Enclosure in No. 77.

Report by Mr. Consul Colnaghi on a New Method of Suffocating Chrysalids of Silkworms, invented by Professor Castrogiovanni, of Turin.

In my Report "On the Yield of Cocoons in Italy in 1869," I had occasion to mention Professor Castrogiovanni's apparatus for the destruction of the chrysalids of silkworms in the cocoon.

In the course of last year I witnessed the Pneumatic Oven (Forno Pneumatico), as it is termed by its inventor, at work. The results appeared to me of sufficient practical importance to warrant a more detailed notice than I gave at first, particularly in view of the recent introduction of the silk husbandry into certain of our Australian Colonies, and the efforts of the Silk Supply Association to promote the production of silk in India.

The ravages of the silkworm disease have caused considerable attention to be given of late years to the destruction of the chrysalids of the worms. Now, when the yield is uncertain and cocoons at high rates, an accident in the baking is a matter of vital importance. In happier times plenty produced carelessness, and low prices indifference to waste.

The destruction of the chrysalids is generally effected either by suffocation under the influence of hot air, or suffocation by steam.

The advantages of the hot air system are to be found in the good and dry condition of the cocoons when the operation has been successfully carried out. Its principal defect consists in a too complete desiccation of the gummous substance contained in the cocoons, thus preventing the easy reeling-off of the thread.

The disadvantages of the ordinary steam oven are of an opposite character. The cocoons, instead of being too dry, are over-moistened by the condensation of the vapour, and have a tendency to spoil and rust. The chrysalis, moreover, though killed, is not dried, and is liable to become putrid, to the detriment of the surrounding web.

In Professor Castrogiovanni's system, the novelty of which consists in the application, the cocoons are submitted to a steam bath, at a uniform temperature of 100° centigrade. The steam rising practically uncondensed,* under an iron receiver, which covers the cocoons, the chrysalids are suffocated by the diffused heat, which penetrates thoroughly, while the web of the cocoon retains its natural condition.

The principal parts are three :—

1. A basin with a furnace underneath, or, if more convenient, made to communicate by a pipe with a steam boiler.
2. Two circular plates, running on rails, on which the trays with the cocoons are placed.
3. A bell receiver, supported by two iron uprights, and easily raised or lowered by means of a pulley and counterpoise.

The bell is provided with a thermometer, and a stop-cock for letting off the air and steam when required.

The apparatus is thus used :—

When the basin has been partly filled with water, to the height of ten centimetres, the furnace fire is lighted, and the bell lowered, the stop-cock being open. As soon as the thermometer registers 99° or 100° centigrade, the cock is shut, not to be opened again during the operations. The bell is next raised, to permit the plate on which the trays of cocoons are placed to be run over the basin and then lowered again into the water until its edges are covered, but not so as to touch the bottom of the basin.†

In about fifteen minutes the bell is lifted, the cocoons which have been steamed are run off, and the second batch, which have been made ready in the meantime, takes the place of the first.

For the full success of the operation, the water must always be boiling, the fire well kept up, and the internal temperature of the receiver maintained at the same degree.

The price of the apparatus, which varies according to size, is noted in the following Table :—

Capacity of Receiver.		Weight of Cocoons that may be Steamed.		Price.
		In from 15 to 20 Minutes.	In from 12 to 16 Hours.	
	Litres.	Kilogrammes.	Kilogrammes.	Italian Lire.
I. ...	130	10	500	750
II. ...	260	20	1,000	1,000
III. ...	400	30	1,500	1,300
IV. ...	530	40	2,000	1,650
V. ...	660	50	2,500	2,000
VI. ...	1,330	100	5,000	3,000
VII. ...	2,660	200	10,000	5,000
VIII. ...	4,000	300	15,000	7,000

1 litre = 61·028 cubic inches. 1 kilogramme = 2·20 lbs. avoirdupois.
At the present time the Italian lira may be calculated at about 26 lire 25 centimes per £ sterling.

The advantages to be derived from Professor Castrogiovanni's process may be briefly summed up as follows :—

1. The chrysalids dry more quickly than under the ordinary system. Immediately after the

* The condensation that occurs is very slight. On the cocoons being placed in the scales immediately after being steamed, when I was present, there was an increase of 3 per cent. on their weight. Twenty minutes later they were of the same weight as before undergoing the operation.

† By a recent modification of the apparatus, the receiver has been made double, instead of single, the inner case resting in the water, the outer hermetically closing in the basin. A stop-cock in the outer case provides for the escape of air and steam during the process. By this arrangement, I understand, a considerable concentration of heat is secured.