



Mahogany trees planted for shade in Paramaribo



Hauling mahogany logs to the landing in Costa Rica

The Mahogany Tree

Most Valuable Member of Tropical American Forests

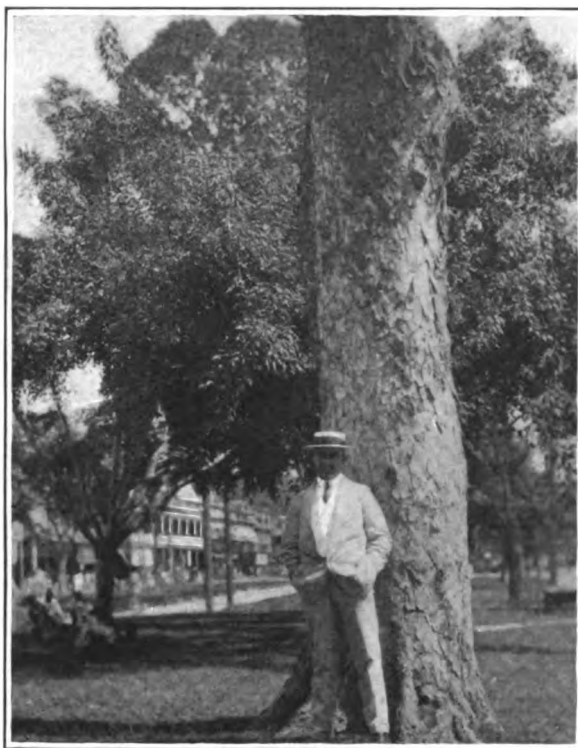
By C. D. Mell

THE mahogany is the most valuable of all the tropical American trees. It can easily claim supremacy as the King of the forest. In beauty and stateliness it has no rival in its native habitat. Its trunk is not so massive as those of some of its neighbors, but it frequently attains a much greater height. The mahogany tree is tall, straight, symmetrical, rearing its crown often more than 100 feet high and is preeminently useful for its timber, which is employed for fine furniture, interior trim of luxurious residences and for all purposes in which beauty and durability are required. For the variety of special and common purposes in which it is employed, it may be regarded as the most useful wood and is always in the highest request. The wood is often curiously veined and is capable of taking an exquisite polish and is, therefore, used extensively by makers of the most exclusive types of furniture and of cabinet work. Mahogany is unmatched for beauty and usefulness by any other wood of the West Indies; moreover, its worth is enhanced by its comparative rarity, for the ax has played havoc with the most accessible trees.

Mahogany is a name given to several distinct species of timber-yielding trees of tropical America; one is the Spanish or small-leaved mahogany (*Swietenia mahagoni*), which was first discovered and exploited in Cuba; the other is the large-leaved or Mexican mahogany (*Swietenia macrophylla*), which is found chiefly in southern Mexico and in British Honduras, the wood of which entered the trade much later than that of the small-leaved variety. The Mexican mahogany was not recognized by botanists as a distinct species until long after dealers and users of the wood had called attention to the fact that it was much softer and lighter, both in weight and color, than that of the Spanish mahogany from Florida and the West Indies. For a long time the softer grades of the Mexican variety were known in the trade chiefly as bay, baywood or bay mahogany, which meant that the wood was false or so-called "near" mahogany. A dwarfed variety that is said to be growing sparingly in the elevated parts of southern Mexico is the ground mahogany (*Swietenia humilis*). While the wood of this species is hard and beautifully textured, it is not exploited, both on account of its small size and inaccessibility. The mahogany growing in Panama and Colombia is a fourth variety, whose botanical identity has not yet been determined. The so-called Panama mahogany may be described as being intermediate between the Spanish and Mexican varieties.

Although mahogany comes from several distinct botanical sources, it is graded in the market largely without reference to whether it is the wood of one species or of another. Timber merchants and wood users are interested primarily in the geographical origin of the wood, which affords them a clue as to its quality, because experienced mahogany users are familiar with the merits of the wood obtained from different regions. The grades of mahogany on the market are designated according to their places of growth, or oftener to their ports of shipment. In a general way it may be said that the small-leaved kind, which is found chiefly in Cuba, the West Indian Islands and in elevated parts of the Spanish Main, is noted for its beauty of grain and figure, which

constitute the chief characteristics by which mahogany buyers judge the quality or grade of the wood. If the wood is derived from the West Indies and is of required sizes, it is at once graded as figured wood of good quality. The large-leaved variety is obtained from the lowlands in southern Mexico and British and Spanish Honduras. The wood usually is softer, lighter and often lacks the



Small leaf mahogany, showing character of the bark

unique figure that characterizes the mahogany from the uplands.

The exploitation and export of mahogany constituted at one time the principal resource of tropical American forests. For many years the supply seemed inexhaustible, but authorities on the world's supply of timber are now fearing a great diminution in the output from the forests and on the market. Serious apprehensions are entertained, even by those engaged in the mahogany business that the scarcity of this timber may lead to the employment of a still greater number of other woods instead of true mahogany and to the displacement of the West Indies from its position as the world's principal source of supply of this class of timber. The African, Philippines and Central and South American woods which come into the American markets are now being used extensively as substitutes for true mahogany for various purposes for which the latter has hitherto been employed.

While the imports of so-called mahogany to the United States have risen in recent years to more than 40,000,000 feet annually, that of true mahogany has fallen to not more than 12,000,000 or 15,000,000 feet.

The Philippine mahoganies have made considerable progress in the American markets during the last two years. Approximately 2,000,000 feet of the best grades of Philippine kinds have been entered at the port of New York during 1914 and 1915. West Africa supplies annually more than seven times this amount. As the supply of these mahogany-like woods from other parts of the world increases, the exports of true mahogany from tropical countries will decrease. The probable future falling off in the export of true mahogany must naturally be attributed also to other causes, as follows:

1. The diminishing number of trees of large dimensions in the forests.
2. The increasing cost of obtaining the timber, owing to the necessity for penetrating the less accessible forests in search for timber.
3. The increasing cost of labor, equipment and transportation.

Fortunately the mahogany tree has a very wide natural range of growth. It thrives in every country bordering the Caribbean Sea, and has been found and exploited on practically all of the Islands of the West Indies. It is native to the keys and to parts of the mainland of extreme southern Florida. In Mexico it occurs from Tampico southward extending into Central and South America. It is difficult to say just where mahogany occurs in commercial quantities south of Panama, but it has been exploited along the Magdalena River in Columbia. A dwarfed variety is indigenous to Venezuela, where it is found most abundantly in abandoned fields and along fences. So far as is known now, true mahogany has not been found growing naturally in the Brazils and in the Guianas, nor does it extend into Peru; the so-called Peruvian mahogany that comes occasionally into the American markets is a generically different wood.

In Florida mahogany is confined to the keys and the well-drained areas of the mainland, which seldom overflow and which have a limestone substratum rendering the soil conditions almost similar to the mahogany-producing regions in Cuba. The trees here are not so large as they are farther south, and the wood is considerably harder and has been classed by experts as the finest mahogany obtainable.

The tree is found also in the Bahamas, where conditions are nearly similar to those in Florida. The wood is called maderia on the Island of Andos, and was for a long time believed to be different from that of the Cuban variety. It is very hard, heavy, and dark colored, and is highly esteemed in the trade. There is very little mahogany left on the island, and practically all the trees are now cut and utilized locally. Originally Cuba, Haiti and Jamaica supplied all the mahogany used in Europe and the United States. Porto Rico has produced very little, if any. The small islands in the Lesser Antilles contain some mahogany, but it is used locally. In Trinidad the supply is also very limited, though formerly a good deal was exported to England.

The wood from Cuba and Santo Domingo is known as Spanish mahogany, which has always been considered the most suitable for making luxurious furniture. It possesses the finest texture and has in a marked degree



Hauling mahogany logs in the forests of Mexico



Large mahogany trees in Mexico

the chemical properties that cause the wood to mellow and improve with age, giving it a tone and charm that are distinctly its own. It has a reputation of being harder, darker and more figured than that from any other locality. In fact, the variety of color and diversity of figure are marvelous and special logs often fetch high prices. A log handsomely figured, if of good texture and color, commands as high as \$400 or \$500 per thousand board-feet. The different figures quite common in the best logs from Cuba are technically known as roe, mottle, cross mottle, dapple, fiddle back, plum pattern, bird's-eye and curls. The figure constitutes in part the quality that fits the wood from the highest purposes in decorative art.

Cuban mahogany has always been considered to be the best in the market. The commonest grades were sold at from \$110 to \$180 per thousand feet. The finer grades of figured mahogany have been sold for as high as \$500 per thousand feet, and a few very fine logs have brought even as high as \$1,200 per thousand feet. Mahogany is found throughout the Island, where it has been exploited for more than 200 years, but the best and most accessible trees have been cut. There is still a good deal of excellent timber available in the interior but the bulk of the logs now coming from Cuba are much smaller than those from some other mahogany-producing regions, and, consequently, bring smaller prices. The material consists largely of such logs as were not accepted by former exploiters of the wood. While it has the reputation of being harder, darker, and more figured than that from any other region the wood is often sold now for less than \$50 per thousand feet in New Orleans and Mobile.

Puerto Principe and Santiago de Cuba produce more mahogany for export than the other provinces of Cuba. Prior to the American occupation the average quantity of mahogany exported to the United States from Puerto



Mexican mahogany trees planted in Trinidad

Principe during a prosperous year was about 135,000 feet. The total export varies considerably, as is shown by the following figures compiled from official records:

Year	Export in feet
1890	62,500
1891	578,000
1892	1,240,000
1893	1,180,000
1894	542,000
1895	31,500
1896	54,642

The mahogany industry in Cuba was greatly developed soon after the period of insurrection. From 1895 to about 1900 the conditions of the Island were not normal and caused great confusion in trade and development of its industries, but the mahogany industry soon expanded and the imports into the United States increased. For the five-year period ending June 30, 1915, the imports of mahogany according to figures of the Bureau of Statistics, United States Department of Commerce, are as follows:

Year	Quantity	Value
1911	2,976,000 feet	\$187,493
1912	3,256,000 feet	201,923
1913	5,395,000 feet	338,996
1914	2,988,000 feet	193,692
1915	1,607,000 feet	98,334

After better transportation facilities to the seaboard are available in Cuba, enormous quantities of fine mahogany, which is still in existence well inland, will be brought to market. To reach a shipping port, only small logs can at present be hauled over the rough roads.

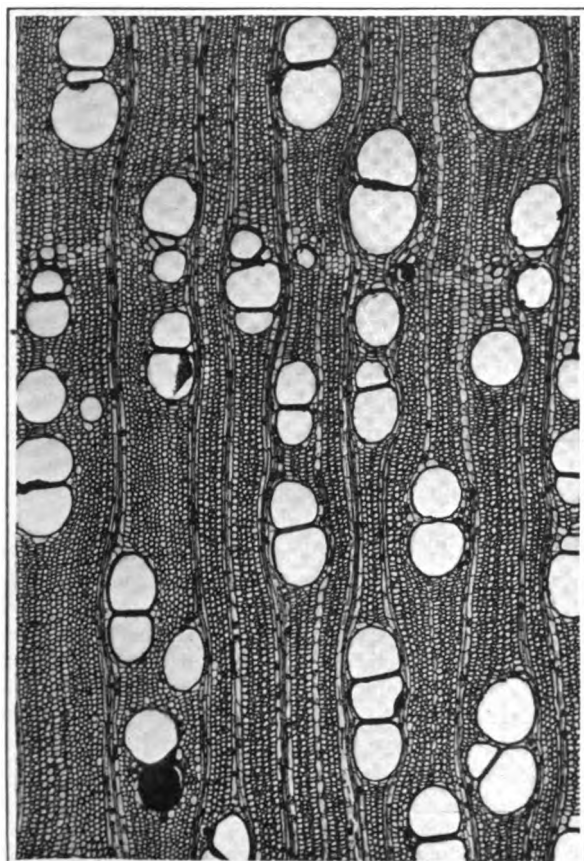
Hayti has extensive forests which contain good mahogany. Little of it has thus far been exploited on account of the unstable government. Foreign timber companies have found it difficult to obtain a clear title to timber grants. The soil and climatic conditions are favorable to the best growth of mahogany, and after better means of transportation have been developed, large quantities of the finest mahogany will be made available. There

are at present no figures extant on the export of mahogany from the island.

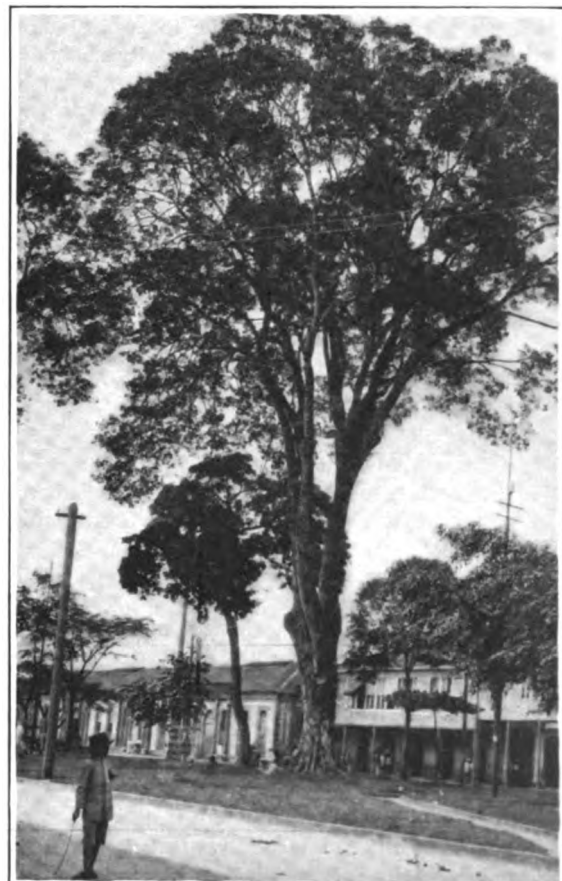
In Jamaica mahogany was at one time a very common tree and large quantities of the wood were shipped to England. Trees of all ages, without any foresight as to the future supply, were cut down and exported. As early as 1753 more than 500,000 feet in planks were shipped from Jamaica. As a result of this ceaseless deforestation, Jamaica has very little mahogany to spare. The wood is of fine quality and is said by some to be equal to that obtained in Cuba and Santo Domingo.

Southern Mexico and British Honduras have soil and climatic conditions which favor the best development of the large-leaved mahogany. In these forests mahogany forms only a small proportion of the timber trees. In the uplands mahogany is diffused throughout the general forests in the proportion of about one to five hundred of other trees, while in the lowlands it is found in the proportion of about one to three hundred, not equally diffused, but confined to certain localities of small extent, where it occurs more frequently than in other places. These localities are the warm southern or eastern slopes; sometimes it ascends to ridges, and when these are sheltered, to the north and west by higher hills, presenting a free southeastern aspect, mahogany assumes a larger size.

It is quite obvious that a tree depending on so many local peculiarities for its full development cannot occur continuously to any great general extent, yet the quantity of mahogany in these forests has been and still is very great, although the lower forests bordering the navigable streams have been heavily worked and the best mahogany is now to be found only up in the forests where its removal is more difficult. This observation applies to all the regions where mahogany grows. Still the numerous streams and rivers which rise in southern Mexico afford



A transverse section of Mexican mahogany, magnified 50 diameters



A massive mahogany tree showing character of growth in the open

splendid facilities for floating the logs, even from their extreme sources in the rainy season.

The soil in which the mahogany grows presents the same uniformity as to geological structure. In the forests where the best mahogany is found the soil is a clayey loam, derived from the dark limestone. In the lowlands the soil is composed of an alluvial deposit on which mahogany is not found in the same perfection, though the trees are often much larger than on the uplands. This difference in the quality of wood is attributed to the character of the soil. The trees grow more rapidly in the lowlands, and the wood is softer and possesses less figure. Nearly all other varieties of timber associated with mahogany partake of the same peculiarity and attain a much larger size in such localities than they do in the hills.

Those who have watched mahogany trees from year to year have observed that their rate of growth, like that of all other of all other trees, varies exceedingly, according to the locality and soil. A mahogany tree grows fastest in deep alluvial soil, where the roots can spread far and deep and the leaves remain green all the year round. Young trees grow very rapidly, often as much as one-half an inch in diameter a year. Young seedlings planted in good soil are known to have made uncommonly rapid growth. In a small plantation of Mexican mahogany in the Philippine Islands the trees attained a diameter averaging about 6 inches during the first ten years. Trees planted in Trinidad in 1900 are now from 10 to 11 inches through a foot above the ground. The Mexican variety was introduced also into India, where it is said to grow very rapidly under favorable conditions. On the other hand, mahogany grows very slowly on well-drained ridges or in poor soil where the majority

of trees remain stunted and sometimes die off before reaching a merchantable size. They seldom attain a diameter of over 18 inches, although the forest has never been interfered with either by fire or ax. Mahogany of this description is found on the dry limestone soil on the hills at the heads of the streams in southern Tabasco and in the far interior of British Honduras. Full-grown mahogany trees growing in good soil have an average diameter above the root swelling of about 3 or 4 feet.

It is difficult to say just how old a mahogany tree is when it arrives at maturity, but a tree 3 feet in diameter is probably not less than 200 years old. No one has ever made any reliable measurements of the annual rings of growth. Authorities on questions relative to the rate of growth of trees in the tropical climates state that in warm countries where the alternation of seasons is less marked than in the temperate climate, no dependence can be placed in this test of the age of the trees. Toward the northern limits of its range, mahogany shows well-marked annual rings of growth. This is particularly the case in southern Florida and in the mountains of Cuba and Mexico. While it is difficult to determine the age of mahogany by the rings exhibited in transverse section, there can be no doubt that the rate of annual increase in diameter varies very much in different parts of the tree's range.

The mahogany from this part of the mainland varies. The best is what is known as the Tabasco. The logs coming from Fronteras and Laguna are good, and the wood has a very large demand both in this country and in Europe. The growth of logs shipped from Tuxpan and Progreso are usually of what are termed *cazones* growth, which results stringy and is more difficult

lumber to finish, and, in consequence, is sold at much less than the woods from other ports. The shipments from Puerto, Mexico, are probably derived from the west coast. The texture of these logs is somewhat harder than that of the east coast and not as well liked, and, in consequence, the values are somewhat less.

The exports of mahogany from Mexico during the last five years are as follows:

Year	Quantity	Value
1911	11,935,000 feet	\$706,498
1912	10,596,000 feet	616,912
1913	10,866,000 feet	664,705
1914	10,381,000 feet	785,148
1915	8,119,000 feet	488,740

British Honduras on an average exports as much mahogany as Mexico. The wood is approximately of the same character, though in point of size the Honduras wood is excelled by the Tabasco variety. The latter yields fine texture wood with good color. The wood from regions including that from Spanish Honduras, comes to market in large sizes and is, therefore, adapted for large work. Their silky texture, along with a general freedom from serious heartshakes, causes the wood to be much appreciated.

The Nicaraguan mahogany is obtained from somewhat smaller trees and the logs formerly came into the markets in the round state. During recent years very little of this wood has been received. The wood was considered to be of excellent quality, with a mild texture resembling somewhat that derived at present from Panama. The shipments received from Guatemala, Costa Rica and Columbia are very variable in quality, but the bulk of the material is good wood commanding good prices.

The American Egypt

SCATTERED all over the Yucatan peninsula are monuments to a civilization that flourished thousands of years ago. Just how many thousand nobody knows and scientists differ very materially in their ideas on the subject, says Mr. George Miner in the *Mexican Review*. The prevailing belief, however, is that this civilization was in full swing as late as the beginning of the Christian era. Other scientists assert that the ruins antedate those of Egypt.

Yucatan can well be called "The American Egypt." The ruins of 172 cities, big and little, have been discovered and not a quarter of the territory has been explored, that is, carefully explored, for the tropical verdure makes the finding of them very difficult. You might pass within a hundred feet of a wonderful old temple or pyramid a hundred times and not discover it, so effectively does the jungle screen these crumbling monuments of the distant past and shield them from the prying eyes of this inquisitive and presumptuous age.

While the ruins of Egypt, through pictures and descriptions, are almost as familiar to the average American as New York's famous skyscrapers, those of Yucatan are practically unknown. They are rarely visited, even by antiquarians, while the casual tourist or tripper never gets there. That is easily understood. They are so difficult of access that none attempt the feat who are not very much in earnest about it.

Of the 172 clusters of ruins discovered, two sets represent what were once large and prosperous cities, of about half a million inhabitants each. Doubtless at different times each one of these two cities was the capital of the country.

One of the cities is Uxmal, pronounced "Ushmul," situated in the southwestern part of Yucatan, and the other is Chichen Itza, in the eastern part of the State. To reach either, the first step is a long railway journey from Merida, and when you reach the point of debarkation from the railway train the real trouble begins.

One is six miles away through the jungle and the other eighteen. In both cases the road leading out is little better than a trail and without question the roughest road that a wheeled vehicle was ever pounded to pieces on.

To my mind the most interesting ruin of all is "The House of the Dwarf" at Uxmal. It is a pyramid, with a temple on top where the priests made human sacrifices. The steps on one side are fairly well preserved. A double chain is run down them so that it is possible to reach the top if you have a cool head. Once there you crawl through a hole knocked in the temple wall and come out on a platform which was the sacrificial altar.

On that platform the priests stood and with knives of flint cut out the hearts of living victims and held the gruesome objects aloft, still throbbing, for the populace below to gaze at. In the great quadrangle at the foot of that side of the pyramid the inhabitants of the

city gathered to watch these festal doings. Fifty thousand people could stand in it. Around this huge court runs a palace, two stories high and beautifully carved, which was the home of the nuns, for whose special delectation these sacrifices were made. The nuns were the aristocrats of ancient Maya society.

On all four of the inner sides of this palace are carved two huge snakes, whose bodies are entwined as they twist around the structure. These snakes have human heads and tassels for tails. In all the ruins the carvings are of the same peculiar design. The patterns of the borders and the general ornamentation strongly suggest the Egyptian.

What is most wonderful of all is how they were able to cut those huge blocks of stone and then carve them so beautifully without metal hammers or chisels. There is no iron or other metal in the country and so all they had to work with was flint. How they raised the blocks into place none can explain. That remains as much of a mystery as the pyramids of Egypt. This is used as an argument to prove that the same race of people did them both.

As there is no gold, silver, or precious stones to be found in all Yucatan, it goes without saying that the ancient Mayas had no wealth of that description. Unlike the ancient Peruvians they had no vast stores of hidden gold. Still the treasure hunters will not believe it. These ruins look exactly as though in some sealed-up chambers fortunes would be found. And so the treasure-seekers have time and again invaded them and dug away and done a good deal of ruthless despoliation, to find nothing and have their labor for their pains. As soon as the Constitutionals came into power a stop was put to that sort of vandalism. There are now Indian watchers guarding all the important ruins, and anyone caught prospecting in them is dealt with severely.

There are many more ruins standing at Chichen Itza than at Uxmal, but in both cities all the smaller structures and private houses have disappeared. The ages have worn them away or earthquakes shaken them down and the jungle has covered all. The natural accumulation of soil for centuries has also covered them many feet deep. The bases of the big buildings still in sight are, of course, below the present surface. Not much has been done in the way of excavating, for the government is only just turning its attention to these wonderful relics of the past. In the old Diaz days they were almost ignored. No attempt to preserve them at all was made. In fact, farmers carted away tons of beautifully carved stones to build walls, and there was none to say them nay. It was a good deal easier to pull down a temple and take blocks away already cut than to quarry new ones.

At Chichen Itza there is a temple like a huge round tower that is very curious. In it are four sets of circular stone stairways, one within another. The object is incomprehensible and the method of erection a puzzle to builders of to-day.

For that matter these ruins have several feats in mason work that are beyond our twentieth century architects, such as arches without keystones, leaning walls, round corners, hanging terraces, and so on. The walls are all enormously thick and the rooms rather small, even in the houses of the governors or kings, or whatever they were called. Most of these rooms are now inhabited by bats and are not at all pleasant places. There are no flat ceilings to be found. All are finished with pointed arches.

In only a few places can any idea be had of what the interior decorations were like, as the coating over the rough stones of the walls has generally gone. Where it still remains it can be seen that frescoing and mural painting were the rule. From these paintings, as well as from the carvings, has been obtained the only knowledge we have of the costumes and customs of the people of that day.

The builder, or designer, of each temple or palace put his mark on it in an odd way. It is the imprint of his hand in red dye upon a stone near the main entrance. This hand mark is always found under the final coat of plaster which originally covered the stones. As the plaster has now scaled off the hand prints can be seen. A remarkable thing shown by these old hand prints is that in each case the second and third fingers were of the same length.

Another form of sacrifice for which these ancients had a great predilection was the drowning of young girls. This was considered a great honor, and for a month before the event the selected victim was treated to every luxury and indulgence. Then she was taken to the sacrificial cenote, an enormous natural well in the limestone, 200 feet in diameter and 100 feet deep. She was pitched into this and allowed to drown, while the populace crowded to the edges and enjoyed themselves.

Around the stone platform from which the priests used to hurl the girls several big trees are now growing, loaded with magnificent orchids.

Ancient Rock Carvings in Sweden

At Leonardsberg, four kilometers from Norrköping, Sweden, there have recently been discovered and cleaned from the surrounding earth a number of rock carvings, both large and small. One of them shows a row of human figures, among others women with children, men bearing shields, horses, and two other quadrupeds with curious head ornaments. Another interesting rock carving has been discovered in Biskopskulla parish in Upland. Six previous carvings were known from this district, but the present one is the representation of a ship of a type hitherto unknown there, since it is not merely outlined but carved on the rock in low relief. About one meter long, it represents one of the so-called dragon ships, and belongs to the oldest group of such monuments of the bronze age, a conclusion confirmed by its height of 32.5 meters above sea level.—*Nature*.