilized.

"Rollizos" is the Spanish word commonly employed in the trade for the rough and untrimmed logs (which the word means), from which only the bark has been removed. They are still supplied by smaller camps from dwarfed undergrowth not great enough for other purposes than posts, beams, cabin pillars, or cart axles. When the forest was first invaded these logs were the only product brought out of it, and the stories told of the primitive methods adopted by the natives for transport carry one back before the days of steam and machinery. A popular way of loading the logs was to lay them on the ground on ropes; then the animals were unharnessed and the cart was tilted bodily upside down over the logs; these were then made fast to the body of the cart, after which maneuver it was brought back to its normal position. Of course only two-wheeled carts were used. As soon as modern methods were introduced, and better carts or wagons became known, these primitive and cumbersome habits disappeared, although in the far interior even today rollizos are still brought to market in this manner. "Durmientes," according to the Spanish, or sleepers, in the English idiom, are probably the most important product of the quebracho of the Argentine Republic.

The industry of making sleepers has assumed huge proportions. The difficulties of former days have been largely overcome by the introduction of modern machinery, especially saws, and some of the mills many miles distant from any main railway are equipped and organized in a manner which would reflect credit on any similar plant in the United States. Special saws are needed to penetrate the wood, but they are furnished from the factories of England, France, and America. This mill business is carried on by many companies, although the tendency is to concentrate the management into fewer but larger organizations. One company owns a tract of land of about 4,000,000 acres, and is prepared to cut timber, fashion it into logs and sleepers, prepare tanning extract, and utilize every other resource which the land provides. Another company can turn out 20,000 to 30,000 sleepers a week. This number, however, can by no means meet the steady demand for railway building which is characteristic of this portion of South America. Sleepers are laid at about an interval of two feet from center to center. Assuming, therefore, only 2,000 sleepers for every mile, it will be seen that 30,000 are enough for only 15 miles. A year's supply at fullest capacity will consequently build only 750 miles of railway. But the Argentine Republic, Uruguay, Chile and Bolivia, all contiguous to the Chaco, are constructing more than this mileage, so that it is easy to see that every sleeper turned out from modern mills can at once find a local market. These sleepers are now finished at the mill, and the mill is situated at the spot in the forest itself most convenient for carrying on the process.

Quebracho extract prepared for tanning skins and hides into leather is, however, the most serviceable product of the tree. All the timber companies are adjusting their plants so as to utilize the wood, either in its entire output, or in that portion not reserved for posts and sleepers, for this extract. In Paraguay and areas in the Chaco remote from good roads, so that the cost of supplying timber is excessive, every particle of the wood is turned into extract, because the demand is usually in advance of the supply, and it is therefore more profitable to manufacture the more concentrated article, which can be easier and more economically carried to market.

One feature of quebracho, in which it is superior to other sources of supply, is that the bark, the sapwood, and the whole of the central part of the tree produce the extract in considerable quantities. The bark contains 6 to 8 per cent. of tannin, the sap 3 to 5 per cent., and the heart 20 to 25 per cent. As the heart represents two-thirds and often three-fourths of the total quantity of wood, the amount of tannin in the Quebracho colorado is seen to be considerable. It is merely a chemical question whether this tanning material is equal or inferior to that from the oak, but later methods of preparation point to a full justification of the claim that the leather from quebracho extract grades up to that resulting from any other tanning substance. So serviceable is it, however, that since its discovery, the tanning industry of the Argentine Republic has made noticeable advance, because, with both hides and extract as great natural products of the country, the government is making every effort to foster the leather industry within its own border.

"Quebracho extract," as it is called in the trade is easily manufactured when the machinery is once installed. All the wood is passed through a machine that cuts it into shavings or the smallest possible chips. It is then collected into immense kettles, in which it is treated by chemical processes until all the tannin is removed; after this the fluid preparation is reduced by evaporation to a thick, jelly-like mass, which is poured into sacks, where it is finally dried into the substance sold in commerce.

The difficulty of gathering the raw material far outweighs the preparation of the finished article, especially as the extract is no longer to be considered a by-product, but is coming to have more importance and value than posts and sleepers. In Paraguay particularly, where all the wood is utilized for extract, the hardest part of the business lies in gathering wood for the factory. The trees are cut in the heart of the virgin forest and hauled by ox teams to the nearest clearing. Only native Indians have proven themselves suitable for the work, as they are thoroughly acclimated, understand the wilderness, and can withstand the plague of insects which make life at night miserable for the foreigner; and exposure for nights as well as days is unavoidable, because the cutting stations are usually remote from any settlement.

In 1895 the first real exportation of quebracho extract from the River Plate was recorded. The increase has been rapid—from 400 tons in the first year to 9,000 tons in 1902, 120,594 tons in the next five years, and 28,195 tons in 1907. Of this quantity the United States received 17,733 tons, or almost 65 per cent.

NEWS FROM MISSOURI

Our Mineral Wealth.

H. A. Buehler of Rollo, state geologist said Missouri's geologic survey at present is nearly the least complete of any state in the Union. "We're working to remedy that," he said. "Missourians, and Americans generally, should be informed of the really great mineral wealth of the state, far in advance of what it popularly is supposed to be. The report we shall publish next spring will surprise the country concerning Missouri's resources in coal, iron and structural materials. "It is a long and difficult task. Some reports will be ready soon, but others may take years in the making. One man now is working in the northwest part of the state, above Kansas City, locating and mapping the oil and gas areas. Two others are in the southwest part, mapping the lead and zinc districts that lie between Carthage and Aurora, about 500 square miles in extent. Iron ores now are found in 48 counties and in 600 different deposits; a report is to be issued next fall, recording the kinds of ore and the sections of their occurrence. Take the coal areas alone. Our report will show 25,000 square miles of what we term 'coal measures,' lying in 25 counties. The work to be done and now in progress includes a detailed study of the fields in every county, with figures concerning the thickness and occurrence of the seams and the grade of the coal. Studies of the principal mining districts in the large also will be given. Copper, cobalt and nickel are found in Southwest Missouri; last year Missouri was the only state producing the two last named. There are barites in the same section; clays over all the state; glass sand in the eastern part; and mineral waters generally distributed, but particularly in the northern part."

The State's Cotton Crop.

J. C. A. Hiller, state labor commissioner, has issued a bulletin on cotton growing in Missouri which gives the cotton crop for 1909 as follows in the cotton growing counties of the state:

County.	Bales.	County	Bales.
Dunklin	22,460	Pemiscot	9,997
New Madrid	5,832	Stoddard	4,169
Ozark	1,192	Taney	968

The counties of Butler, Howell, Mississippi, Oregon, Scott and Ripley, combined, produced 793 bales.

The crop in Missouri for a period of years is given as follows:

Year.	Bales of cotton.
1909	45,141
1908	61,907
1907	36,243
1906	54,358
1905	42,730
1904	51,570
1903	37,813

Nearly all the crop goes by steamboat or rail to Memphis. Commissioner Hiller points out that there is an opportunity for cotton mills in the cotton growing section of the state.

Big Farm Class at M. S. U.

One hundred and forty-three students are now taking work in the college of agriculture of the University of Missouri, which is twice the number enrolled for the summer session last year. Since September of last year 1,253 students have received instruction in the college of agriculture. Most of the students this summer are teachers in city and rural schools. The courses will enable them to return home and teach courses in agriculture in the elementary and high schools.

Roosevelt's Dates Taken.

Theodore Roosevelt, when invited to attend "editors' week" at the University of Missouri next spring, wrote Dean Walter Williams: "I wish I could say now I will accept, but it is simply an impossibility at present. I have more on my hands than I can begin to attend to. I am very sorry."

Boy Hero Rescues a Woman.

But for the heroism of Kenneth Morgan, the 11-year-old son of W. E. Morgan of Joplin, Miss Erwin McLean, a Joplin school teacher, would have been drowned in Shoal creek. The two were members of a picnic party composed of members of the Central Christian church Sunday school. Miss McLean, with a number of other young women, was bathing. A better swimmer than the others, she ventured too far from the shore and was seized with cramps. Her cries for help attracted young Morgan's attention. He was the only boy or man within several hundred yards. Without waiting to discard his shoes or clothing, he plunged into the stream and dragged the almost unconscious girl to the bank.

To Relieve Congested Dockets.

A proposition to urge the legislature to abolish the appellate courts at Kansas City, St. Louis and Springfield and substitute branches of the supreme court probably will be presented at the meeting of the Missouri Bar association at Excelsior Springs. The plan is to relieve the congested dockets.

Tip From the Waiter.

"Do you know," says William Curry, "that it was a colored waiter who showed me that putting a spoon in the cup would keep the coffee from spilling in the dining car and swift moving train? How many folks know that?"

Violated Quarantine Regulations.

A man in North Carolina was fined $100 for driving cattle through counties quarantined on account of Texas fever into a county outside quarantined area.

Autoing and Optics.

"Is not auto driving terribly hard on the eyes?" we asked.

"Well, I guess not," replied the chauffeur, withering us with scorn. "Why, before I got to runnin' a car I was thinkin' o' gettin' specks, my eyesight was that poor I couldn't see the contribution box in church until it was so near past me it was too late to dig for any money. But I hadn't been runnin' that wagon two days till I could see a policeman's little finger stickin' out from behind a tree four miles away. I could even see which way a copper's eyeballs were turned if he was standin' in the shade three miles off. Hard on the eyes! Well, not much! It's the best medicine for weak eyes that was ever invented, don't you forget it."

Incorruptible.

The lady of the house hesitated.

"Are my answers all right?" she asked.

"Yes, madam," replied the census man.

"Didn't bother you a bit, did I?"

"No, madam."

"Feel under some obligations to me, don't you?"

"Yes, madam."

"Then, perhaps you won't mind telling me how old the woman next door claims to be?"

"Good day, madam," said the census man.

Novelty.

"I thought you told me you had something original in this libretto," said the manager, scornfully. "Here at the very outset you have a lot of merry villagers singing, 'We are happy and gay!'"

"You don't catch the idea at all," replied the poet, wearily. "The 'g' is soft. It should be pronounced 'happy and jay.'"