of the publication cited, and in the later full description, no statement is made of the indebtedness of the inventor to these older machines, except in the case of the original description of the lance and nozzle (*op. cit.*, vol. v. No. 2), where credit is given. This naturally gives the impression that the apparatus is novel in many or all of its features.

When compared with the French machines, the following facts become apparent:—

(1) The reservoir is practically identical with that of the Vermorel, Japy, and other French machines, and the opening for introducing the liquid with strainer and lid presents no new features.

(2) The pump is an ordinary double-cylinder (or hollow piston) force-pump, the hollow piston furnishing an air-chamber which causes the liquid to be forced out in a continuous stream.

(3) The lance and nozzle combination consists of the Riley nozzle fitted to a lance, and provided with a degorging apparatus, which also acts as a stop-cock modelled exactly after Raveneau's apparatus, and is practically the same as the Japy degorger and stop-cock, except that the action is reversed. In the latter (see *Insect Life*, vol. i. p. 265, Fig. 61) the spring normally closes the discharge orifice; and in the former the orifice is normally open, and is closed by the action of a lever in the spring.

That this modification of the foreign knapsack sprayers will prove a serviceable one for vineyard work, and by reason of its cheapness and availability come into general use, I have little doubt.

Strawson's Air-Power Distributer.

A new and distinct type of insecticide machine, the invention of Mr. G. F. Strawson, Newbury, Berks, England, has attracted no little attention, and has received numerous awards during the past two years at various agricultural shows in England, and has been very favorably noticed and recommended by competent judges. It was shown at the late Paris Exposition, and was thoroughly tested before a select jury, from which it received the highest praise, and was awarded a gold medal. I had occasion to study it thoroughly not only at Paris, but at the Royal Show at Windsor, and am under obligations to the inventor for courtesies and facilities afforded.

It will have, in common with all the heavier and more expensive machines, to contend with the more popular and less expensive portable machines. It has many advantages in the control of the volume and character of what it disseminates, and, with some modifications and adaptations for nether spraying, it would prove extremely serviceable in extensive fields of any crop that needs such spray, and where the rows are relatively straight and the plants low. The principle also is a good one, and practicable, with modifications, for many other uses.

The machine is called the "Strawsonizer," and is a pneumatic or air-blast distributer, and may be adapted to a variety of uses, such as broadcast sowing of grains, distribution of fertilizers or of disinfectants in cities, and of dry or liquid insecticides.

The machine is light, simple in construction, and easily operated by one man; the larger sizes being drawn by one horse, and the smaller by hand-power. It is constructed largely of wood, and is mounted on two iron wheels. The distributing power is obtained by a blast of air produced by a revolving fan worked by the travelling-wheels of the machine.

The essential part consists of a suitable receptacle or hopper, either for liquid or dry substances, from which the material is fed automatically and regularly to the blast generated by the revolving fan, the whole operated by suitable gearing. A receptacle for either dry or liquid material can be employed in connection with suitable nozzles or deflecting devices on all the machines; so that, with practically one apparatus, all the kinds of work indicated above can be accomplished.

For solids a metal spreader is used, while for liquids nozzles of the direct discharge type, but variously arranged to suit different requirements, are employed.

Very uniform and rapid work may be done with this machine in broadcast sowing of wheat, oats, and smaller seeds. These are distributed with great regularity over a track from eighteen to twenty feet wide, giving a rate of from thirty to forty acres per day. It is especially serviceable as a distributer of fertilizers (phosphates, nitrate of soda, lime, etc.) and all insecticide powders, which latter may frequently be applied in connection with the former substances.

Liquid insecticides are distributed broadcast at a rate of from one gallon upwards per acre, and, by the action of the powerful blast of air, are broken up into a fine mist, which spreads uniformly to a width of twenty feet. Nozzles for upright or lateral spraying would adapt the machine for work in hop fields or orchards.

A patent for the apparatus has recently been taken out in this country; but its manufacture here has not, so far, been inaugurated.

The one-horse-power machine for broadcasting grains, fertilizers, and either solid or liquid insecticides, with suitable receptacles and nozzles, is retailed in England for £30 sterling, or $150. If fitted with special nozzles for vertical work, £2 extra are charged. Hand-power machines are sold for £12 and £14. These prices would be even greater in this country, and would doubtless interfere with its adoption were it not that it combines the other advantages indicated.

(To be continued.)

THE CORK-INDUSTRY IN SPAIN.

THE cork-tree is found in Spain in great abundance in the provinces of Gerona, Cárceres, and Andalusia, especially in the provinces of Huelvas, Seville, and Cadiz, and, although in less quantity, in the provinces of Ciudad Real, Malaga, Cordoba, Toledo, and some others. The United States consul at Barcelona says, that, according to a calculation made by the administration of forests the extent of cork-forests in Spain is about 255,000 hectares (a hectare is equivalent to 2.47 acres), distributed as follows: 80,000 in the province of Gerona, 45,000 in Huelvas, 32,500 in Cárceres, 28,000 in Seville, 20,000 in Cadiz, 11,500 in Ciudad Real, and 9,500 in Cordoba. In the localities exposed to the north the cork is better than in those exposed to the south, and it is seldom found in calcareous soil, preferring always that of the felspar, this being found principally in the province of Gerona. It grows and develops in ground of very little depth, and sometimes in very stony ground. The leaves of the cork-tree are oval oblong or elongated oval, frequently toothed, and the teeth jagged; length, from three to five centimetres, and width from one and a half to two. The roots are strong, and spread considerably, and are frequently to be seen on the surface of the ground. It sometimes happens that the portion of root exposed to the air produces cork, while that which is buried produces scarcely any. The most common practice is to cultivate the plant by sowing, which is frequently done, especially in ground somewhat manured, making alternate furrows with vines. Up to their twentieth or twenty-fifth year the ground is cultivated as if it were a vineyard, rooting up at that age the vines on account of producing less fruit, and also on account of the cork-trees being fairly grown up, and no

longer requiring the shelter of the vines. The barking of the cork may be effected when the plant has acquired sufficient strength to resist the operation, and the time chosen for this operation is in the summer. The cork of the first barking is called *corcho bornio, bornizo*, or virgin, and is not fit for making corks. The cork taken after the first barking is called *pelas*, or secondary cork. The method employed in Spain for this operation consists in the total barking of the trunk, and not partial barking, or barking one part of the year, and the remainder three, four, or five years later.

In proportion as the cork is taken from the tree, it is removed, and piled up in heaps. Sometimes the cork is cooked in the woods, but at other times this operation is effected in the caldrons that exist in the cork-factory. The slabs remain in boiling water during the space of one hour, this operation causing an increase of thickness (generally of one-fourth to one fifth), elasticity of the cork, and dissolution of tannin and other substances. The caldrons in which the cork is boiled are of copper, and are either cylindrical or rectangular. The boiling of the cork can also be effected by steam, for which purpose it is introduced into a wooden box lined on the inside with copper or zinc, which is filled with water and steam injected therein. The steaming of cork sometimes hardens it and makes it brittle. The loss of weight produced by boiling the cork varies between twelve and forty per cent.

In making corks it is necessary to take away the hard crust, or *raspa*, for which purpose a tool is used with a short handle and curved blade, called *doladera, raspador*, or *raspeta*. A workman can scrape from two to three square metres of cork daily, and the loss in weight of the cork by scraping is from twenty to thirty per cent. Scraping-machines are also used, two systems being employed, — the Besson and Tousseau. The former, propelled by steam, consists principally of horizontal spindles supplied with comb-like teeth, and turning with great velocity, at the rate of nine hundred revolutions a minute. The Tousseau scraper attacks the cork by means of a vertical iron shaft carrying several knives, whose edges are also vertical, and by the rotary movement of the shaft, giving fourteen hundred turns a minute, work like a brush. This machine is simpler than the Besson, and the slabs suffer less damage when worked by inexperienced workmen. Before cutting the slabs into strips, they are cooked for about half an hour, so as to facilitate the cutting, and piled up soon after in a damp place, so as to preserve the softness until ready to operate upon. The slabs are divided into three strips (*rebanadas*), the width of which is equal to the length of the corks, and in such a way, that, if the cork be placed in the position occupied by the slab on the tree, they would have their fibres running alike. The workmen obtain or cut the strips by means of a knife with flat surface and curved edge, called *cuchilla de rebanar*. The strips are then made into squares by means of the *cuchilla*. They then have the edges cut, and, thus prepared, they are ready to be made into corks. This and the preceding operation are the most difficult of the cork-industry, requiring great intelligence if the slabs and strips are to be cut to the best advantage.

In the manufacture of the corks, the squares made into octagons first pass into the hands of the workman, who is furnished with a knife composed of two pieces, — one of them similar to an ordinary knife, and the other a blade the edge of which fits into the first. Consul Schench says that only by seeing is it possible to form an idea of the rapidity with which these men take hold of a square, and from it make a cork. They hold the knife by a small iron catch to the table in front of them, and, giving to the square a circular movement, the result is that the cork is made in a few seconds. The squares are usually boiled for about a quarter of an hour. They are then deposited in a cool place, and four or five days after they are sorted, and kept damp until required. The amount which the workmen receive for cutting 1,000 corks varies from .75 to 4 *pesetas* according to the kind of workmen (the *peseta* is equivalent to about 9½ pence).

Machines are also employed to make corks; and all consist, at the base, of a knife, the blade of which is placed horizontally, joined generally to a piece of wood, and to which a backward and forward movement is given similar to that of a carpenter's plane. In moving, the knife turns the square cork, which, being attacked by the knife, takes off a strip of cork more or less thick, according to the distance from the axle of the cork to the edge of the knife. If these are parallel, the result is that the cork is cylindrical; and if not, it becomes conical. The cork-maker or workman has a large basket, or several of them, in which he places the corks according to size or quality; but this first classification is not sufficient, and the corks are placed upon a table, the back part of which is furnished with boxes the front part of which are open to the operator. To classify the corks according to size, they also employ wooden boxes, the bottoms of which can be taken out or put in, having a kind of grating of wood somewhat resembling Venetian blinds. The boxes are suspended by ropes to the ceiling, and the workman gives it a swing backwards and forwards, by which the smaller corks drop out at the bottom. With this apparatus worked by one man, 100,000 corks are classified for their size in one day. The corks are washed in a solution of oxalic acid or bioxalate of potash. As soon as washed they are placed out to dry gradually in the shade, in order to enable them to retain the silky gloss which the cork has when it is damp. For packing, 30,000 corks constitute what is called a bale. For South America and Oceania, bales consisting of 5,000 to 10,000 corks are made, and for England the sacks or bales are made to contain 100 gross, or 14,400 corks for those of the larger size, and 150 gross for those of smaller dimensions. The greatest number of corks are manufactured in the province of Gerona; and the most important towns engaged in the industry are San Filieu de Guixols, Palafrugell, and Cassa de la Selva. The number of workmen engaged in the cork-industry in Spain is said to be not less than 12,000.

NOTES AND NEWS.

ACCORDING to M. Edouard Marbeau, in the *Revue Française de l'Etranger et des Colonies*, quoting from Professor Léon Le Fort, the following is the rate of increase of population in several European countries: for every 1,000 inhabitants there are born in Hungary 42 children; in Germany, 39; in England, 35; in France, 25. In 1778 the number in France was 38.4. At the present rate of increase, the population would be doubled in Saxony in 45 years; in England, in 52 years; in Prussia, in 54 years; in France, in 198 years.

— The Belgian consul-general at Singapore, in a report quoted in the English *Board of Trade Journal*, says that rubies and sapphires abound in the Siamese provinces of Chantaboun and Battambang. Several mines have been worked since a remote period by the natives, but for a long time they produced for the most part only stones of little value. It was in 1874 that the first mine of sapphires of good quality was discovered by a native huntsman in the environs of Chantaboun. The place was very difficult of access, so that the news of the discovery spread slowly. Rangoon being still at that time the nearest market to Siam for the sale of precious stones, the Burmans were the first to know of the existence of the new mine by the stones which were offered for sale at Rangoon. Some went there, and the large sums which they brought on their return from the sale of their produce brought about a movement of very active emigration for the same destination during the years 1878 and 1879. The new-comers discovered several mines as rich as the first. But there, as at Bantaphan, fevers made such sad ravages in the ranks of the workers, that in 1880 the number of arrivals decreased in considerable proportions; and at the present time the population of these mines, which once reached the figure of 10,000, consists of a few Pegu Toung-Thons, who can ward off better than other races the ills resulting from the terrible climate of the country. Rubies, onyx, and jades are also found in considerable quantities in the province of Chantaboun, but their quality leaves much to be desired. Battambang is as rich in precious stones as Chantaboun, and it is stated that recently diamonds have been found near the frontier of Cambodia; but the mines of this province are almost abandoned because of the insalubrity of the climate, and the want of protection for foreign workers