The Economic Uses of Leaves.

Of the three divisions of nature's products, man is most chiefly indebted to the vegetable kingdom, whether for his food, medicine, or domestic comforts. Every part of plants and trees is more or less utilized by savage and civilized men, and a common category might be furnished by the various uses of the separate parts—the roots, stems, sap, bark, fruit and seeds, and leaves.

If we take the last-named, the foliage, apparently the most insignificant part of the plant, how dependent are we on these for food, clothing, medicine, dyes, stains, and various comforts.

The miscellaneous application of leaves for different purposes as domestic appliances, and for manufacturing uses, of themselves would furnish a long list; some few of these we may pass under notice, because their adaptability and usefulness are mainly confined to tropical countries. It is true that some leaves have been utilized by the paper maker, as in those of the dwarf palm, maize leaves, and others, but this is only on a small scale.

The leaves of many palms are largely employed for making hats. Those best known are Panama hats, so named from being shipped from that port. These are made from the finely plaited fiber of the leaves of a South American screw pine (Carludovica palmata). These hats are much prized for wear in the tropics, being light and flexible, and can be washed and bleached repeatedly.

The tree has no stems, the leaves have long slender petioles, springing from the ground; they are some two feet long, fan-shaped, and four-parted, each segment being again ten-cleft, so that when folded in venation, each segment on its own rib, there are eighty layers in a young leaf. The tree occurs only on the slopes of the Andes.

About 200,000 dozens of these hats are made in Ecuador and different States of South America. These hats are distinguished from all others by consisting only of a single piece, and by their lightness and flexibility; they may be rolled up and put in the pocket without injury.

In the rainy season they are apt to get black, but by washing with soap and water, besmearing them with lime juice, or any other acid, and exposing them to the sun, their whiteness is easily restored. The plaiting of the hats is very tedious and troublesome; the coarse ones may be finished in two or three days, but the fine ones take as many months to plait. It commences at the crown and finishes at the brim. The hats are made on a block, which is placed upon the knees, and requires to be constantly pressed with the breast. The hats vary in price, according to fineness and quality, from 20s. to as many pounds.

The unexpanded fronds of Livistonia australis, prepared by being immersed in boiling water, are dried, and the fiber thus obtained is much valued for the manufacture of hats in Australia, which much resemble the celebrated Panama hats.

The rough leaves of the Chumico (Curatella americana) and of Davilla lucida are used for cleaning iron, and polishing and scouring wood. Curatella alata is used in the West Indies for polishing bows, sabers, etc.; and C. sambaiba in Brazil—indeed, they serve all the purposes of sandpaper to the Indians for polishing their blow-pipes and war clubs. The leaves of Celtis orientalis are used for polishing horns in the East Indies.

The foliage of Guiacum officinale is very detersive, and is frequently used in the West Indies to scour and whiten floors, which it is said to do better than soap.

Leaves sewn together are much used in India as substitutes for the plates and dishes of more civilized life. It is not always poverty that leads natives to use them in preference to metal or porcelain articles, as caste or custom has often some influence in the matter. The leaves principally used are those of the Egyptian lotus (Nelumbium speciosum), Bauhinia species, Semecarpus anacardium, Butea frondosa, those of the banyan (Ficus bengalensis), by Brahmins, and the plantain leaf (Musa paradisaica).

The leaves of Bauhinia Vahlii are used in the construction of the curious, rude leaf bellows in Sikkim, with which the natives of the hills smelt iron. These leaves, when sewn together, are used as plates, cups, rough table cloths, rain hats and caps. The leaves are heart-shaped, and above a foot in breadth, and the same in length. Sewn together with twigs, they also serve for baskets for holding pepper, turmeric, and ginger, and are likewise used for thatching.

Under the name of "Chattahs," a kind of umbrella hat or sunshade is made in the East of the leaves of the Licuala peltata and the Talipot palm, or a Plantain leaf. These Chattah hats are much worn by the plowmen, cowkeepers and coolies of Bengal and Assam.

The large fan-shaped leaves of the Talipot palm (Corypha flabelliformis) are, like those of the Palmyra palm, carried over the heads of people of rank as an umbrella, and also used for making books, and for various domestic purposes. The leaves are also cut up into neat bracelets, worn by Santal girls in India. Those of Vanda Roxburghii, split, are also worn by them as anklets. Those of another species, Borassus æthiopicus, occur as much as 12 feet across; they serve also for the manufacture of baskets, mats, ropes, and sieves. The leaves of Nipa fruticans attain a height of 15 to 20 feet, presenting a very handsome appearance, resembling the fronds of huge ferns. This graceful Eastern palm is utilized in various ways, the principal being in the manufacture of thatching for house roofs, in the East called "Ataps." This manufacture is quite an industry of itself, and affords employment to many natives, chiefly women, the men simply bringing cargoes of the fronds to the women, to be stitched with split rattans, and made up. Atap roofs are the best adapted for these climates, for while the winds are never strong enough to blow them away, they afford the coolest protection against the sun of any kind of roofing known.

The leaves of the Palmyra palm (Borassus flabelliformis) were formerly used like paper, to write books on, and to this day they are applied to this purpose in Orissa, Southern India, and Ceylon, where an iron style is employed to write upon them; in certain parts of Bengal, young children use them to write the alphabet lessons on. They are largely employed for making pans, bags, winnows, hats, umbrellas, and for thatching, etc. The leaf takes a dye well, and is worked up in Madras into pretty colored patterns in baskets and mats.

The slips of Talipot and other Palm leaves are coming into European commerce for the manufacture of ornamental braids, and in the construction of straw or Leghorn hats. The fiber obtained from the base of the leaves of the Chusan Palm (Chamærops fortunei) is used by the Chinese for making hats and coarse clothing. The sale of Palm leaves for decorative purposes in the towns of Elche and Alicante in Spain produces a considerable income to the towns.

Kadjan mats, manufactured out of Nipa leaves, are indispensable for traveling purposes. Packed up in the smallest compass when not required, each mat is capable of affording sufficient cover at night for two or three persons, either in boat or forest journeys. They also form, almost exclusively, the material for side walls and divisions within houses. The young leaf unfolded and dried, under the name of Roko, forms the favorite covering for cigarettes in the Malayan Peninsula in preference to paper.

The large leaves of the Teak tree (Tectona grandis) are used for plates, for packing, and for thatching. The leaves of Cordia myxa are employed as plates in Pegu and to cover Burmese cheroots. In Bangalore the leaves of Canna indica are used by the natives in lieu of plates, to serve their Ragi or Millet puddings and other dishes on. The leaves of the Papaw tree (Carica papaya) are employed by the negroes in washing linen, as a substitute for soap. They have also the property of rendering meat wrapped in them tender, owing to the alkaloid papain which they contain, and which acts as a solvent.

For cordage and other textile purposes, numberless leaves are used, and they serve very generally for packing and wrapping up small parcels in India. In Guiana, Tibisiri fiber is obtained from the inner surface of the spiral leaves of the Ita Palm (Mauritia flexuosa). It is used by the Indians for making hammocks, etc. The leaves are cut before they are open, and the midrib separated by drawing each division of the leaf through the finger and thumb. After drying, the fiber is ready for use without further preparation. About a quarter of a pound may be procured from each leaf, and if the central leaf is left uninjured, no evil effect is produced on the tree. Bags or matting could be cheaply and easily made from this fiber, as well as hats similar to those known as Panama.

The foregoing is only a brief enumeration of some of the many uses to which leaves are industrially applied.—*P. L. Simmonds, Gardeners' Chronicle.*

The Perils of Quicksands.

A remarkable example of the dangers of working in quicksands occurred recently at Woodside, N. Y. An intelligent man, Mr. James H. Parsells, undertook to build a well near his house. The well was 15 feet deep in the center of a quicksand. Mr. Parsells went into the well to repair a pipe when the sides caved in, partly burying him. When he was discovered, his head and part of his body were still above the sand, which was slowly pressing around him. He did not seem to be much injured, for he was cool and self-possessed, and with a calm voice himself directed the excited villagers, who were eager to rescue him.

Steven and John Parsells, aged fourteen and nineteen, worked desperately to save their father's life. Dozens of men with shovels worked around the well, while others fastened ropes under Mr. Parsells' arms. Ten men pulled on the rope from the second story of the new house, until deep ridges were made by the rope in the window sill, but all the efforts to pull out the man failed, and the sand packed itself more solidly around his form. It continued to rise, stealing up over his shoulders and about his head. Stimulants were given to the doomed man, and a rubber tube was placed in his mouth to supply him with air.

Meanwhile the rescuing party fought the deadly sands desperately. They could not dislodge the body from the tenacious grip of the sands. Then the sands rose quickly, bubbling up like the waters of a spring. They surrounded the man's head and covered him entirely. John Parsells stood at his father's head, and with a shovel worked furiously for nearly two hours. Three times he succeeded in clearing the sands from his father's head, but they rapidly covered it again, being forced up, no doubt, by the crowds which pressed closely about the well. Trenches were dug at the sides of the well, in the hope that the man might be extricated in that way, but they were quickly refilled.

After working for a long time the rescuers succeeded in dragging out the body, but when the sands had closed over Mr. Parsells' head the air-tube fell from his mouth and he was suffocated.

Mr. Parsells was one of the oldest and most respected of the citizens of his village. He leaves a wife and six children.

PHOTOGRAPHIC NOTES.

Salted Paper for Enlargements. — The *Bulletin* of the Photographic Society of Italy, published at Florence, gives in its last number a special formula for salted paper for enlargements, communicated to it by Signor G. Moretti, a member of the society and director of the studio for the Dilettanti Photographers in Florence. The formula is this:

Water	1,000	grammes.
Gelatine	2	"
Chloride of sodium	4 to 6	"
Citrate of soda	21	"
Ammonia chlorhydrate	13 to 16	"

The gelatine, cut up into very small slices, is first dissolved in the tepid water; afterward the other substances are added; when all are dissolved, the solution is filtered, and placed in bottles for use. To prepare the paper, the mixture is poured into a basin, and the sheets are allowed to float for three minutes, using the same precautions as in the preparation of albumenized paper. After the moisture has been removed from the sheets prepared with this solution, they are sensitized on an ordinary 12 per cent silver bath, and when dry they may at once be used, and a beautiful tint, imitating perfectly that of hematite, will be obtained. When the bath above described is employed, especially if it be fresh and uncontaminated by any noxious vapors, the sensitized paper may be kept in excellent condition for three days during the summer, and for a week in the winter season.

Combined Toning and Fixing Bath for Gelatino-Chloride Paper.—Mr. R. E. Liesegang, a young but very serious investigator, has made careful experiments in order to find out the most efficient combined toning and fixing bath for prints on gelatino-chloride paper. He recommends the following one:

Solution No. 1.

Hyposulphite of soda	200	grammes.
Alum	80	"
Nitrate of lead (pulverized)	2	"
Boiling water	400	c.c.

The solution is allowed to stand for two days; then once more 400 c.c. of boiling water are added, and the solution is filtered. Meantime, the following solution is prepared in a bottle:

Solution No. 2.

Sulphocyanide of ammonia	160	grammes.
Water	1,200	c.c.

Solution No. 1 is mixed with solution No. 2, and then added:

Solution of gold chloride (1 per cent) .... 10 to 20 c.c.

With this bath the prints take any desired tone within three to five minutes.—*H. E. Gunther in Photo. News.*

A Great Volcanic Eruption in Alaska.

A recent dispatch from San Francisco brings word that Bogoslov, the Alaskan volcano that rose from the ocean depths about seven years ago and blazed and smoked for a time, is again in eruption.

This recent eruption began February 10, and has continued at intervals. April 17 and 22 there were signs of great activity, smoke and flame pouring from the lofty crater, and rising to a great height. The sky for weeks was clouded with ashes, and these fell in liberal showers in the town of Illuliuk, forty-four miles to the eastward.

To the people who saw the eruption it seemed a pillar of fire and smoke fully fifteen miles high, rising from the horizon and losing itself in the low clouds.

Professor Davidson, of the Coast Survey, estimates that the volcanic pillar must have been sent up to a height of at least four miles above the sea.

Captain Everett Smith, of the steam whaler Orca, passed near the scene soon after the first eruption. He noted that four new islets, each detached, but near the volcano island, had arisen from the depths. As the ocean bottom here, off Bogoslov, sounds 844 fathoms, and there is a depth of 1,200 fathoms about twelve miles away, an idea may be gained of the tremendous energy required to raise an islet from the ocean bottom above the surface.

The First American Tin Mill.

An interesting account of the mill of the Glendale Tin Mining Co., the first tin mill established in the United States, and from which is now being put out the first fruits of the Dakota tin mines, is given in the Rapid City *Republican*. That paper states that the mill is located on Iron Creek, about 22 miles southwest of Rapid City, at the foot of the mountain in which the mines are situated. The mill proper measures 50 feet in width by 100 feet in depth, and is divided into three stories. It is unique in plan, compact and convenient, well built in all particulars, and protected from all danger of fire, both by a system of water pipes and by having roofs, etc., covered by a thick asbestos coating.

Either steam or water power may be used for running the machinery. The steam equipment consists of two 100 horse power boilers and a 100 horse power high speed engine. The water power equipment consists of a flume 20 by 24 inches in section, bringing the water from a dam on Iron Creek, 1¼ miles distant from the mill, giving a head 100 feet pressure at the wheel. About 500 miner's inches of water are supplied to the turbine wheel, which was manufactured by Craig, Ridgeway & Co., of Coatsville, Pa. The water power will be used except during short cold snaps in the winter, the engine being placed in the mill as reserve power in case of accidents.

The ore is hoisted from the main shaft, and dumped first into an ore bin of 200 tons capacity, located high up the mountain over the mill. From this bin it is conveyed to the mill by a wire rope bucket tramway, the loads going down hill to the mill, hauling the empty buckets back to the mine. The ore buckets mechanically deliver their contents into a 175 ton ore bin, above and back of the mill. The large lumps of ore are crushed, first by a Gates crusher, then passed through a drier to a set of Gates improved Cornish rolls; thence elevated to a set of rotary sizing sieves. From the sieves the finer sizes are conveyed to a set of Paradox concentrating tables, and the coarser sizes to common Hartz jigs. The screens, jigs, and concentrators separate completely all of the mica, quartz, and feldspar, leaving clean concentrates of cassiterite or oxide of tin, ready to be smelted into bar tin. The concentrates are, for the present, being shipped to Chicago to be smelted, but it is the intention of the company to erect at once a smelting plant in the hills. The first shipment of concentrates to Chicago yielded 65 per cent of metallic tin, and the second shipment 68 per cent; and it is expected that with more practice they will yield over 70 per cent.

The main vein measures from 28 to 32 feet in width at the outcrop, and over 40 feet in the lower working. There is no doubt as to the true fissure character of the vein, as it cuts the slates at nearly right angles, and has well defined polished walls with a thick clay gangue or cleavage. The vein stuff is principally albite (white feldspar), with here and there white, glassy quartz. The black crystals of tin oxide are disseminated all through the vein material, varying in size from crystals weighing an ounce or more to those as fine as grains of pepper. Assays and tests from the different workings give an average of over 3 per cent metallic tin, while picked or specimen rock is often blasted out that will yield over 30 per cent of the white metal. With these large bodies of ore, and the excellent facilities for mining cheaply, there is no question but that the present mill, with a capacity of crushing and concentrating 100 tons of ore per day of 24 hours, will soon be supplemented by a still larger mill.

Electricity Taking the Place of Steam.

Prof. Elihu Thomson, in speaking on "The Problems of the Future," says: "In the near future railways will be run by electricity; not the small roads, I mean, but really the large ones connecting cities, and there is no reason why we should not expect higher speeds than we can attain at present with our steam locomotives. There we have reciprocating parts that must be put in motion, stopped, and reversed continually, while in the electric locomotive we have the simple rotary motion, which is all we need, which makes it possible accordingly to run at a much higher rate of speed. Although the steam locomotive has been very much improved, yet it can hardly compare with the economy of stationary engines, placed where they can have an abundant water supply for condensing purposes. We can, therefore, by employing stationary engines and electric roads, do away with a great deal of unnecessary weight, and the moving parts being symmetrical, we can attain a much higher speed, say a hundred miles an hour. This would be a grand step forward, which would save us a great deal of time. It might even be possible to reach a speed of 150 miles an hour. It simply depends upon finding the method of applying sufficient power, and building the locomotives to suit, arrangements being adopted to keep the cars on the track."

A DERRICK used by a shipping company at Hamburg can pick up a ten-wheeled locomotive with perfect ease.

Edible Birds' Nests.

Travelers going from Hong Kong to Bangkok or Singapore by steamer pass along the coast off Annam and near a group of islands that are at once picturesque and curious. Behind them is Tourane, an ancient French settlement, the stopping place of steamers bound for Hue and Haiphong, and destined to be an important commercial port in a not very distant future.

Several of these islands produce an important article of commerce—that is, the edible birds' nests, which have caused considerable learned discussion among scientists. They are as dear to the Chinese palate as to the Chinese purse. It is a singular fact that Annam is the only country that produces them. Why the swallows select this locality as a habitation, and no other, when there are islands apparently as eligible scattered all along the Asiatic coast from Sumatra to Korea, is a mystery that the scientists who have given the subject so much attention have never attempted to elucidate. Had Banquo lived in these times, he might have given an explanation as poetic and reasonable as that which he gave to Duncan for the preference manifested by the Scotch martins for the pure and delicate air that bathed Macbeth's castle. The swallows' nests are a source of riches to the region. Their value is said to have been discovered some hundreds of years ago, during the reign of Gia Long, who promised a liberal reward to any one who would discover a new and profitable article of export within his realm. The nests discovered on the island of Nam Ngai were presented to the sovereign, who, faithful to his promise, offered a patent of nobility to the finder. This was respectfully declined, and instead a monopoly of the harvest was accepted by the discoverer for himself and his descendants. This privileged family was to pay yearly eighty pounds of the nests to the emperor as royalty. On the other hand, they were to be exempt from personal taxes, from military service, and from contributions of personal labor, such as are common in Oriental countries. They formed a family league of forty or fifty men, elected two of their number as leaders, under the title of *gnan* and *doi*, and founded a village convenient for their commerce, which still exists under the name of Yen Xa—"Village of the Swallow's Nest." The nests are the product of a salivary secretion of the birds. As to their mercantile value, they are divided into three distinct categories. The most valuable are those into which there enters a certain proportion of the blood. These are called *yen huyet*. Singularly enough, they can only be produced by the birds affected with a malady which resembles consumption, and which is attended by copious hemorrhage. Nests of this kind are in great demand. They are rare, and are gathered only in the spring. Local tradition says that these birds died of exhaustion, or of consumption in its advanced stages, before the end of the second winter. Scientists being scarce among the Annamese, and the French colonists not having yet had sufficient time for observation, it is not known whether this disease is peculiar only to a part of the birds or whether the salivary secretion that causes the malady causes the death of all of them after a year or two of existence. The smallness of the quantity of these nests annually gathered—which is only three or four pounds—would seem to indicate that the disease is only partial and peculiar to those possessed of the weakest lungs. All other nests (*yan soo*) are classed as second quality. Nothing but the saliva of the bird enters into their construction. They are gathered in the spring, summer, and autumn. The spring harvest is the most valuable because it includes the two qualities. Two nests of the first quality weigh one ounce, and are worth at the place of production five Mexican dollars at current value in Annam. Those of the second quality are worth little more than half as much. The summer gathering is entirely of nests of the second quality. They are smaller and less compact. It requires four of these to make an ounce, which is worth two Mexican dollars. The autumn harvest is still less valuable. The nests are scarce and not highly esteemed. It requires seven to make an ounce, which is not worth more than $1.20 to $1.40. Experts express the opinion that this third gathering should be dispensed with, since it is worth so little and there is danger of. destroying the eggs. Nearly all the nests are sold to the Chinese living in the cities of Annam and Tonquin or sent to Chinese ports. Only the Chinese and some high mandarins of the Court of Hue, who prefer the Chinese *cuisine*, can afford the luxury. They are eaten by the Chinese cooked with flesh or with sugar, having first been cleaned of all extraneous substances by a liberal application of hot water. When cooked with fowl or game, fruit of the water lily is added. Chinese physicians prescribe them as a sovereign remedy for diseases of the lungs, asthma, disordered digestion, and most other maladies. If they have curative qualities of the kind mentioned, they probably share them with other alimentary substances containing more or less gelatine. The good qualities of the nests are estimated no doubt in proportion to the price. It is certain that, as an article of diet, they have made little impression on Western nations.

The harvest is made in a manner simple and picturesque. Sections of bamboo are thrust into the holes in the side all the way up the precipice, forming an immense ladder by whose rounds the coolies ascend, detaching with a knife as they go the nests glued to the walls. One of the family which monopolizes the industry watches meanwhile anxiously below to see that the laborer does not in gathering detach some portion of the precious nest and secrete it about his person. The operation is full of danger, and annually costs several lives. The monopoly is at this moment in danger of passing into other hands. A rich Chinese company of Hong Kong, which is building a handsome European hotel at Tourane, and which has branch houses in the principal cities of Annam and Tonquin, if offering the Hue government a handsome bonus for the privilege of gathering the nests. The monopolists are greatly excited at the prospect of losing it, and in support of their claim are offering in evidence the very document given to their ancestors by the Emperor Gia Long. Money is needed at the court of Hue, and the ancient manuscript will be critically scrutinized by Annamese officials to discover if it is indeed a grant in perpetuity or whether there is not a chance to make a good round sum by the transfer. In the meantime the swallows, instead of seeking haunts free from invasion, come back punctually with every recurring season, regardless of their health and this increasing spoliation. Other swallows in other countries can return peacefully to their last year's nests in the ensuing spring. These swallows of Annam must keep on pandering to an aristocratic desire, building and rebuilding their homes and giving their life's blood forever to satisfy a diseased appetite.—*Shanghai Courier.*

A European Census.

Americans who are loudest in their groanings about several census questions should look at the inquisition to which the Germans are subjected.

The German year book gives the figures of even the income tax. An income of $250 or less is not taxed, and up to $750 the tax is nominal. For incomes over $750 the owner must swear as to the truth of the figures he gives. The exact rental of each dwelling is obtained, and the average rentals for different conditions are published. The showing for the year 1885 makes the average rental for a single room without a stove—or an "unheatable" room, as the expression used is—a sum that corresponds in our money to $30 per year. It makes the rental for a single room with a stove in it—or a single "heatable" room—$50; for living apartments consisting of two "heatable" rooms, $85 per annum; for apartments consisting of three such rooms, $150; for four "heatable" rooms, $200, etc.

No personal liberty in Berlin. The police methods in Berlin greatly aid in the preparation of an accurate census. No room can be rented at a hotel or boarding house, and no apartment or house can be legally leased, until the landlord has sent to the police the name and purpose of the newcomer and the length of time for which he will probably make the city his home. The same method is in vogue in other German cities. The experience of one of the professors of the University of Pennsylvania last summer is significant as to the effectiveness of these methods. Wishing to communicate with an American lady who was abroad and, as he thought, in Leipsic, he wrote to the police of that city. The answer declared that no person of the name was in the city. A similar letter was sent to the police headquarters of Dresden, and a similar answer was received. When, later, however, the professor wrote to the police of Berlin, the reply announced that Mrs. —— was living at No. — —— street, on the —— floor.

Golden Magnesium.

M. N. Varren finds that when the metal magnesium is heated in a current of ammonia thoroughly dry, and keeping the temperature below a red heat, it combines with the gas without changing much in appearance, though its chemical properties are much modified; for instance, it will not melt below a bright red heat, and burns, when red hot, with violent decrepitations or small explosions. If the current of ammonia is continued, and the metal in this form heated to bright redness, it is gradually converted into an orange yellow substance which is permanent. This new product dissolves in acids, and the solution contains ammonia. When fragments of magnesium which have been kept at a dull red heat for some time come in contact with gaseous ammonia, it often happens that their surface becomes dark yellow and shines like gold. The exact nature of this golden magnesium has not yet been made out.

A LOCOMOTIVE working under a pressure of 140 to 160 pounds to the square inch may move a railway train at a velocity of 60 miles per hour, which we are apt to think of as a wonderful speed. But it is slow compared with the rate of motion of the projectile from a modern great gun. Such projectile flies at the rate of 1,365 miles per hour, impelled by a pressure of 35,000 to 40,000 pounds per square inch.