and nuts generally; and the invention belongs to that class of nut locks wherein a ratchet block or spring stop is employed between the inner face of the nut and its contact surface, and engages with grooves upon the said inner face of the nut to admit of the free movement of the nut in one direction and prevent it from moving in the other direction.

The Yellow Pine of the South.

The average height of the yellow pine, says a southern writer, in the virgin forest is from 60 to 70 feet, with a diameter of 12 to 18 inches for two-thirds of its height. It is of slow growth, particularly at the later periods of its life. According to the number of annual rings, trees of the above dimensions must have reached an age of 60 to 70 years. The reproduction of a tree from the seed, furnishing an equal supply of timber, would at this rate take two generations. It is a poor seeder, as the younger Michaux observed. In unfruitful years, a forest of hundreds of miles may be ransacked without finding a single cone, and these, according to my observations, are far more frequent than fruitful ones. In its struggle for existence in our days, the odds of a survival of its kind among the arborescent vegetation that disputes its ground are greatly against it. Taken from the flat and moist lands, and it is replaced almost exclusively by the pond and old-field pine; the hilly, broken, dry upland, denuded of the grand old pine forest, is with surprising rapidity covered by a dense and scrubby growth of blackjack, turkey oak, scarlet, and upland willow oak, above which seldom a young pine raises its head, crowned with its large white-fringed terminal bud.

Full of resinous juices through all stages of its life, the young trees are not as able to withstand the raging fires that annually devastate the woods as the less resinous species and the deciduous-leaved trees; besides that, being of much slower growth, this noble tree is doomed to extinction if not protected by the aid of man. On tracts sheltered from the invasion of fire, groves of young trees from 15 to 25 feet high, can be observed around Mobile, testifying that its existence for the future can in some measure be secured if protected from these destructive influences, unnecessarily caused by man. The utmost efforts by an enlightened community should be made through active and efficient State legislation without further delay, to guard against the calamity of a total destruction of such a magnificent estate intrusted to the hands of our people. Besides its contributions to the manifold necessities of the agriculturist, the builder in naval architecture, the construction of railroads, the arts, medicine, and the innumerable smaller demands of domestic economy, and the varied industries of the world, the influences of this great belt upon the climatic conditions and the salubrity of the Southern coast, are even of more far-reaching importance to the interest of the community at large, extending far out of its confines. Rearing its horizontally outspreading limbs high up into the atmospheric ocean, their branches densely clothed with the long, slender leaves, the forests of these trees present to the canopy of heaven, for many hundreds of square miles, an unbroken sheet of perpetually active vegetation, whose forces at such an altitude affect a constant attraction of the fleeting clouds, causing them to deposit their life-giving and supporting humidity in grateful showers over a large area with wonderful regularity during all seasons. To this fact is due the delightful climate of this part of our country, equalizing its temperature, particularly in tempering the rigors of the long summers of a region near the tropics.

During the great progress of meteorological science of late years, the fact has been established that in this exercise upon the conditions of the atmosphere, as regards the precipitation of its moisture, the pine trees stand unrivaled among all other trees of the forest. Robbed of this protection, the hills and the plains of the Gulf region, now blooming and clothed with the richest verdure, would be arid and parched, presenting as forbidding and austere an aspect as those of the denuded coast of Africa along the Mediterranean Sea, devoid of productive power and unfit for the habitation of civilized man. The efforts of nature are ever directed to recuperation in its aims to insure the existence of different forms of the living organisms from generation to generation.

To secure to our posterity the blessings enjoyed by us in its bounty in assisting these efforts as directed by her laws, is a stern duty imposed upon us. Its discharge in the prevention of a wanton destruction of our forests and the adoption of measures regulated by the light of science, common sense, and the proper regard to the future, should engage the attention of every intelligent and patriotic citizen, appealing particularly to the owners of the soil. Of little importance to agriculture and industry are the other species of pines found in this region. Of considerably smaller dimensions than the yellow pine, and of a soft and sappy wood, they have, as timber trees, but a small value.—*N. W. Lumberman.*

ENGLISH SOFT PORCELAIN.

In England no regular hard porcelain is made, but a soft porcelain of great beauty is produced from kaolin, phosphate of lime, and calcined silex. The principal works are situated at Chelsea. The export of these English porcelains is considerable, and it is a curious fact that they are largely imported into China, where they are highly esteemed.

ENGLISH SOFT PORCELAIN VASE.

Our engraving shows a richly ornamented vase in soft porcelain from the works at Chelsea.

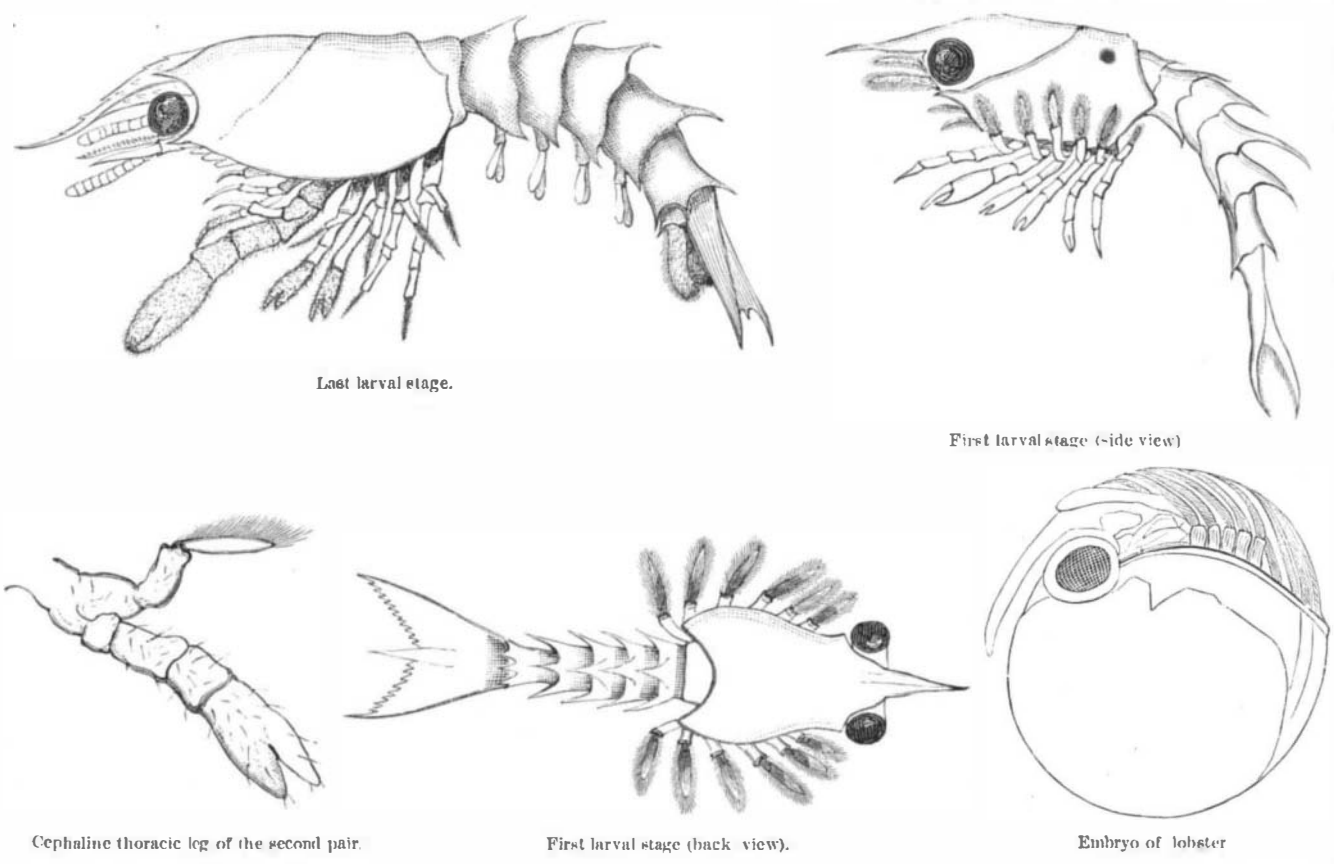
LOBSTERS.

BY A. W. ROBERTS.

Previous to the establishment of the oil works at Hunter's Point and Greenpoint, the lobsters caught at Hell Gate were considered to be the finest that came to the New York markets. But the few caught now are so strongly impregnated with sludge, acid, and coal tar, that it is next to impossible to eat them. There is no doubt that the blastings at Hell Gate destroyed immense quantities of lobsters; so great a dread have lobsters of thunder that they will cast off their large claws when a loud clap occurs or when a gun is fired. In olden times captains of vessels often extorted blackmail from lobster fishermen by threatening to fire cannon over their fishing grounds, knowing full well that the concussion would cause the lobsters to cast their claws, thereby destroying their value. Our common lobster (*Homorous Americanus*) belongs to the order of long-tailed crustaceans (*Macroura*), which includes the crayfish, prawns, and shrimps. As an article of food the lobster is the most important of all crustaceans, and dates back to the early ages of the world. Latium was famous for its lobsters, and Athenæus, whose cook book is the oldest in the world, mentions Apicius, who spent much of his time at this place on account of its lobsters.

Fifty years ago large quantities were taken on the reef of rocks that extended from Castle Garden to Pier 4, North River, and also on the reefs off Governor's Island; now only a few are taken in the neighborhood of Fort Lafayette, our markets being supplied from Maine, Nova Scotia, and Massachusetts, the lobsters reaching here alive in "well" smacks. Large quantities are sent to New York from Boston, all ready cooked, during the winter season. On the Maine and Nova Scotia coasts thousands of girls, women, and boys, are employed in the canning of lobsters. On the first floor of these canning establishments are brick furnaces, in which are placed large copper boilers filled with sea water kept at boiling heat. As fast as the lobsters are received fresh from the fishermen they are plunged into the hot water for a few minutes, after which they are distributed on long benches covered with zinc. The women and girls then break them up and extract the solid meat from the tails and large claws, the only parts used in filling the cans, which are then placed in shallow boilers to expel the air before sealing them up, after which they are taken to the second floor to be labeled and packed in boxes capable of holding four dozen cans; these sell at four dollars per box. The number of lobsters boiled per day varies from one thousand to three thousand. The American canned lobster goes to all parts of the civilized world.

The usual way of catching lobsters is in what are known as "pots." The "lobster pot" is made of a variety of materials, laths, netting, and wicker work. On the Eastern coast nearly all the pots are made of laths, forming a long semicircular cage; at each end is a door, which lifts up when the lobster presses against it; after he has passed in the door drops back into its place, and the lobster is imprisoned, as the door cannot be raised from the inside; others have a funnel-shaped netting of rope. The pots are weighted with stones and fastened on set lines, which are buoyed at each end to mark their positions. A smart fisherman can fish one hundred and fifty pots on a single line, but it is very hard and laborious work lifting and hauling up from the deep water into the boat so many heavily weighted pots; each pot has to be rebaited and emptied of its lobsters, also cleared of all seaweed and drift. The pots are baited with what are known as "evil" fish, such as stinging rays, skate, bonkers, etc., which cost the fishermen a few cents per hundredweight. After the lobsters are caught they are placed in large stationary cars provided with a hopper on the top, the lobsters are thrown into the hopper and pass into the car, where they remain until the "well" smack returns from New York for a fresh load. Lobsters are in season all the year round, but are the fattest from April to October. It is a mistake that any part of the lobster is poisonous; although the "lady," which is the stomach of the lobster, is very tough and indigestible, it is not poisonous. The bluish vein situated along the back and tail is to be avoided, as it often causes sickness. Lobsters are prepared for the table in many ways, the flesh is boiled, fried, pickled, scalloped, and is used for soups, salads, sauces, croquettes, pies, and pastry, but the most delicious of all is a fried "shedder" lobster. A "shedder" is a lobster who is within one or two days' time of casting its shell, which is removed artificially from the lobster before cooking. The shell of a lobster is composed of an unyielding calcareous substance, which, without doubt, is a most excellent defense for a *full grown* lobster, but it leaves no room for growth. To overcome this, all crustaceans possess the power of shedding their shells at certain seasons of the year, after which a new shell is formed; this again is cast off, and so continually until the animal has attained its full growth. Not only is the shelly coat of the body and limbs cast off, but also the following portions of the body: The foot-stalks of the eyes, external cornea of the eyes, internal thoracic bones, membrane of the ear, membranous covering of the lungs, tendons of all the claws, lining of the stomach, and the stomachic teeth. There can be but little to wonder at that a lobster often experiences great difficulty in shedding



Last larval stage.

First larval stage (side view).

Cephaline thoracic leg of the second pair.

First larval stage (back view).

Embryo of lobster.

its old coat, when so many organs are involved. Sometimes the legs are torn off or badly lacerated in drawing them through the narrow joints, and when successfully accomplished the lobster is the most helpless and defenseless of all living creatures; the limbs, being soft and pliant, are incapable of offering the slightest defense. For some days previous to casting, the lobster begins to excavate a cavity under a rock; as soon as the cavity is of sufficient size he closes the entrance by pushing from the inside with his large claws a number of stones, through which enough water passes in and out for a constant supply of oxygen. He now rests for three days, refusing all food, and preparations are going on for forming a new shell. The membrane which lined the shell has become more dense, and has collected a quantity of liquid material for the consolidation of the new shell. These materials are mixed with a large quantity of coloring matter. As soon as the shell is cast off, the membrane is suddenly expanded by the pressure from within, and by the rapid growth of the soft parts the lobster soon acquires a much larger size than that of his cast-off shell. Lobsters are of a very quarrelsome disposition, and it often happens that when they fight they snap off one another's claws; in such cases the injured member is amputated to the next perfect joint, from which, in a short space of time, a new limb makes its appearance, at first very small, but constantly increasing in size. This new limb being soft and tender, all the defensive qualities of the lobster are displayed in protecting it from enemies, till next shedding time, when it comes forth a hard claw, much smaller in size than the rest, but which, in the course of several sheddings (if the lobster is young) attains its full size. It is, for this reason, a common circumstance to find a lobster with one very large claw and one small one. The amputating of the injured limb is for a very wise purpose. The blood vessels are but slightly contractile, and a wound inflicted on the most fleshy part of the claw would continue to bleed freely. By amputation at the joint the surface of the wound is reduced to a very small space, which heals quickly. A few years ago the enterprising (but not over-scientific) fishermen of the New England coast expended considerable money uselessly in constructing establishments wherein to breed lobsters. No breeding establishment in which it was necessary to have a free passage of the sea water in and out, on the rise and fall of each tide, could possibly answer for raising young lobsters, for the reason that they are so minute after leaving the egg as to be known as very interesting objects for the microscope. Again they are free swimming animals in their early stages, and what makes it still worse is that they are surface swimmers when passing through the larval stages. Most fishermen believe that after the young lobsters leave the egg they fasten on to the curiously silk-fringed appendages attached to the under side of the abdomen (erroneously called the "tail") until they are strong enough to shift for themselves. Another general belief was, that when the young lobster left the egg he was in form and color the same as the parent.

But thanks to Professor S. I. Smith, who has made a special study of the development of the lobster, there is no longer an excuse for the general ignorance on the subject that has existed. Professor Smith divides the larval condition of our native lobster into three stages. There are probably two succeeding stages before the adult form is attained. One is described by Professor Smith, while the first of the two he supposes to have existed, but has not discovered. After this the animal ceases to swim on the summer and later in the summer it seeks the bottom of the sea, where it feeds on the young of various marine animals, the larvæ of crustacea, etc. When much crowded in captivity the larvæ will feed on its own kind. In the first stage of the adult form, when the animal is about three-fifths of an inch long, it still differs from the adult so much that it would be regarded as a different genus. In this stage the young lobsters move very rapidly by means of their abdominal legs, darting backwards when disturbed by means of their abdominal appendages, and frequently jumping out of the water like shrimps, which in their movements they much resemble. They appear to live a large part of their time on the surface, and are often seen swimming about with other surface animals. Professor Smith thinks they pass through all the stages he figures in a single season. How long the young retain their free swimming habits after arriving at the lobster-like form is not known. Specimens three inches long have acquired nearly all the characters of the adult. Of all the larval stages of other genera of crustacea there are none which are closely allied to the early stages of the lobster.

In the neighborhood of Southampton, England, are several storage ponds capable of holding 50,000 lobsters in good condition for a month. Fishing (well) smacks holding 10,000 lobsters each collect the lobsters off the coasts of Scotland, Ireland, and France for the storage ponds. In the reign of George II. a close season was established in Scotland, extending from June 1 to September 1. There still exists a fine of five pounds for taking lobsters during the close season, but its not having been enforced of late years the number of lobsters has gradually decreased. The quantity of lobsters taken on the Irish coast is less now than 20,000 per annum A law exists in England regulating the length of salable lobsters to eight inches, and the penalty of exposing them for sale under eight inches is confiscation.

The number of lobsters shipped from the coast of Norway to London amounts to over a million a year, for which the sum of $100,000 is paid. The English lobster companies have agents along the entire coast of Norway to buy up all the lobsters caught, which bring at Billingsgate from 18s. to 20s. per dozen. The number of lobsters sold in England has averaged 3,000,000 per annum.

In the State of Rhode Island lobster fishermen are prohibited by law to "lift" their lobster pots from Friday night to Monday morning.

In the State of Maine there exists a close season which covers the period of time in which the female is carrying her eggs and the release of the larvæ from the egg.

The law of New York State, which is based on that of Massachusetts, has been mailed to every lobster fisherman in New York State by the fish dealers of New York city:

DEAR SIR: The Legislature of the State of New York has passed a law, which has been signed by the Governor, prohibiting the sale of small lobsters, as follows:

AN ACT PROVIDING FOR THE PRESERVATION OF LOBSTERS.

Be it enacted in Legislature assembled, and by authority of the same as follows:

SEC. 1.—Whoever sells or offers for sale, or has in his or her possession, with intent to sell, either directly or indirectly, any lobsters less than ten and one-half inches (10½) in length, measurement to be taken from one extremity of the body to the other, exclusive of claws or feelers, shall for every such lobster be fined to an amount not less than five dollars ($5), and in all prosecutions under this act the possession of any lobster not of the length hereinbefore required, shall be *prima facie* evidence to convict.

SEC. 2.—All forfeitures accruing under the act shall be paid one-half to the person making the complaint and one-half to the city or town where the offense is committed.

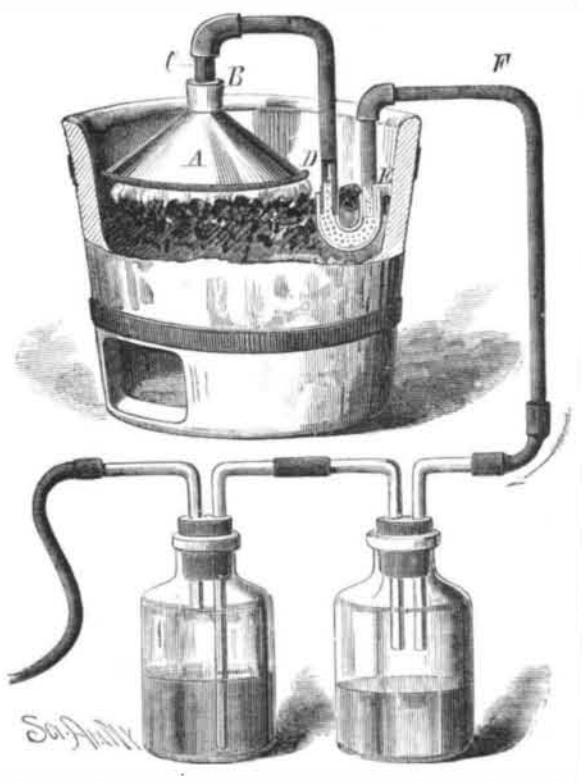
SEC. 3.—This act shall take effect on the first day of June, 1880.

You will therefore please see that there are none of less size than allowed by law—10½ inches in length—in any of your shipments to us.

To show how prolific lobsters are, it is stated that no less than 12,000 eggs were counted in a single female. The eggs are carried by the female under the abdomen, and are fastened and entangled to the silk-fringed appendages previously mentioned. As the outer layers of eggs become ripe the mother constantly stirs them with her small hind claws, either to clear them of sediment or parasites or else to aid the larvæ in breaking through the shell. The "coral" formed in cooked lobster is the roe or egg masses of the female lobster. As to the sight of the lobster it may well be good, for he is possessed of compound eyes like those of insects, only the lenses are square instead of hexagonal. The lobster often freaks both in colors and the form of the large claws. When in charge of the Aquarium I had several specimens of deep blue and a beautiful light blue lobsters, also three of a bright crimson, and many with double large claws.

OXYGEN FROM BLEACHING POWDER.

Hitherto oxygen when required in anything like a pure or undiluted state—as for the lime light, oxyhydrogen blowpipe, etc.—has been obtained almost exclusively from



APPARATUS FOR MAKING OXYGEN GAS FROM BLEACHING POWDER.

potassium chlorate by heating that salt to decomposition in the presence of peroxide of manganese.

Pure potassium yields nearly one-third its weight of oxygen. The commercial is never chemically pure, however, and in practice it rarely yields more than twenty-three gallons a pound (at 60° Fah. and normal pressure) of gas, the latter frequently containing much chlorine.

The salt costs at wholesale twenty-five cents a pound, and requires to be mixed with about one-quarter its weight of peroxide of manganese, costing eight cents a pound, thus making the cost of the gas for materials alone about nine cents a cubic foot.

Where economy is considered, common bleaching powder or chlorinated lime can be made to profitably take the place of the more expensive salt as a source of oxygen.

An average sample of bleaching powder (fresh) contains at least twenty-six per cent of calcium hypochlorite. This substance when heated to the boiling point of water splits up into calcium chloride and calcium chlorate. If the heat is increased to low redness the chlorate is decomposed into calcium chloride and oxygen.

During the elevation of temperature some hypochlorous acid is apt to pass off; but if the apparatus is so arranged that the gas is forced to pass over or through a small quantity of heated lime it is arrested, decomposed, and the oxygen liberated—oxygen and steam only passing over.

In a series of late experiments with an apparatus similar to that described below, the yield in oxygen per pound of common commercial bleaching powder, costing one and three-quarter cents, averaged four gallons, making the cost of materials for oxygen from this source about three and one-quarter cents per cubic foot, as compared with nine cents where potassium chlorate is used.

The gas after passing through the wash bottles is perfectly odorless and nearly pure.

Where the gas is required in small quantities, a few cubic feet at a time, the following simple and inexpensive apparatus answers very well:

The retort, A, is made of common sheet iron, doubly lapped and riveted. The short neck, B, is slightly flaring so as to admit of the luting in of a piece of inch steam pipe. This pipe, C, is connected by a screw cap or elbow with a longer piece of similar pipe bent somewhat and extending downward two or three inches below the bottom of the retort, where it is joined by a U cap at its lower end with a third piece of iron pipe extending upward above the bottom line of the retort. A fourth piece of pipe is connected with this latter at right angles for convenience of attachment to condenser and wash bottle. The space from D to E in the tube is loosely filled with fragments of quicklime, each somewhat larger than a pea.

Two or three pounds of the chlorinated lime having been put into the retort, the pipe, B, is loosely inserted in the neck and the joint made tight with a stiff luting of clay or plaster of Paris. The retort is then placed on a charcoal or other moderate fire, the portion of the pipe containing the lime being in the fire. Connection is made with the condenser and wash bottle as soon as steam begins to come over, and as soon as the air in the apparatus has been displaced connection is made by rubber tubing with the gas bag or reservoir.

The moisture in the heated substance first passes off together with some gaseous matter, the latter being decomposed by the lime; then as the temperature rises and approaches low redness oxygen is rapidly disengaged, and if the fire is good ten minutes' heating will suffice to exhaust the charge.

The stop cock at bag or reservoir having been closed the retort may be slipped out, another similar one already charged put in its place, and the operation repeated if desired.

The chloride of lime should not be too moist when placed in the retort, or the charge greater than will loosely cover the bottom of the vessel to a depth of one and one-half inches.

If a sudden pressure greater than the delivery pipe can relieve is developed in the retort the luted joint acts as a safety valve.

The sheet iron retorts do not, of course, last very long under such treatment. If the pipes are well washed on the inside with a thin paste of ocher and water and allowed to dry the gas and vapors passed through will not affect them much after the first charge.

The lime in the tubes is usually sufficient for two or three charges. It is better to renew it frequently, as it is gradually converted into calcium chloride, which melts on heating and when cooled requires to be washed out.

On a larger scale retorts similar in form to those used in making coal gas may be advantageously employed, the large delivery tube, partly filled with fragments of quicklime, being arranged so as to pass over the fire and be kept at a low red heat.

The Crater of Popocatapetl.

In a letter to the Philadelphia *Record*, Mr. Nathan E. Perkins, of Merchantville, N. J., describes at great length an ascent of the Mexican volcano Popocatapetl, having reached the crater after a toilsome climb and descended as far as he could without a rope. From this position a good view was obtained of the crater walls; the bottom was hidden by ascending smoke and steam. The lower walls were hung with large masses of sulphur interspersed with icicles hundreds of feet long.

"The crater is about one mile across, and has the appearance of a large funnel whose sides are but little inclined, and the bottom not visible. There seem to be three distinct rings, which divide it into four zones, the largest being that nearest the mouth. From the summit, the City of Mexico, although over 100 miles away, was plainly visible, and, surrounded by lakes, as it is, seemed like a magnificent gem set around with pearls. The whole great Valley of Mexico can be seen at a glance. At our feet lay Ameca, over 30 miles distant, with its luxurious growth of tropical plants and orange groves and banana plantations, and on the right Puebla and the old cities of Chilulo and Tascalla, with their 365 churches and spires. The distant mountain of Orizaba, nearly 200 miles away, the snowy peaks of Melencha, the White Lady, and several others in the distance, stood arrayed before me. I felt fully repaid for my toil in having climbed the highest mountain in North America, whose summit is about 18,000 feet above the sea level.'