OZONIFEROUS PLANTS.

Ozone is a mysterious element found in the atmosphere under certain conditions. It long puzzled scientific men as to its nature and composition, but it is now considered to be oxygen in an allotropic state, or the property possessed by some simple bodies, of assuming different qualities when subjected to certain modes of treatment. Its varying quantity in the atmosphere is supposed to affect the health of man. By some it is supposed to be oxygen condensed to two-thirds of its bulk. It is insoluble in water and in solutions of acids and alkalies, except in potassium iodide. It possesses very powerful bleaching and disinfecting powers, corroding cork, caoutchouc, and other organic substances, and rapidly oxidizes iron, copper, silver when moist, iodine, and dry mercury; and also has an irritating effect upon the lungs when in any large quantity in the atmosphere. It has a peculiar, somewhat metallic odor. It is produced when a current of electricity is passed through dry oxygen or atmospheric air; or by allowing phosphorus to burn in contact with water in oxygen or air, and also by different other processes.

Many trees and plants are supposed to evolve ozone, or to aid in producing it in the air, and so by its powerful oxygenizing qualities to destroy the disease-breeding germs floating in the atmosphere. Not that all plants do so, for there are some which are reasonably credited with producing malaria. This power of evolving ozone is strongest in sunlight, and often quite feeble at night. Although ozone is a recent discovery, yet the power of certain trees and plants to prevent malaria was well known centuries ago. A species of thyme was in such high repute for this purpose as to be held sacred to Vishnu. The disciples of Empedocles, one of the Grecian philosophers, planted aromatic and balsamic herbs near their dwellings to ward off malaria. Our English ancestors considered camomile and fever-few to have a similar effect. Places in which the sweet bay tree grew plentifully were considered by the Romans as being secure against infectious diseases. The antimalarial powers of the *Eucalyptus globulus* and other species are fully proven by the effects they have produced in Algeria, Corsica, Cuba, the Cape of Good Hope, Australia, and other places, having rendered almost uninhabitable regions perfectly healthy. Malarial diseases are also rare in sections of country in which pine trees or other coniferæ are abundant. In places where certain odoriferous plants are grown in large quantities, for the purpose of obtaining their essential oils, all such diseases are rare. The essential oils obtained from such plants also have similar effects when exposed to sunlight; and in a lesser degree such perfumes as eau-de-cologne, essence of lavender, extract of millefleurs, etc., all attributed to their power of producing ozone. Other plants, however, which do not produce essential oils, appear to have a similar power of preventing malarial diseases, or of rendering malarious districts healthy. In some parts of the well-known Campagna, near Rome, immense areas of thistles rendered the localities where they grew quite healthy, but upon their being destroyed, these districts became again unhealthy. In this country, in Holland, in the Mauritius, and other places, the planting and cultivation of the common sunflower has had remarkably beneficial effects in destroying malarial poison.

All odoriferous plants do not produce such effects in destroying the malarial germs in the atmosphere. There are some, such as the *Daphne mezereum*, the oleander, the wall flower, the pride of China (*Melia azedarach*), and others, which are actually deleterious when planted in great numbers. Besides the plants supposed to produce or evolve ozone, and hence called ozoniferous plants, there are others which have powerful disinfectant qualities, but whether they are ozoniferous has not yet been determined. The plants we have already noticed as such give off their emanations into the atmosphere, and the malarial germs are destroyed by the oxidizing power of the ozone burning them up. The plants of which we are about to speak have the power of disinfecting water, or destroying the organisms or gases which are deleterious to health. Whether malarial diseases are produced by infinitesimally minute organisms or by gases, is a matter of dispute, but they are most probably produced by germs which our microscopes have not yet been able to detect. This is becoming more and more the accepted theory. It is very probable that these water-purifying plants give off ozone by means of their leaves and roots, and thus destroy the germs in the water in which they grow. Very few, if any of them, produce essential oils or resins, but, as in the case of thistles and the sunflower, these do not appear to be indispensable in the formation of ozone. Among such plants are nearly all of our various pond weeds, such as float on the surface as well as those that are immersed, and some that are submerged. Many of our bog plants and some of those that grow on the borders of streams also appear to have the same power. In India, the West Indies, and in Africa, there is a species of duckweed, *Pistia stratiotes*, which possesses this purifying power in a remarkable degree. It will, in a few days, sufficiently purify stagnant water to admit of fish living in it, but at the same time makes it unsuitable for drinking purposes, rendering it so acid as to produce intestinal fluxes.

Now that malarial diseases are so common and produce such a large amount of suffering and death, the mode or means of preventing the development of the germs which produce them should be carefully studied and investigated. If the planting of certain odoriferous plants about our houses, or the stocking of ponds, streams, and marshes with plants producing similar beneficial effects, will destroy them, it certainly ought to be tested in an intelligent way by careful experiment. That some plants will do it is certain; they may not be desirable to have about our dwellings, but others more desirable and ornamental will no doubt be discovered when sought for. By our strict utilitarians, the study of botany and the culture of flowers are considered to be a waste of time, producing no useful results whatever; but the time is not far distant when they will be considered as highly useful pursuits. Realizing that an ounce of prevention is better than a pound of cure, our medical sanitarians are devoting much time to the study of the prevention of disease. The subject which we have thus so cursorily glanced at is one that commends itself to their attention.

The Utilization of Refuse.

A system of destroying the noxious properties of refuse, and converting it into more or less useful matter, has now had a fairly extended trial at several towns in England, notably Leeds, Blackburn, Warrington, and Derby, and has been found fairly successful. Leeds has led the way in these improvements, and the municipal authorities are satisfied with the result. The furnaces and other appliances were designed by a Mr. Fryer, of Nottingham, and their first practical trial was made at Burmantofts, about two miles from the town hall of Leeds, by the erection of a six-celled destructor and a carbonizer. The destructor consists of six (or more) compartments or cells, built in brick, lined with firebrick, and tied together with iron rods. It occupies a space of 22 feet by 24 feet, and is 12 feet in height. An inclined road leads to a platform over the top, and another incline leads from the level of the firing-floor to the adjoining road. Each cell is capable of destroying or carbonizing seven tons of refuse in twenty-four hours, and to secure the greatest economy the work goes on uninterruptedly. The cells consist of a sloping furnace, with hearth and fire-grate covered by a reverberatory arch of firebrick, with one opening for the admission of refuse, another for the escape of gases, and a furnace door for the removal of clinkers.

The refuse is emptied on the platform, and shoveled into the cell, falling first on the incline, thence reaching the sloping hearth, whence, when sufficiently dry, it is pushed on to the fire, where, owing to the radiant heat of the firebrick arch, it burns fiercely, the products of combustion being gases, a fine ash, and clinkers. Every other cell is provided with an opening large enough to take in infected bedding, mattresses, etc., as well as diseased meat. The gaseous products of combustion pass through a flue to a boiler, which supplies steam to a horizontal engine driving two mortar mills. In these mills the clinkers are mixed with lime, and ground into an excellent mortar, which sells readily at 5s. a load; while the tin cans and iron are sold for old metal. No fuel of any kind is required, the cinders and other combustibles found in the refuse supplying all that is needed.

During the year 1879 the following is an account of the work performed by the Burmantofts destructor: 14,000 tons of rubbish, 190 beds and mattresses, 264 carcasses of pigs attacked by some fever, 1 cow, 10 sheep and lambs, 28 quarters and 13 cwt. of bad meat. The staff required for each "shift" comprises a foreman, who acts as engine driver, four furnacemen, and one laborer.

Besides the destructor there is also a carbonizer, which is necessarily built in a different manner, as it is used to convert street refuse and vegetable matter into a charcoal, which sells at the rate of 30s. a ton. The carbonizer consists of a group of brick cells, each having a separate furnace. It is 26 feet long, 12 feet wide, and 15 feet 6 inches high. The "shoot" is fitted with sloping plates, which project from its sides and form a kind of spiral eave or ledge, which, near the bottom of the cell, takes the form of a fire-block, resting on a wall which divides the contents of the cell from the gases of the fire. The vegetable and other refuse to be converted into charcoal is filled into this shoot or well in a solid mass, the eaves or ledges forming on their underside a flue, so that the matter is gradually heated as it slips down the well, until at the bottom it is surrounded by nearly red-hot firebrick. The charcoal is withdrawn at the bottom, and is placed in a cooler worked by the steam engine, and each cell is capable of treating 2½ tons of vegetable and street refuse in twenty-four hours. The cost of a complete establishment, with a six-celled destructor, an eight-celled carbonizer, boiler, engine, mortar mills, buildings, etc., is £4,500. No nuisance of any kind is experienced in the vicinity of the depots, and the refuse which might, under other circumstances, be deposited in places where it would become the hotbed of disease, is effectually destroyed or utilized.—*Building News.*

Potassic Hydric Saccharate.

Pure cane sugar is dissolved in boiling water in a wide deep test tube until a boiling saturated solution results. To this liquid an equal bulk of strong nitric acid is added, and the mixture warmed until the reaction commences. This is very violent, and results in the disengagement of voluminous brown fumes. After the evolution of gas has ceased, the liquid is boiled. It is then, while hot, divided into equal parts, and one-half neutralized with a strong solution of caustic potash. To this the other half is added, when after a short time an abundant precipitate of acid saccharate is obtained. The salt, if slightly colored, is easily purified by passing the hot solution over animal charcoal, evaporating to a small bulb and recrystallizing.—*Thomas Bayley, in Chemical News.*

BLACKFORD'S TROUT SHOW.

The annual exhibition of trout in Fulton Market, which signalizes the opening of the season for that game fish, began on Friday, the 1st inst., and lasted two days. That popular interest in the propagation and cultivation of fish for food is wonderfully on the increase was evidenced by the throngs which attended the show even during the most inclement weather. Not only was the mercantile community represented, but among the visitors were noticed many well known lights of the literary, social, scientific, and artistic world.

Beside the display of fish, there were other attractions. There was a plaster cast from the Smithsonian Institution of a brook trout (*Salvelinus fontinalis*), weighing 11 pounds, caught in Rangely Lake in October, 1880. A collection showing the different stages of the manufacture of shell fish hooks, from San Nicholas Island, California, and shell fish books made by the Indians of the Pacific Coast islands; a prehistoric bone harpoon from the Dordogne Cave, France; flint tools used in the fabrication of shell fish hooks; the Feuardent collection of fish hooks; prehistoric bronze fish hooks from the Lake dwellings of Switzerland; Franklin bronze fish hooks from Normandy; Commander H. H. Gorringe sent a bronze of an Egyptian sacred fish and a Græco-Roman bronze box designed after a sea crab.

But the trout stand was the magnet, for here were specimens of the speckled beauties from Canada, Maine, Connecticut, Vermont, New Jersey, Pennsylvania, the Empire State, England, and remote California; indeed to the California exhibit must be awarded the palm. There were trout in tanks and trout in banks; live trout and dead trout; big trout and little trout; trout reclining on beds of moss, and trout suspended in bowers of roses. The two principal exhibitors of California trout were B. B. Redding, Fish Commissioner, and M. T. Brewer, of San Francisco, the following specimens being specially worthy of notice: Fish Commissioner Redding sent an exhibit of Truckee River trout, a large black spotted fish which grows from six to ten pounds weight.

Lake Tahoe trout, also a black spotted fish, but much larger than the Truckee River trout. It averages about twelve pounds in weight, although they have been caught weighing as high as seventeen pounds.

The Dolly Varden trout, so called because covered with variegated blotches. It is a small but gaudy fish, and weighs from three to four pounds.

Rainbow trout, from the McCloud River. It has a brilliant stripe from head to tail, and was quite a feature in the exhibition.

Mr. M. T. Brewer's exhibit, which did not arrive until late on Saturday, was comprised of nine distinct varieties, as follows:

Truckee River land-locked salmon trout.
Lake Tahoe salmon trout.
Independence Lake trout.
Donner Lake speckled trout.
Humboldt salmon trout.
Silver Mountain salmon trout.
Pyramid Lake speckled trout.
Truckee River red trout.
Sacramento River salmon.

Among the most interesting exhibits were the following: White Brook trout, from White Brook, Richmond, Rhode Island. "Speckled trout," light color, spots very small, W. H. Robinson, Patchogue, L. I. Wild trout, color very dark, by Mr. Hogan, Quebec, Canada. South Side Club, Long Island, heavy display of cultivated trout. Fry of English trout, W. L. Gilbert, Plymouth, Mass. Clark's trout, L. A. Beardsly, Sitka.

South Side Club, L. I., dead brought one dollar per pound, alive out of tanks, one dollar and fifty cents per pound, fresh caught salmon one dollar and seventy-five cents per pound, while wild trout bring only thirty cents per pound retail.

In fish novelties were viviparous perch from California, which unlike other fish do not spawn, but bear perfect young.

Lamprey eels were exhibited, and attracted no little attention, as very few people seemed to know what they were.

An immense live specimen of marine lobster weighing 22 pounds was exhibited. It was covered with an ancient growth of barnacles and seaweeds, caught off the Massachusetts coast.

"Lump fish," "Jelly fish," "Indigo bag," so called by fishermen from the fact of its being a deep transparent blue, and in shape like the old-fashioned indigo bag used by laundresses. There was an exhibition of fresh water insects, that prey on young trout, and living natural food of trout.

TO DYE STRAW HATS BLACK.—In order to obtain a level color a solution of gluten is added to a lye of soda, which is allowed to stand for twenty-four hours and filtered. The hats are then steeped for twelve hours in the clear liquid. The straw is thus freed from grease, and the mordants of nitrate, sulphate or acetate of iron, as well as the decoction of logwood mixed with sumac or galls, is very evenly taken up by the fiber. A slight addition of bichromate of potash improves the tone of the dye, and the goods are finished with gum or gelatine.—*Baden Gewerbezeitung.*