

flakes for the construction of comb. This comb building always begins at the top of the hive to the centre of the cluster of bees, and if it be a frame hive, they will commence at the top-bar, and if they are supplied with guide combs, they will usually build the comb straight in the frame.

Now, if the swarm of bees are supplied with ready-made comb in frames, it will not build any, but only clean out the old comb and repair it, and commence filling it immediately with honey, pollen and brood. By supplying them with old comb, you assist them very much, and they will fill their hive in a short time.

It takes about twenty pounds of honey to make one pound of wax, and according to this rule wax ought to be worth \$5 per pound when honey is worth twenty-five cents. But wax only sells for thirty cents per pound. I have sold in five hives more than 2,000 pounds of honey, and during the same time but ten pounds of wax.

I save all the comb I can and give it back to the bees; if it is white comb, I stick it in the boxes. If it is a worker brood comb I fit it in the frames; if it is comb which I cannot use in the boxes or in the frames, I put it in a shallow box and set in the sunshine, and as the sun melts the wax, the bees carry it back to the hives, and I have every reason to believe that they use it again for comb-building. —*Cor.—Bee Keepers' Magazine.*

Voices from the Bee Hive.

INTERPRETED BY M. QUINBY

An acquaintance for several years with the Queen Bee and her numerous subjects, and a close attention to her and their teachings, lead me to believe that I can faithfully report what is done within this hive. There can be no doubt that bees have what answers them the purpose of language, but these reports will give what is seen quite as much as what is heard.

How cold the weather is? No man unless he be a perfect coward, will be afraid of stinging at this season. Indeed, it is the fault of his own carelessness, if he ever gets stung at all. We love warmth, and the colder it gets the closer we cluster together. One of us, exposed alone at freezing temperature, would soon grow stiff, and then die outright. If a half dozen were grouped together, they could endure it longer, as they would help to keep one another warm, but the heat created by these few bees would amount to very little; we must be in a large cluster in order to help one another much. The bees of a full colony create heat enough to allow us to withstand the coldest weather of this climate, for a short time at least; the more there are of us, the warmer we are. The colder the weather, the denser we cluster. But those on the outside have the worst of it, whatever they may do, their backs will be cold, and unless they can change places with some of those on the inside, they must drop, and expose the next below them to the cold air. We understand this, and as soon as those on the outside become chilled, they change places with others on the inside of the cluster, and so matters are equalized. The colder it is the more we must eat to keep up the animal heat, and food must be close at hand, and we must change places so that each one can get his share. A family of us clustered between the combs, generate no little heat, which is confined by the hive, consequently the air which surrounds us, provided our hive be properly built, is very much milder than that outside. If the temperature is such that we can change places frequently, we keep in perfect health. Our food being honey, is of course, liquid, and if the temperature is not too low, much of the watery portion of this passes off through the pores of our bodies, and the solid portion is evacuated in the dry state. As long as we are in health, this natural condition of things continues. The bee-keeper can readily know our sanitary state, by examining the bottom board of the hive; if he finds one single drop of liquid excrement, he may be sure that one of us is sick, and if there are several drops, there is trouble among us, for the liquid excrement will be in proportion to the amount of disease. My physicians tell me that they know of no other cause of diarrhoea, than low temperature, and that when the cluster is large enough to sufficiently warm the interior of the hive, the disease never occurs. But in the extreme cold weather! yes, there is where we have the most trouble, especially if it is long continued. You who have stoves, can warm not only yourselves,

but the air round us, which is constantly getting cool from contact with the cold sides of the hive. When it is so cold that the evaporation can not take place through the pores of our body, no matter where the hive may be, then disease appears. In the old box hive, in the open air the sun would shine upon it for the most of the day, and the little warmth that would strike through the sides together with what we could make ourselves, keep the interior warm enough to allow us to change places frequently and to keep in perfect health. People should consider the temperature in shading the hives; I know that fewer bees are lost on the snow when the hives have the full sun, than when they are shaded. In your living rooms the air is full of vapor; you do not notice it until the out door air cools the window glass, so that the invisible vapor condenses upon it; now the same thing takes place in the hive. When the external atmosphere is very cold, the air of the hive comes in contact with its sides, moisture is condensed, and even the combs that are not kept warm by the clustering of bees upon them, become so cold, that the moisture that our bodies give off to the air of the hive, condenses upon them. At first the moisture is in exceedingly small particles, but they increase in size and number, and finally run together, and form drops large enough to run. A comb kept moist in this way will finally mould. If the cold continues, these drops freezing upon the outside combs, or fall upon the bottom, and freeze there, and if the opening of the hive be small, it may freeze there, cutting off all ventilation, as a consequence of which we are all smothered. When the outside air is at 50°, we have no trouble, for then the vapor passes off through the small openings, and a very small cluster will safely pass the winter at that temperature which would fail in the open air. If we are housed pray do not make us too warm, and above all, let us be quiet. If we are in a warm place, the least excitement among us creates much heat. I know of an instance, in which one of our families were placed in a room, and so close that not a bee could escape. So long as it was quiet, they were comfortable and happy. But some children had a frolic in that room, and their noise so excited the bees that the whole family of them was ruined. If those who find it necessary to move hives from a cool to a warm situation, would be careful of their movements, and not disturb us with the least jar, we will be all the better. Many stupid or indifferent people undertake to keep bees, who have not the least idea of what we want. We are always willing to give all the honey we do not need for winter, but such people do not know how to allow us to give it to them. Pray tell all who do not like bees, and who do not care enough about us, to study our ways, and understand our nature to let us alone. Such persons who do not begin right, and who do not know enough to stop when they are wrong, but will persistently follow their own way, must not complain, if we do no more for them than we can help, and if, when we see them going wrong, we will use the only language they will understand—a sting—to remind them that they are not treating us properly. —*American Agriculturist.*

Which is the Best Form of Tile?

Any one who has observed how sensibly the friction of the banks retards the velocity of the adjacent water in rivers—a slight curve in the bank producing an eddy or counter-current, and a bend causing such an accumulation of drift-wood as to obstruct the stream, causing it to overflow its banks and cut a new channel—will be convinced that a tile drain should be as straight and smooth as it is possible to make it, and that the form of the channel is not a matter of indifference. The history of tile-draining shows a gradual improvement in the form of tiles used. Had any of the preceding forms fully answered the purpose, there would have been no new forms designed, for each improvement in form has required more expensive machinery, and its introduction has been opposed by the very class it was designed to benefit. It is a common saying that "necessity is the mother of invention," and the common idea is that inventions are made to supply the demand of the people when the best inventions are in advance of public sentiment. It is probable that the first form of tile used was the brick tile, molded similarly to our slop brick, and laid flat side up; after this the

horse-shoe tile, having the same internal and bearing surface, but being much lighter. The next improvement devised was the sole, laid beneath

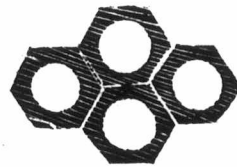
the horse-shoe tile. Following this was the D tile, which resulted in an effort to combine the sole and horse-shoe tile in one piece, and made the use of a con suspended in the die necessary. The objection to these forms is that the sand flows to the sides and gathers in the angles, rendering them liable to become obstructed. All forms having an internal flat bottom are discarded by engineers and persons of long experience in tile draining. A current of water that would spread itself over the flat bottom, and move slowly along, without power to move any sediment, would in the round tile form a current that would carry the sand with it. Many who considered this laid the flat side up, thus obtaining a semi-circular grooved channel. The next step towards perfection was making the bore of the D tile round. The flat bottom being still retained—not for the benefit of the farmer—not to facilitate laying in the trench, but because it was difficult to mould it without a flat bottom with the machinery then in use—stronger machinery, more power and stiffer clay must be used to make a cylindrical tile. Manufacturers find it difficult to make a straight tile of this form. On account of the excess of clay on the flat side, and the tiles being laid on that side to dry, the upper side dries much sooner, and the tiles are warped, so that when laid on the flat side in the trench they form an undulating channel, and have a



V-shaped opening between the ends of the tiles. Eventually these depressions fill with sand, and the channel becomes in about as bad a shape as can be conceived for the flow of water. To obviate these defects, many lay this form of tile on the side, with the flat bottoms first on one side and then on the other, forming a series of lateral curves, thus making a better joint and a much better channel.



Various methods have been tried by tile-makers to prevent this warping. Some make them thinner on the flat side, which weakens them, and makes them more liable to crack in the burning; others make them nearly square, so as to have an equal amount of clay on each side of the bore. Experience in manufacturing has determined that if there be one flat side, the tile should be a regular polygon. Of all polygonal forms, there is none better than the hexagonal for the following reasons:



They will set to better advantage in the kiln, and bear transportation better than other polygonal forms. They are readily packed, so as to leave no interstices, bearing upon the whole of their exterior surface, and like wedges one against the other, so that they cannot vibrate. Tiles are seldom broken by pressure, but generally by concussion from vibration.

Nature has taught us, in innumerable ways, that the form which combines the least weight with the greatest strength is the cylindrical form. Tile of this formdry with less liability to warp, burn with less breakage, rest to better advantage in the kiln, are better to lay in the trench, and will bear transportation better than any other form. When piled or packed for transportation, they naturally assume a compact position, and bear upon each other at six points in their circumference. Abundant evidence might be offered that the round tile is the best form of tile. If the objections to other forms are well founded, they are not trifling. If we would excel in our work, we must pay close attention to details. A perfect work has every part perfect.

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