a lovely shrub for massing on the outskirts of the lawn, its graceful shoots studded with flowers larger than those of *P. microphyllus*, spotless white, and almost hiding the leafage. A pretty picture was formed by it in the gardens of Sir Trevor Lawrence, Bart., at Burford Lodge, early last summer, when a plant, about three feet in height, or less, was smothered with flowers, the branches gracefully bent, and almost touching the ground; while the sweet fragrance loaded the air for many yards around. Neither is troublesome to grow, and both deserve the attention of all who delight in hardy flowering shrubs of distinct beauty.—*C., in The Gardeners' Magazine.*

LAKE TE-ANAU, NEW ZEALAND.

THE country known as New Zealand is in the southern hemisphere, and consists of two large, narrow islands, extending northeast and southwest, between latitude 34 and 48, having an aggregate area of about 100,000 square miles; length, some 750 miles; 45 to 250 miles broad. It is a very mountainous land, having many rivers and lakes; the climate is equable and temperate, the scenery in many parts grand and magnificent. In South Island, among the larger lakes, is that of Te-anau, of which we give an illustration. It conveys some idea of the superb character of New Zealand scenery. The lake has an area of 132 square miles. Our engraving is from the *London Graphic*.

RELIGION OF SAVAGES.

BEFORE the Anthropological Institute, Dr. Edward B. Taylor, F.R.S., read a paper on the limits of savage

ening the writer's view that they, and ideas related to them, form no original part of the religion of the lower races. The problems involved are of great difficulty, the only hope of their full solution in many cases lying in the researches of anthropologists and philologists minutely acquainted with the culture and languages of the districts; while such researches will require to be carried out without delay, before important evidence, still available, has disappeared.

THE SOURCES OF OUR RUBBER SUPPLIES.

By I. A. SHERMAN.

THERE are merchantable in New York between thirty and forty different sorts and grades of India rubber, the variations determining the selection by manufacturers in the purchase of stocks. Of course rubber in all its variations is essentially the same, differing somewhat in the same degree as the pumpkin in South Dakota from that in New England—one large and another small, one with little flavor and the other richer in food qualities. The difference between sorts of rubber, however, is due in large measure to the methods employed in gathering the sap. It happens that the natives of the Amazon Valley have always taken pains in the curing of rubber. While climatic conditions in that country may have had their influence upon the character of "Para," the condition in which this rubber is exported has become a prime factor in making it a favorite with manufacturers. On the other hand, some of the African sorts are so full of bark and stones as to make them almost unfit for use. At one time "Assams" were

tributary of the Amazon having its source in the Andes. Brazilians, however, are apt to believe that the locality of the best sorts is unknown to Americans, and possibly the Purus may not be the locality.

There comes from Peru, at the sources of the Amazon and its tributaries, a rubber resembling the Nicaragua sheet, and called Caucho. This rubber is very wet and consequently shrinks very much, which is a serious drawback. It is considered a good strong rubber and it is utilized to a considerable extent by the boot and shoe manufacturers.

Of Ceara rubber there are three grades, numbered one, two and three respectively. It is called a "mule gum," the significance being that it is neither one thing nor the other, it being so deficient in elasticity as to cause some to argue that it is not rubber. It is used to some extent in the manufacture of mechanical rubber goods, but as it does not vulcanize like ordinary rubber, many firms do not understand the manipulation of it, and it is not very popular. Number one is the finer grade, number two is a mixture of one and two, and number three is very dirty and difficult to use. It consists of reddish brown string-like pieces made into balls or blocks. It is a very dry rubber, its gathering being peculiar. The tree is incised at the beginning of the dry season, and as the gum oozes from the wound it forms on the outside of the bark, to be pulled off at the end of the season. The gathering of this rubber seems to be on the wane, for every year there is an extensive migration of Ceara people to Para, bound for the forests of the Amazon.

From Bahia and Pernambuco, in Brazil, comes a rubber of a different grade from that of Para. It is cured with alum and salt water. The Pernambuco comes in

TE-ANAU LAKE, NEW ZEALAND.

religion. In defining the religious systems of the lower races, so as to place them correctly in the history of culture, careful examination is necessary to separate the genuine developments of native theology from the effects of intercourse with civilized foreigners. Especially through missionary influence since 1500, ideas of dualistic and monotheistic deities, and of moral government of the world, have been implanted on native polytheism in various parts of the globe. For instance, as has lately become clear by the inquiries of anthropologists, the world famous Great Spirit of the North American Indians arose from the teachings of the Jesuit missionaries in Canada, early in the seventeenth century. This and analogous names for a Supreme Deity, unknown previously to native belief, have since spread over North America, amalgamating with native doctrines and ceremonial rites into highly interesting but perplexing combinations. The mistaken attribution to barbaric races of theological beliefs really belonging to the cultured world, as well as the development among these races of new religious formations under cultured influence, are due to several causes, which it is the object of this paper to examine: (1) direct adoption from foreign teachers; (2) the exaggeration of genuine native deities of a lower order into a god or devil; (3) the conversion of native words, denoting a whole class of minor spiritual beings, such as ghosts or demons, into individual names, alleged to be those of a Supreme Good Deity or a rival Evil Deity. Detailed criticism of the names and descriptions of such beings in accounts of the religions of native tribes of America and Australasia was adduced, giving in many cases direct proof of the beliefs in question being borrowed or developed under foreign influence and thus strength-

almost unmarketable in New York, the price sinking as low as ten cents per pound, and not wanted at that. One firm, after long experimenting, discovered a chemical solution in which the rubber was washed, the process being that the bark and other impurities absorbed the chemicals, making them so heavy that they separated from the gum and fell to the bottom and away. This company made a fortune in a moderate space of time, but they put up gradually the price of Assams, from the fact of their creating a demand for that sort of rubber, until the profits became comparatively small, when they disposed of the privilege of washing to some leading rubber men who use the process at the present day.

Para rubber is more largely consumed in the United States than any other. It may be noted, also, that the larger share of the rubber exported from Para comes to this country. There are three grades—fine, medium and coarse. Fine Para is the standard by which all other grades are measured; it brings the best price, and probably is more used than any other. Should it become irregular in quality in the operation of curing over the smoke of palm nuts—as when little strips of virgin gum occur in the grain—it is called "medium," and its price is lessened by a cent or two per pound.

The "coarse" is imperfect, being composed of the scrapings and refuse of the fine sorts, and sells for about two-thirds of the price of the better grade. It shrinks considerably, having much water in it, and the importer generally is in a hurry to turn it over to the manufacturer. There are again many variations in Para rubber coming from different localities on the Amazon. This subject is involved in some obscurity, but the best rubber is supposed to be found on the river Purus, a

sheet, and is of a yellowish white tinge. That from Bahia is not so good and comes in round balls. The principal objection to it is that it is very damp, entailing a large loss to the importer from shrinkage.

Of Mangabeira rubber there are three grades, very similar to the Bahia and Pernambuco sorts. It is a difficult sort to work, but it is one of the few rubbers that will cure white, and is largely used for tubing, water bottles, and articles of that character. A grade that has a red look is considered superior and sells for five or ten cents per pound higher than the others.

From Central America comes a variety of rubbers, distinctive in name theoretically, but owing to the lines of transportation centering at Greytown, and the transshipment at that point to New York, there is much confusion, one sort often getting substituted for another. The Pacific Mail steamers gather also different varieties at Panama with the same confusion. That which comes from Nicaragua is called Nicaragua "sheet" and "scrap." The latter comes in pieces about 2½ feet long, weighing from ten to forty pounds. In the gathering of rubber in the forests, around the cuts in the tree a residuum is left, which is given to the men as a perquisite, and this forms "scrap." As in the peculiar mode of gathering it is very dry, there is little loss in shrinkage, and this quality makes it a favorite with manufacturers. It contains some bark, but not so much as in the "sheet." The sheet, after it is milled and washed, is the same rubber as the "scrap." Both are cured by the use of a vine from which a soapy substance is formed.

There is another grade which comes from Central America, containing a considerable amount of ashes, due to its being smoked over the latter. It comes in

thin sheets $\frac{1}{2}$ to $\frac{3}{4}$ inch thick. It is a dry rubber, there not being so much loss in shrinkage, but it is not so firm as the other grades, and it is difficult to work. There also comes from Central American ports a rubber which is chiefly grown in New Granada, and is called "Carthagena strip." It is from $1\frac{1}{2}$ to 2 inches thick, and there is a great deal of sand and dirt in it. It is a black, tough rubber.

Honduras furnishes a great deal of rubber of the Tuno sort, which is found in many other sections of Central America. Guatemala ranks low in the American varieties, containing a resinous substance which gives it a tarry appearance. It comes in sheets pressed together. There is a rubber which comes from Angostura, as good as Para. When cut it is found to contain little spots of white as large as a pea. Tuxpan, Mexico, once sent a fine grade of strip rubber, but as the trees have been destroyed by cutting them down instead of tapping for rubber, the imports from there are now very small. The rubber is gathered by scraping from the bark.

Guayaquil comes in large flakes or lumps of a whitish color in the best sorts, the inferior sorts being porous and exuding a black liquid which stains the knife and hands. As in a great many "Centrals," the name is often confounded with the sorts.

Esmeralda comes from Guiana, is a strip rubber, and is also made into "sausages." Some brokers are of the opinion that very little of the real Esmeralda finds its way to America, it being almost indistinguishable from other grades. It brings a high price. Certainly little of it finds its way to Europe, brokers not quoting it there. A great deal of the rubber gathered in Colombia finds its way to the Amazon and Para.

In rubber from Asia the Assams probably take the lead, and are rated above coarse Para in price. They come in oblong slabs with a long fiber of two or three feet, about half as wide, and of varying thickness. The slabs are wrapped in plaited straw. When cut they have a marbled appearance, somewhat pinkish in color. They are three or four grades, the lower ones being very dirty and all of them requiring much washing. The demand for the higher grades is very large, and it is bought in a great measure under contract. Still considerable quantities find a way to America by way of Hamburg and London. These grades are a strong resistant rubber and find their way chiefly into mechanical goods.

There are two grades of rubber coming from Borneo. The rubber from that source was first called a gutta, on account of its geographical location, but this error was a palpable one and soon corrected. It is a white, soft, porous or spongy rubber, the pores being filled with salt water or whey. This is caused by using salt to coagulate it, the outside of the ball, in which shape it comes, being acted upon first, which makes little cells in the interior, filled with salt and water. As this rubber becomes old it changes in color to a dull pink or red, and the water evaporating leaves a saline incrustation in the cells. The better grade is a fair rubber, but the second grade is often when cut almost as soft as putty and practically worthless. The shrinkage in both grades is very large—from 25 to 50 per cent. It is used mostly for mechanical preparations, and to some extent in the manufacture of hard rubber goods.

Of Africans there are many varieties. The favorite sorts comes from Madagascar. The pinky sort comes in the shape of round balls, weighing $1\frac{1}{2}$ to 4 pounds. It is black on the outside, natural from exposure to the air, but when first cut it has on the inside a pinkish white look, and is susceptible of a fine polish, which makes it a favorite with hard rubber men. It is not so strong, however, as fine Para. There is always a good demand for it, and it is rarely found in store, being sold "to arrive." This sort comes from Tamative. There are two or three variations in quality of Madagascar, but the grade called "black" comes from Majunga, is exported in small balls and has a dark color when cut. This latter grade is used to some extent by mechanical goods men and is worth about ten cents less per pound than the pink, which latter ranks next to Para.

From the west coast of Africa there are many varieties, the best coming in the shape called "thimbles," which are square pieces, one inch each way. The rubber is very dry, and is in good demand by mechanical goods manufacturers. It is a very strong rubber, and naturally has little shrinkage. Tongues are shaped as their names indicate. There is considerable shrinkage, but it is a very good rubber. There is also a small ball rubber, about $1\frac{1}{4}$ inches in diameter. It cuts white and is fairly firm.

Congo ball is made from small strips of rubber and rolled into balls, from 1 to $2\frac{1}{2}$ inches in diameter. It is a firm and very elastic rubber, but there is more or less bark in it, and as manufacturers do not always have proper machinery to exclude it, they do not buy readily.

Sierra Leone comes in balls three to four inches in diameter and is a very fair grade of rubber. It has a considerable demand from boot and shoe and mechanical goods men. Like all West coast rubbers, it reaches us by way of Hamburg or Liverpool.

The finer grade of Mozambique is called "white ball." It resembles Congo ball in appearance and comes in about the same shape. The "red ball" is mixed with a reddish bark and gets its name for that reason. Oftentimes both varieties of "ball" will be found filled in the center with bark. The rubber is then called "unripe Mozambique" and sells for ten cents less per pound.

"Flake" is used very extensively as a friction rubber in mechanical goods—as in hose, where duck is used. It is a soft rubber and cannot be used on hot rolls, as it would stick badly and also run in an annoying manner. It is compared to molasses when it starts off on such a trip, consequently it is used only on cold rolls. For hose, and in cases where cloth is used, it is a very useful rubber.

From Liberia comes a lump rubber, which is harder than "flake." There are three rivers in Liberia from which rubber is gathered, but it is all assembled at the common mouth and the grades are not kept separately, making a class of rubber which is very variable, and therefore disliked by manufacturers.

There is on the whole a growing tendency toward the use of Africans, and in this is a true check on the price of Para. In Centrals there seems to be a falling off in the production consequent upon a scarcity of la-

bor, which has been from time to time drawn into internal enterprises. In Europe the stocks of Africans are always larger than of Para, and a steady growth is very noticeable.—*India Rubber World*.

LOCUSTS.

By S. L. CLAYES.

ALL our lives we have heard of the likeness which the locust hordes bear to an immense army, advancing with a force so overwhelming as to defy resistance. We have been familiar with the dread but sublime description of their coming given by the prophet Joel. We have even had some experience—though happily slight—of their ravages in our own country. But however vivid may have been the descriptions we have read or the tales to which we have listened, it is only by the added aid of a powerful imagination that we of the Western world are enabled to form any just idea of what a swarm of locusts really means to the nations of the East.

Dr. William Thomson, in his account of one of their incursions into Syria, tells that early in the season a detachment of winged locusts passed over the land, leaving behind myriads of their eggs, which lay glued together in small lumps everywhere over the fields, plains, and deserts. This flying squadron soon disappeared, but in less than two months the eggs began to hatch, and, apparently, the whole surface of the earth awakened into life. Each grain of sand seemed to have become a living, sentient thing. Presently this seething mass of nearly indistinguishable particles developed until it could be seen that it was made up of the tiniest imaginable grasshoppers. The little creatures entered promptly upon their life task of destruction, all moving as vigorously in one direction as if swayed by a single will—a crawling, jumping host of living atoms.

Dr. Thomson was upon horseback when he caught his first glimpse of an extraordinary and puzzling spectacle. He could hardly persuade himself that he saw aright, but surely the whole surface of a hill near by was agitated—moving; more than this—a thin layer seemed to be peeling off and rolling down its sides. It looked like quicksilver; no, too thick for quicksilver—it was more like mortar. What could it be? His interest was greatly excited; so was that of his horse, but while he was eager to approach and examine, the horse was strongly of the opinion that it was well to leave the strange thing as far as possible behind them. Rebellion followed; but, fired by scientific zeal, the doctor left the animal only half conquered, dismounted, and came close. He found his mortar was a living mass of infant locusts—wingless, even too young to leap—that had started rolling down hill for some cause best known to themselves. Perhaps it was only from accident, but who can say what access of baby terror might have swept over them at the heavy tread of the approaching horse.

Some years later Dr. Thomson was privileged to form a more intimate acquaintance with these small imps of destruction, this time grown to their full size, though wingless. He was living upon Mount Lebanon when the locusts were reported to be coming toward the mountain in force. The people put forth every effort to stay their progress, but without success; and soon the whole surface of the earth grew black with the on-moving of their steady ranks. They scaled the rocks, they clambered over walls, hedges, ditches; whatever came they surmounted, never turning aside for any obstacles—not even for the houses—not even for the palace of the Emir—they went straight up over everything and down on the other side. Dr. Thomson thought he might compass, perhaps, the saving of his garden. To this end he hired a large number of men and set them on guard night and day. They built fires, they drove the locusts off, beating them with bushes and branches of trees; but, though many were killed, others so intemperately followed in their wake that at length the men fairly succumbed and gave up the battle.

This army was four days only in possession of the land, but when they left it was as if the mountain had been swept by the besom of destruction—as if a great fire had raged over it, consuming all vegetable life. The vines had been covered with young grapes, the trees laden with figs, mulberries, and olives; but they were now barer than ours in midwinter, for even their bark—bitter and hard as it was—had been stripped from them and devoured. The land, before the coming of the locusts, was green as an emerald; now even the gardens were but beds of sand. In the fields not an inch of pasture was spared, not a stalk of corn, not a blade of grass. The flocks and herds were left absolutely without food. Even this was not all. It was soon found that they had eaten up everything made of silk, wool, linen, or leather that they had come upon in their path.

Mohammed endows the locust with speech and makes him say: "We are the army of the great God, we produce ninety-nine eggs, if the hundred were complete we should consume the whole earth and all that is in it."

The Arabs declare that the locust has stolen a part from every bird and beast, taking its body from the scorpion, tail from the dragon, legs from the stork, wings from the eagle, head from the horse, eye from the elephant, neck from the bull, and breast from the lion. Yet it is far from being an ugly creature to look upon. It is about two and a half inches in length, of a pale brown color, the elytra being spotted with darker brown or black. The legs are brown with alternate bands of black and yellow; the hind legs are very large and strong, and are powerful for leaping. The thorax is covered with fine down, and the wings—which are often tinted with iridescent hues and folded like a fan—are large and shining. In appearance the locust is not unlike the common grasshopper of this country. The principal differences lie in the comparative shortness of its antennae, its somewhat stouter body, and its possessing only three foot joints, while the grasshopper can lay claim to four.

Locusts are found in all except the coldest parts of the earth. Europe, Asia, Africa, and America can each boast them as her own; but in both Europe and America they are comparatively harmless outside the tropical and sub-tropical regions of the continents. Even in these hotter states their ravages are inconsiderable compared with the terrible destruction they have

wrought in Africa and some Asiatic countries, notably Arabia and its neighboring regions.

As each blessing has its bane, so every bane should bring its good along; and the good of the locust is that while it destroys all else, it can in its own person furnish that which will sustain life in both beast and man. All kinds of birds as well as quadrupeds feed upon it greedily. At first, doubtless, from necessity, when the locust had left him nothing else to eat, man, too, tried the little creature as a food, learned to relish his flavor, and has since continued to eat from choice. Some of the Arabs boil their locusts and then dry them in the sun; others cure them by soaking in oil; and again others preserve them in brine, perhaps drying them afterward. They are also roasted, or fried in butter, and eaten with honey. Besides this they are often dried and ground, and the flour-like substance resulting is made into bread.

They are even offered for sale in the markets of Arabia, Syria, and Egypt. The African bushmen cook them by making great fires. The locusts fly into the flame, their wings are burned, they fall and are roasted; then the bushman draws them forth, eats, and is happy. Some Europeans do not fancy their nut-like flavor, especially at first, while others find them palatable.

Lady Anne Blunt tells of riding through a part of Northern Arabia where a swarm of locusts had lately passed, leaving their dead and stragglers behind them. The camels ate these as a relishing morsel with their provender, and her greyhounds picked them up all day, eating a great many of them. She says they were regularly used in camp as a part of the day's ration, and thought a very fair substitute for vegetables, their flavor being somewhat like that of wheat still in the milk. After trying the many different modes of cooking, all the Europeans agreed that they preferred them simply boiled. When cooked they took the creatures daintily by the wings, pulled off their long legs, dipped them in salt, and "ate them with much relish." Lady Anne, when she first tasted them, thought them "fairly good," but soon came to consider them "a most excellent article of diet." During her visit to Arabia many of the tribes where wholly dependent upon locusts and camel's milk for their food.

Dr. Livingstone considered locusts very good eating, and they are highly prized by the natives of South Africa as affording a nourishing and wholesome food for man, birds, and beasts. Their domestic animals—horses, cows, and sheep—fatten upon them, while they are devoured in great numbers by antelopes, hyenas, and jackals, and even elephants and lions do not disdain to eat them. *Popular Science News*.

MEXICAN ONYX MINES.

To the lover of geological eccentricities few localities can present greater attractions than that portion of Mexico politically known as the State of Puebla and the country immediately contiguous thereto. Within the lines of the state, or in their immediate vicinities, tower three of the greatest volcanoes in the world—Popocatepetl, Ixtaccihuatl and Orizaba, each over 17,000 ft. high, and presenting in themselves many magnificent geological studies as well as every variety of vegetation, from that of the tropics to that of the poles. One of the greatest of the many peculiar formations encountered, equaling in interest the sulphur mine contained in the bowels of Popocatepetl, are the quarries from which come the stone known as "tecali," "Mexican marble," or "Mexican onyx." In beauty no marble or similar stone ever compared with that which these quarries yielded. For centuries before the advent of the *conquistadores* of old Spain, Aztec artist and architect found in this marble their favorite material. Among them so highly was the stone prized for its beauties that it was deemed too sacred to be given to the ordinary uses of common mortality, and was devoted almost solely to the ornamentation of religious edifices or the manufacture of sacrificial vessels. So strict and arbitrary was this limitation of its use that its Indian name, "tecali," is merely a corruption of the Aztec word "Teocali" (Lord's mansion), a name given by the Indians to their temples. With Cortez and his freebooting followers the stone found as high favor, while, with that peculiarity that always distinguished them of picking out the best under all circumstances, the padres regarded it as a most meet and proper offering to the church from the devout. Altars and baptismal fonts were always made of it when it could be obtained, and among the most notable sights connected with a tour of Mexico are the magnificent collections of articles of this marble which are to be found in many churches, particularly that in the cathedrals of the cities of Mexico and Puebla, and in the churches of Leon, Queretaro and Guadalajara, several of which contain perfect slabs 3 and 4 ft. square—an extraordinary size on account of the small and irregular shape in which the stone is found.

During recent years fashion has taken up what the priests of these two religions thus marked with their approval, and the stone under the name of Mexican onyx, with its capricious markings by Dame Nature's brush, has become so well known as to make a detailed description of its different varieties unnecessary. To those who have made its acquaintance, though only through the medium of the ordinary onyx table top, clock, or the interior ornamentations of public buildings, beautiful as such are, it would be hard to convey a correct idea of the exquisite beauties of the finer grades of the marble. While the ordinary grades commonly encountered probably surpass in elegance any similar material, it is only in the light and dark green, the ivory colored, the brilliantly banded and the dark red varieties that a full realization of the stone at its best is had. Then under the touch of a skilled hand it becomes almost a gem. But while the man of civilization may work it into a thousand designs that the artistic traditions of our civilization have pronounced beautiful, and while he may even bring the sun to his assistance by cutting the translucent shades into slabs so thin that their iridescent beauty surpasses the finest glass that ever served as a window, it is only in the hands of the half-clad Indian workers found scattered through the quarries that its rare possibilities are shown. Under the touch of these the inherited skill and taste of centuries are brought into play, and from a dead, inanimate marble there seems gradually to grow something that is almost