

WHAT MAKES A MAN.

Not numerous years nor lengthened life,
Not pretty children and a wife,
Not p ns and chains and fancy rings,
Nor any such like trumpery things;
Nor pipe, cigar, nor bottled wine,
Nor liberty with kings to dine.
Nor coat, nor boots, nor yet a hat,
A dandy vest or trimmed cravat,
Nor all the world's wealth laid in store;
Nor Mister, Rev'rend, Sir, nor Squire,
With titles that t e memory tire;
Nor ancestry traced back to Will,
Who went from Normandy to kill;
Nor Latin, Greek, nor Hebrew lore,
Nor thousand volumes rambled o'er;
Nor Judge's robes nor Mayor's mace,
Nor crowns that deck the royal race—
These all united never can
Avail to make a single man.

A truthful soul, a loving mind,
Full of affection for its kind;
A helper of the human race;
A soul of beauty and of grace;
A spirit form erect and free,
That never basely bends the knee;
That will not bear a feather's weight
Of slavery's chain, for small or great;
That truly speaks of God within,
And never makes a league with sin;
That snaps the fetters despots make,
And loves the truth for its own sake;
That worships God and him alone;
That trembles at no tyrant's nod—
A soul that fears no one but God,
And thus can smile at curse and ban—
That is the soul that makes the man.

ARTIFICIAL AND RECONSTRUCTED COMB.

The following interesting paper was read by Mr. Adair before the National Bee Keepers' convention, Cleveland, O., held Dec. 6th, 7th, and 8th, 1871, and reported in the *National Bee Journal*—

"Ever since it has been proven that beeswax is produced by the consumption of great quantities of honey, and that, too, only at a time when the bees could be, many of them, better engaged in collecting than consuming it, bee keepers everywhere have been exercising their ingenuity to save the bees the labor, and consequently increase the surplus of honey.

"The happy idea of Major Von Hruska, of applying the centrifugal force to expel the honey from the comb, so that the comb could be returned to the bees, at first seemed to be all that was desired, and when put in practical operation, was found to at once more than double the yield of honey. I do not propose here to discuss the Mel-Extractor, except to say that, while it is the greatest improvement introduced since the movable-comb system was initiated still it does not satisfy the entire want of the bee keeper, consequently we see the many efforts made to supply the bees with artificial comb.

"All efforts, so far, to make entire comb of beeswax have failed, and the nearest success has been to stamp on sheets of wax the rudiments of cells, and leave it to the bees to finish them out. Mr. Samuel Wagner, editor of the *American Bee Journal*, at Washington, several years ago took out a patent on 'Artificial Comb Foundations,' but, from some cause, it has never been introduced into general use.

"At the late meeting of the North American Bee Keepers' Association at Indianapolis, a dozen or more sheets, the size of letter-paper, were shown and distributed in small pieces to the members. Mr. R. Bickford, of Seneca Falls, N. Y., stated that it was a success, and from the eagerness displayed by the intelligent bee keepers present to see it and know more about it, it was easy to see that its successful use would supply a great want of bee keepers. During the year 1870 Dr. Knaffle, of Nashville, Tenn., succeeded in making small pieces of artificial comb with the cells complete; but from a failure to get a patent, and from the difficulty in getting the proper machinery to make it in large pieces, it has not been introduced. Further efforts may make something out of it.

"Mr. Quinby, the veteran bee keeper of New York, exhibited before the Northeastern Bee Keepers' Association, at their annual meeting, 1870, specimens of artificial comb made of metal, which, from the partial experiments he had made, he thought could be successfully used. A patent was refused him as well as Dr. Knaffle, on the ground that it would conflict with Mr. Wagner's patent. Whether any of these inventions will be entirely successful, is to be tried. While some are sanguine of their success, others doubt.

"For two years I have been conducting experiments to accomplish the same

ends in an entirely different and more natural way. It is well established that, for the first two or three weeks of the life of the worker bee, she remains in the hive engaged in nursing the young, making comb and doing other work.

"A hive entirely filled with comb in every part would leave a great number of these young bees out of employment. Why not keep them employed in constructing new comb, if it can be done without too great a sacrifice of honey? With this end in view, I have tried various experiments. The first colony of bees I ever transferred, gave me an opportunity to witness the fact that the bees, in trimming the comb to suit them, covered the bottom of the hive with the small particles of wax that were cut away. This was brushed back against the back of the hive, which was of glass. So much had accumulated there that I was afraid it would furnish a nest for the moth, and I determined to clean it out. Before opening the hive, I happened to notice that the comb that was being built to fill out the last section which I had left vacant, was of a dark color. Noticing further, I saw that the bees were gathering up the wax from the floor of the hive and using it in constructing their new comb. I took none out, and in the course of about two days, it was all used in that way.

"The sheet of comb, 10x14 inches, was more than half built of it. What they built afterwards was white. The conclusion I came to was: if wax were furnished to the bees, they would use it instead of going to the trouble of generating it, and if so, an important point would be gained, as it is estimated that \$5 or \$10 worth of honey is consumed and permitted to go to waste for every pound of comb made in the natural way by the bees.

"I immediately got a lump of wax, and opening the glass side of the hive, laid it on the floor. In a little time it was covered with bees, and I saw them taking off small particles and carrying them up. I was delighted, but on looking the next day, I saw that the lump was deserted, and that my experiment was a failure. It was not an entire failure, however, as from it I obtained another fact. All of the loose particles and sharp angles of the lump had been appropriated by the bees. The inference was, therefore, that the bees were unable or unwilling to cut the hard lump into small pieces, but if the wax could be given to them in small particles, they would use it.

"My second experiment was to take the lump out and to pare it off in thin shavings with my pocket-knife, and return it. The bees immediately went to work on it and used more than half of it before abandoning it. The labor was too great for them, and after using all that could be easily obtained, they ceased to work on it. I tried various ways to get it fine enough for them, but with indifferent success. During the summer of 1870 I one day went out from dinner, having, just as I left the table, taken a piece of honey in the comb and placed it in my mouth. After chewing it until all the honey was out, I took the wax in my hand and noticed that it was brittle and easily broken, and in a condition, perhaps, that would enable the bees to use it.

"I placed it in a hive that had an empty section next to the glass, and on examination next morning, found that every particle of it had disappeared, and that in that time a piece of new comb, three inches long and two inches in diameter, had been constructed, and the queen was on it, depositing eggs in the half finished cells in the middle of it. Thus another step was gained, but as I did not propose chewing all the wax for my bees, in a short while I adopted the following plan:

I took some wax and melted it. After it had partially cooled, I took white granulated sugar and worked it into the wax by taking it into my hands and kneading it like dough. If worked rapidly, it will remain soft and plastic for some time. After I had thus incorporated with the wax enough sugar to render it quite short, I formed it into a cone which was about an inch in diameter at the base, and perhaps six (6) inches high. This I set in a hive. In less than a minute it was covered with bees so completely that every part of it was hidden. It was all used by the bees, and from it they formed comb rapidly. I repeated the experiment a number of times through the summer and fall, and since, and as the result, I give the following:

"1st. If properly proportioned, so that the bees, in extracting the sugar, out off the wax in small particles, the bees, if they have room, will build it all into comb.

"2nd. I am satisfied that the comb built will weigh more than the wax

given to them, as the sugar fed with it enables them to generate wax.

"3rd. When there was no honey in the flowers to be gathered, the bees would construct comb from this preparation, and store honey in it prepared from the sugar.

"4th. Pure wax, however prepared, was unnoticed, except during the honey season, while the bees constructed comb from wax prepared with sugar at all times.

"5th. Bees furnished with this mixture preserved their drones, and the queen continued to lay eggs.

"6th. Black bees worked on it as readily as Italians.

"The exact proportion of wax and sugar I am not able to state as I did not weigh it; but I should judge that one pound of wax would require between 3 and 4 pounds of sugar. If the wax is warm enough to melt the sugar or any part of it, when it cools it will be found too hard. If too little sugar is put in, the same result will follow. Further experiment will establish the proper proportions, and also the best methods of giving it. With wax at 30 cts. per pound, and white granulated sugar at 16½ cts., the cost of filling a hive with comb will cost about \$1.50. In order to have the same amount of comb made by the bees from honey, it would require at least 50 pounds, which, at 30 cents, would be worth \$15.00, or just ten times as much; or to state it differently:

To wax and sugar.....	\$1 50
By honey saved.....	\$15 00

Profit.....	\$13 50
-------------	---------

"This is not all. During a large part of every season, bees not only cease to gather honey, but consume their stores. By this discovery they can be kept at work preparing comb for another season, and as breeding will go on they will not only be richer for the stores saved, but stronger.

"During the season of 1871 I have made several experiments with a view of taking more complete advantage of this propensity for 'reconstruction.' And as one of the results I have the pleasure of announcing that I have succeeded in having the bees to build comb on wire cloth foundations. The wire cloth extending through the whole sheet of comb and being fastened at suitable points to the top, bottom, and sides of the frames, it can be placed in the extractor and subjected to as rapid a motion as is desired, without any danger of 'breaking down,' thus removing the greatest obstacle to the easy and thorough expulsion of the honey from the cells. While this was the only object I had in view, I found that I attained others of perhaps greater importance.

"I found that the queen did not in any instance, lay in the comb thus constructed, although I placed the sheets in the centre of the brood nest—consequently such sheets were always clear of brood filled with honey alone. This result will be appreciated by all who have any experience with the Mel-Extractor. These were not all the facts I ascertained, for, better still, I found that when one of those sheets of comb was placed in a hive the queen would not only not deposit eggs in it, but that she would not pass it. In one instance, in a very populous colony, I placed a sheet of the wire foundation comb in a hive only having two sheets on the side of it where the queen happened to be. It remained there for two months, during which time I did not examine it, but then noticing that the colony was becoming very weak, I opened it and found that there was neither eggs nor brood in the wire sheet, nor in any other except the two the queen was on. She had been confined to two sheets of comb, 10x13 inches, which left her so little brooding room that the strength of the colony could not be maintained. I removed the wire sheet and she immediately occupied the others.

"There were other phenomena connected with this experiment that confirmed some other theories of mine in regard to swarming, a recital of which would render this paper too long. This last discovery enabled me to construct my hives of a continuous simple chamber without division boards, and at the same time to restrict the queen to any part of it I pleased, and to have a hive that was a perfect non-swarm, or could be made to swarm at will."

MR. ADAIR—In answer to numerous questions, stated that in preparing the wire cloth he coated it with bees wax by dipping it into melted wax several times, or until enough wax adhered to it to furnish material for not only the foundation, but enough to build out the

cells. It was better to have too much than too little. The wire cloth must then be fitted into the frames. To do so it is best to make the frames with the bars a little less than half width. Two of these, with the waxed wire cloth between, are nailed together to form one. The wax, where it goes into the frame, should be scraped off. Or the wire cloth may be inserted in the frames first, and the wax applied afterwards with a brush. It can not be put on so evenly with the brush, as by dipping in the wax, without great care. If too little wax is put on, the bees will denude some of the wire, and will not again cover it with wax or fill the meshes of the wire. If too much, it does no harm, as the bees will cut away any surplus.

Not more than one of these foundation combs should be put in a hive at a time, and it should be placed in the center of the mass or cluster of bees, in a populous colony, and during active honey gathering. If placed to one side, or in a weak colony that can not work over the whole surface at once, any part of it that is appropriated at first, or is outside the working cluster, is apt to have the wax cut off, which will not be again replaced. In such cases, however, the wax coating may be again supplied with the brush, and to make it sure, rudimental cells may be placed on it by shaving off from the surface of a sheet of comb, with a broad bladed, heated knife, a thin section of the cells, and placing it on the waxed surface, before the wax melted by the knife cools, when it will stick. If the trouble is taken of covering the whole surface thus at first, it can hardly fail. The size of the meshes in the wire cloth he considered of little importance. He had generally used No. 10, that is with ten meshes to the inch, or with about four meshes to the worker cell. This sometimes misled the bees, however, and caused them to build the cells in straight rows, following the course of the wire, and place the cells in quincunx, instead of in their usual relative positions, with six cells surrounding one. A finer wire cloth, about 14 or 16, did not have that effect. A wire cloth with four meshes to the inch, if drawn so that the cells were in the shape of a diamond composed of two equilateral triangles, would place the cells in their natural position, even if the bees followed the course of the wires, and would be about the size of worker cells, five to the inch. He used tinned wire to prevent rusting. In using the sugar mixture for reconstructing comb, to be used in storing honey in boxes, the wax could be tinted in fanciful colors.

PRESIDENT QUINBY—Suggested that the wax could be bleached perfectly white for that purpose. He gave an account of his experiments in making artificial comb of metal. He first took strips of tin a half an inch wide, and crimped them in a machine, so that each crimp or curve would form three sides, or one half of a cell. These were dipped in wax. A smooth sheet of tin was also dipped in wax and coated, and those crimped pieces were set upon it in such a way that they formed the cells. The strips were merely pressed together and into the foundation sheet, which helped to hold them together. The bees accepted them, stored honey, and the queen laid in them, filling them with brood, but he found the cells too deep. The bees would cap the brood by sinking the cap below the mouth of the cells. He found that seven sixteenths of an inch was deep enough. He had no doubt of the success of this comb. It cost from \$10 to \$12 to fill a hive with it, but once there it was everlasting. He had tried to cheapen it by using thin sheet iron, but it rusted and the queen would not lay in it.

MR. ROOT—Suggested the use of very thin tin, as being easier worked and cheaper, and said it could be made as thin as paper.

MR. QUINBY—Thought it quite probable. He said he had only tried to winter one stock of bees in this metal comb, and that died. He did not think, however, that the comb was the cause of it. It was a lack of food. It was not examined by himself when put away for winter, but its weight induced the belief that it was well supplied with honey, when it was only the weight of the metal.

EZRA ROOD, OF MICHIGAN—Thought this metal comb would be a great trick in foul brood, as the comb could be taken out and cleaned by boiling, and put together again. The same was the case with Adair's mixture, the comb could be melted up and the wax restored to the bees, with honey to stow in it.

CAPTAIN HETHERINGTON—Said the metal comb would be everlasting. It could be pieced like type, cleansed, and re-set. He thought it could be set up by