Honey Processing Equipment

(Continued)

By J. RENTOUL

Cooling Plant Invented

With a satisfactory melter, it was possible to then consider what further was necessary to secure a satisfactory packing plant. Experience made it plain that what was necessary was that the honey should be melted at as low a temperature as possible, that after melting it should be cooled rapidly to a temperature low enough to allow starter to be added, the starter thoroughly mixed and the packed honey put in a cool chamber to granulate. The next problem then was to cool the honey after melting. With temperatures in summer running about 80° F. in the shade, 3,000 lbs. of honey in a tank will take some days to cool down to 80° and 90°. There are technical difficulties about cooling honey that are peculiar to itself. If you simply try to run the honey over a cold surface the viscidity increases until it will scarcely run at all, but will build up till the cold surface is insulated. There was no commercial cooler in use that was suited to the job.

The idea needed, seemed to me to be a reversal of the melting process, that as the honey travelled in a thin stream, it was to be subjected to a cool air current. The rate of flow from the melter at its maximum varied, but was as fast as 2 tins every six minutes, and over the whole melting period, averaged 2 tins every 12 minutes, 10 lbs. a minute. It was required to get the honey down to a temperature at least below 90° from a temperature of 120° to 125°, a reduction of 35°. I tried experiments of drawing air through a unit cooled by refrigeration. The refrigerating engineer estimated it would take two horse-power refrigerators, and cost £300 to install.

You have all noticed the cooling effect of a fan. Actually the fan does not cool the air. Turning the air over does not help. It is as hot one side as the other. As a matter of fact, if you put a thermometer in the current close to the fan the mercury will rise slightly owing to the heat generated by the impact of the air on the thermometer. It is the frequency of contact that does the cooling, and it was this idea that I brought into use. The resultant cooler is another box only some 3 feet 3 inches square, with a fan driving air through it. The honey runs from the melter through this box to the tanks. With an outside temperature of 78° in the evening, dropping to 74° in the morning, the honey in the tanks when mixed in the morning is round about 83° to 85°, whereas without the cooler it was 120° to 125°. I built the cooler mostly myself, and it cost only £25 for material. The cost to run it is the cost to run a quarter h.p. motor.

Honey Mixer Designed

The next unit in handling honey for packing is the tanks with mixers for stirring in a starter. This was not a difficulty as a type of mixer in general use was adopted.

To Mr. T. S. Winter is due the credit for developing into a commercially successful process the "starter process" for inducing granulation in honey. Whilst in charge of honey packing for the H.P.A., Mr. Winter had experimented until he had achieved success.

Fast Filler Invented

The next process is filling the honey into retail packages. For some years we have been using a hand filler that I had obtained in Europe. This filler was a big improvement on just running the honey out of a tap. With it a good man could fill 600 pots an hour and fill to exact weights. For a long time I have been looking for a power-driven filler that would handle honey satisfactorily. Back in 1927, we tried one out in the London Depot, but the expert with it could not get satisfactory results.

Recently the Department of Industries and Commerce went to considerable trouble to put various firms who manufacture fillers in communication with me. The information concerning the various fillers on the market was very useful in that it showed that our requirements were something different to anything that was available. The melting unit previously described will melt 600 tons a year, and four tanks are required. To move a filler from tank to tank and connect up did not seem the most efficient method of doing the job, and this would be necessary with the fillers offering. The fillers we had were efficient with hand power and an adaptation of this idea to a power driven filler seemed to me to be the thing.

The finished machine is a compact power-driven pump attached to the tank so that there is no delay in shifting and connecting up, and the tank can be moved anywhere. The pump's action is geared to a small feed table with holders that will take twelve containers of any kind up to 2 lb. capacity. The filling rate is 24 containers a minute, i.e. 1440 an hour. This, if desired, could be speeded up to 1,800 an hour. The comparative cost of the machine is small.

Two boys or two girls and a man can fill with this machine 1,440 packages an hour, as compared with two men filling 600 an hour with the hand machines. From the fillers the packaged honey goes to the cool chamber.

From this brief description, it will be seen that the plant to be operated by the Marketing Division will handle honey with no deleterious effect whatever on the honey. Providing the producer does his part in sending in the honey with all the excellence the bees have put into it, we will be able to pass it on to the consumer with that excellence unimpared. The plant will be as near "fool-proof" as it seems possible to get it. The tins as sent in are put into the melter. The honey runs away as soon as melted, passes through the cooler into the tanks, is mixed with the starter and packed and put into the cool chamber to set. It is all very simple with no stage in which the honey can suffer injury.

It is obvious, of course, that there will be considerable saving in costs as compared with methods previously used. Labour costs will be reduced one-half. Some of the other benefits are: quicker handling, bigger capacity, takes less room, and a much better pack. A complete packing unit is one melter, one cooler, four tanks and fillers, and one cool room. The unit at present installed would not be improved in efficiency by increasing its size. For bigger output the unit should be duplicated and by adding further units, there would be no difficulty at all in packing to any extent desired.

Granulation Temperatures

The idea prevails amongst some beekeepers that granulation is induced by temperature changes—cool nights and warm days. This is quite incorrect. At 140 degrees F. granulation is impossible; at 0 degrees it is also impossible. Somewhere between these two extremes is a temperature level that gives the maximum conditions favourable to granulation. This maximum level is at 57 degrees F. Honey of average quality which has had starter stirred into it, will granulate semi-firmly if held at this temperature in a freezing chamber for three days. Cold nights assist granulation by reducing the temperature of the honey nearer to 57 degrees; warm days retard granulation by removing the temperature away from that favourable level. Apart from temperature, an alteration of the balance of dextrose and levulose in honey will retard granulation, as also will an increase in water content.

Preventing New Infections

If a colony infected with American foul brood is destroyed and another colony later placed on the same site, it often contracts the disease. To prevent this, the soil in front of the diseased colony should be dug over or burned with benzine or kerosene, which will destroy all spores of disease.—Dr. E. J. Dyce.

Efficient Swarm Control

After the greater part of the active work of the season has been devoted to the production of brood, it is a most deplorable crime against efficiency to permit the crop of brood (i.e., bees) to be wasted and lost by means of swarming. Where the swarm is captured and its strength added again to that of the deserted parent colony, only a small loss is sustained, but where the swarm disappears the colony is of little value as a honey producer. It really amounts to this: A beekeeper who has produced the maximum amount of brood in his colonies and retains it there for the flow, secures 100 per cent. of the possible honey crop he could secure with his methods. But the beekeeper who loses swarms, loses the same percentage of his crop. A beekeeper who finds that ten per cent of his colonies have swarmed away, is only 90 per cent efficient. He has to carry 10 per cent more colonies than he need do in order to secure his desired crop. This increases enormously his costs of production of honey, and reduces the value of **HIS** share of the crop. The share of the crop used for wages, tins, cases, etc., is settled by fixed prices for these goods and services. **The Beekeeper's share is settled by his own efficiency.**

The prevention of swarming is one of the most important of all operations in the apiary, and will require a special article