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*Produce beautiful
comb honey
the easy way!*

Comb Honey in the Halfcomb Cassette Revisited^{1,2,3}

by JOHN A. HOGG⁴

Foreword

The Halfcomb Cassette is a MODULAR comb honey section which is *pre-fabricated* in one-piece clear molded plastic with embossed foundation and then *pre-waxed* (fig.1). The task of assembling section parts and installing (or buying) wax foundation has been completely eliminated. These cassettes are *pre-stacked* and *pre-taped* in 4 columns of 10 cassettes each (fig. 2) for transfer directly into pre-converted standard 4 3/4" comb supers. The block of 40 cassettes is self-supporting so that no separators or holders are needed. The 4 stacks can be transferred by the beekeeper so smoothly into an empty pre-converted super (fig. 5a, 5b) that it is virtually a *pre-assembled* super (figs. 5, 7, 8). Significant advances in the manufacture of Halfcomb cassettes and their use on and off the hive have been made since first marketed in 1989 by Dadant & Sons⁵. Experience has revealed labor efficient handling procedures inherent to the Halfcomb. Means to optimize the yield and quality of marketable cassettes have been discovered and developed, in part by exploiting the

remarkable influence of clear plastic on comb building by bees. And an elegant new Halfcomb-exclusive label now imparts a classic blue ribbon appearance to complement the clear view into natural honeycomb with no midrib, therefore less wax; the hallmark of "Comb Honey in the Halfcomb". These and other improvements are described in this review and update.

I. THE HALFCOMB CASSETTES: *The overall manufacturing process has been completely revised and streamlined for efficiency. The resulting cost reductions have been largely passed on to the beekeeper.*

The cassettes plus covers (fig. 1) are produced together in a multi-cavity mold, waxed and packaged at once on-line from the injection mold.

Each cassette is embossed with the recycle logo ♻️. Polystyrene is still the plastic of choice, given the required combination of low cost, rigidity, FDA food approval, and clarity. These benefits outweigh the breakage risks in using polystyrene. The clear plastic emerged to be of much greater than expected importance, as will be explained.

The cassettes are waxed on the way to a stacker where the cassettes interlock and are taped together in stacks of 10 cassettes each (fig.2).

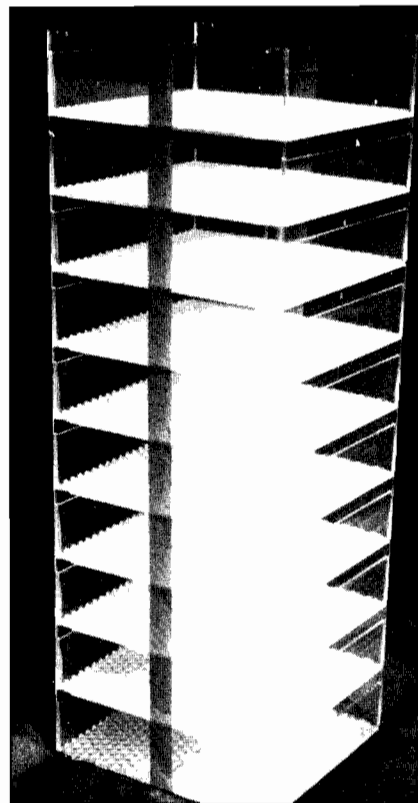


Fig. 2: Units of 10 cassettes pre-taped for convenient handling.

Four (4) of these taped stacks (40 cassettes) are packed into a newly designed package (fig. 3), protected with bubble pack; the covers are independently packaged in a small carton (fig. 4) and included within the larger package, conveniently protected for storage until needed after harvest. Quality control procedures* have now resulted in an unusually neat and attractive package.

II. THE HALFCOMB SUPER: *Given a*

* McPhersons Plastics, Inc., Otsego, MI 49078-0043

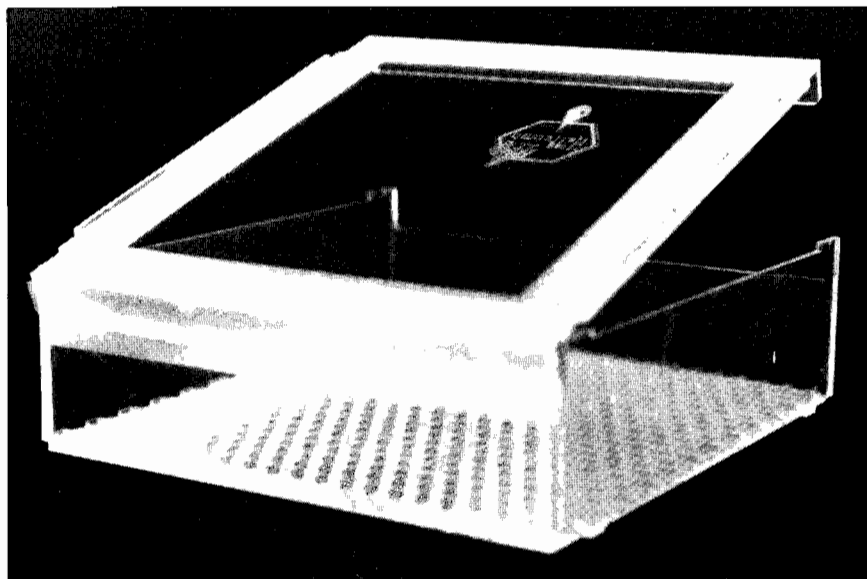


Fig. 1: The Halfcomb cassette with cover, showing how clear tape can be used as a cover hinge later when filled with honey.

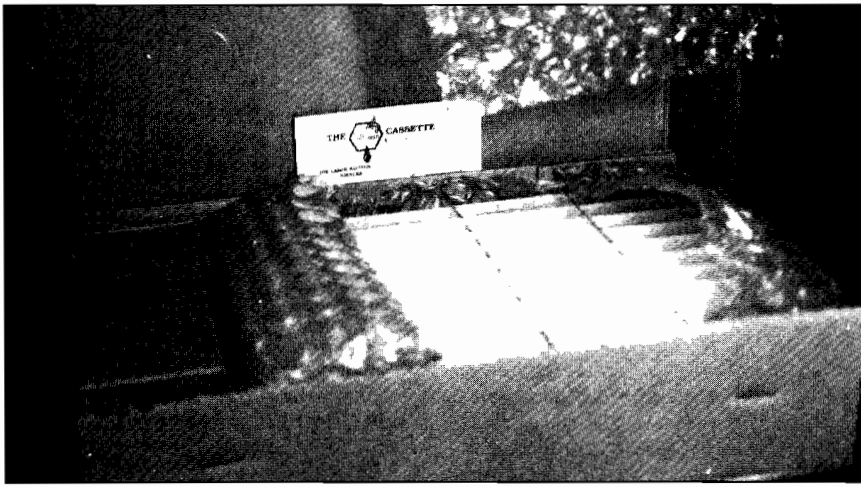


Fig. 3: Open package of 40 cassettes and covers to fill one super.

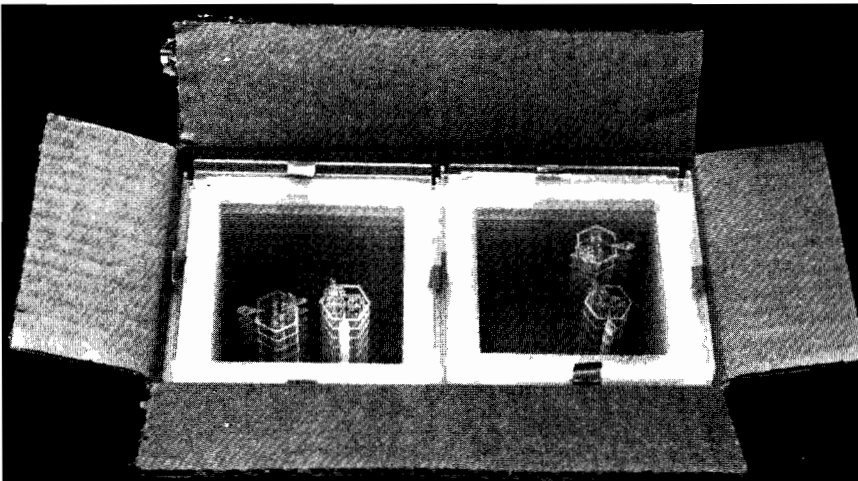


Fig. 4: A package of covers showing identifying logo for the "HOGG HALFCOMB"

standard 4 3/4" comb super which has been converted in advance for Halfcomb use and the short loading time, the Halfcomb super becomes virtually a preassembled super.

A. The Conversion of Standard 4 3/4" Comb Honey Supers: This is a one-time task and a modest one-time investment.

The super conversion unit (fig. 5A)**, in addition to providing peripheral bee space, is a functional part of the Halfcomb super: the full weight of the otherwise self-supporting block of 40 cassettes rests on the two support followers (1 & 7, fig. 5A). These also position the cassettes to provide 1/4" spacing (3/16" top space and 1/16" bottom space) between supers and over brood frames. The fixed support follower (1) requires precise positioning; the other parts will automatically position to regulate top and bottom space.

The fixed support follower (1, fig. 5A) is first attached by partially driven nails to the space strips (2) distributed at approximately equal distances. This unit is then set onto the bottom inside of the super (on-edge) with the small 1/16" feet of the moveable follower (7) against a temporary backstop board (3, fig. 5B) and held tightly as the nails are driven. The backstop simulates the actual hive resting position of the super edge so that the cassettes will be precisely 1/16" bottom spaced. The short fixed follower (4, fig. 5A) is similarly prepared and then simply nailed in place by alignment with the support follower. After nailing on the two metal corner supports (5, fig. 5B), the conversion is complete.

B. Loading the Halfcomb Super: A package of 40 cassettes can be transferred into a pre-converted super (fig. 6) so smoothly that it can be done even in the course of a honeyflow. The need for advance preparation is minimized because unanticipated requirements can be corrected.

With the package open (fig. 3) grasp the bubble packing to lift all of the cassettes at once from the shipping box and with the converted super resting on-edge, set the 4 stacks vertically onto the fixed follower (1, fig. 5b). Shove the stacks against the metal ledge (6) and to the left against 4, fig.7. Insert the moveable support follower (7) over the top of the cassettes feet first and rabbits down without regard to engagement, and then the moveable short follower (8) as shown; secure these with the five super springs evenly spaced with curled ends against the followers. Now, by feel and by sight, make certain that the rabbets of the sup-

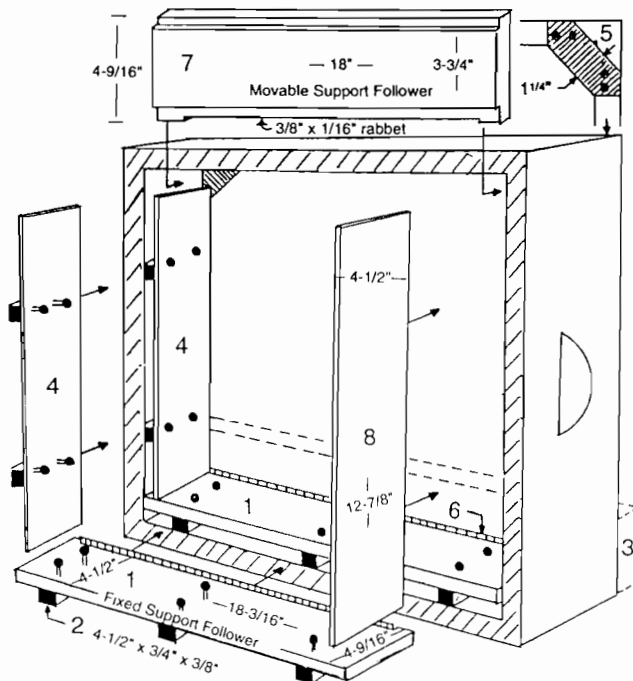


Fig. 5A: Conversion Unit.

Fig. 5B: Converted Super.

** The conversion kits are available commercially or can be made according to the specifications of Fig. 5A.

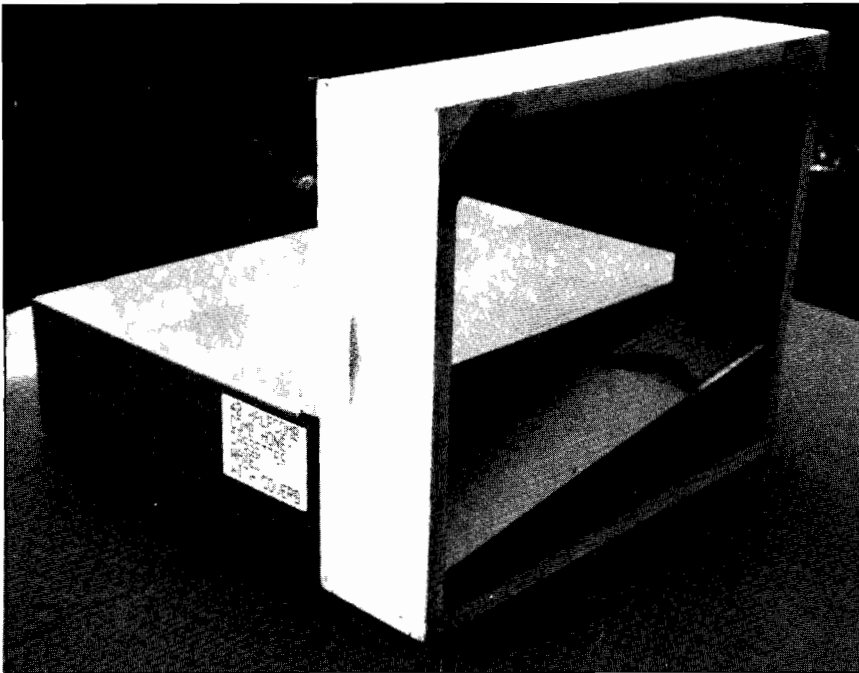


Fig. 6: The only task left to the beekeeper is to transfer the contents of the package into the converted super.

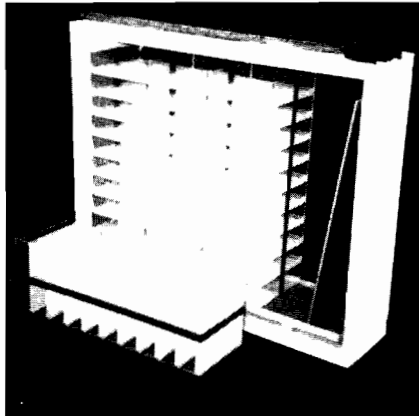


Fig. 7: Partially assembled super in the vertical loading position.

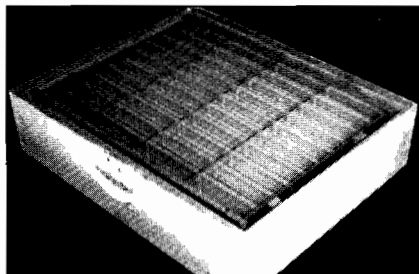


Fig. 8: The Halfcomb super ready to go on the hive.

port followers (2) have engaged the top corner posts of the cassettes. Finally, with super turned flat on the table, make certain that all stacks are pressed down flush and to the left (fig. 8).

III. THE HALFCOMB SUPER ON THE HIVE: Years of experimentation

with the Halfcomb and with comb honey methodology to define its unique requirements and to improve the yield and quality of marketable cassettes has led unexpectedly to important discovery (and rediscovery).

A. "Windows" in the Halfcomb Super: "Windows" through clear plastic into any bee space or open space beyond, occupied by other bees, has been found to stimulate the bees to build comb all the way to such cassette walls; paradoxically, when the space beyond is bee exit or entry space comb building to the cassette wall may be suppressed.

Since there are now several different and observable examples of adaptive comb building behavior by bees to situations beyond the clear plastic of cassettes, it follows that honey bees must "see" through the many windows of the Halfcomb super. Perhaps there is an analogy with pit-viper "vision" in the dark utilizing infra-red (heat) waves, except that bees use their antennae instead of pits as sensors.

This discovery is of seminal importance in the Halfcomb super because of the potential for inducing bees to consistently produce well filled cassettes. The examples of such "windows" leading to these conclusions are as follows:

1) **The vertical inner cassette walls:** These walls are windows between adjacent cassettes. The fact that bees will largely build comb completely to such walls, but not when they were rendered opaque, was observed earlier and reported in 1984². This was then explained as a visual influence; the bees were building comb as though it were uninterrupted by the clear plastic.

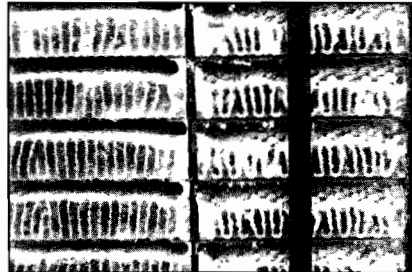


Fig. 9: Comparison of super-end fill with opaque follower (right) and a clear plastic follower (left) by the same bees but in different supers.



Fig. 10: Poor bottom-fill when the entry slots of cassettes in adjacent supers are not aligned.

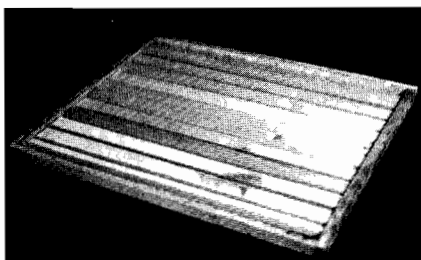


Fig. 11: Preliminary experiments with this "Heddon-like" honey-board indicate better bottom-fill.

2) Vertical super-end cassette walls: Unlike the inner cassette walls, the end walls next to the opaque end followers (4 in fig. 5B) tended to be less well filled. The solution? Removal of the opaque followers or replacement with clear plastic followers usually results in considerable improvement (fig. 9) presumably in response to comb building cues beyond the plastic. Super-end cassettes are the last to be filled, however, as in any comb super. If these opaque end followers are omitted, they should be relocated as dummies against that super wall with no spacers to maintain the same peripheral bee space.

3) Bottom-fill of cassettes over another super: When the offset entry slots of cassettes in adjacent supers are not aligned, i.e. rotated 180°, the bottom walls of the top super cassettes may be considerably shunned (fig. 10). Apparently the bees are attempting to maintain travel continuity to the access slots below by not building comb. Solution? Align the entry slots.

4) Bottom-fill of cassettes over frames: When the Halfcomb super is over frames, there may be random voids at the bottom walls — presumably for the same reason offered in 3) above; cassette slots may or may not be aligned with access space between frames. The solution? Start and finish supers above the frames. (See super rotation system in III. C-2).

If the above arguments apply here, then a super over a special slatted honey board (fig. 11) with slots perfectly aligned with the cassette slots should help, as preliminary results show, if super rotation is not planned.

5) Readiness to enter Halfcomb supers: There are increasing reports that bees enter the Halfcomb super more readily than the Round comb super. I have seen them at work within the hour after adding an empty super.

It is reasonable to attribute this to windows also — a sense of openness; and perhaps also the bees are being visually decoyed by other bees already there.

6) Monitoring super status: "Windows" are for the beekeeper too; all of the above can be monitored at weekly inspections and appropriate action taken

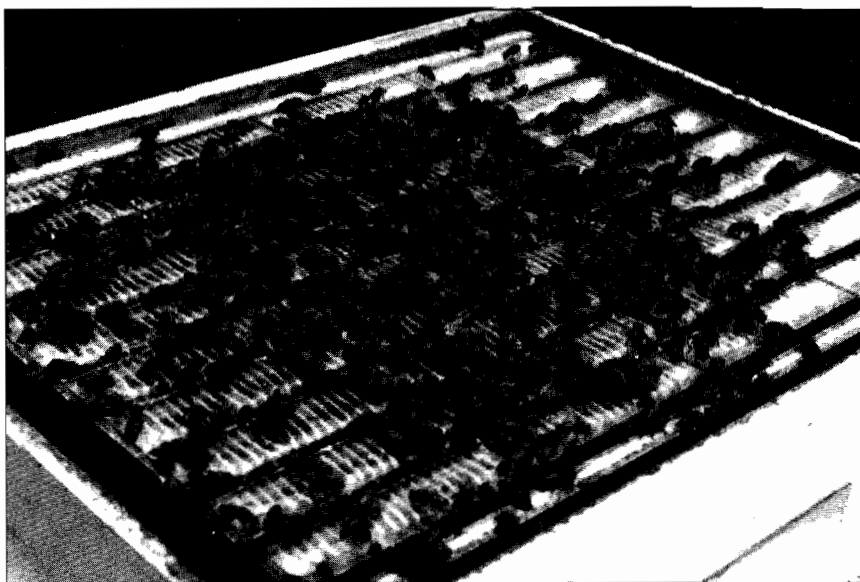


Fig. 12: Progress in supers can be easily monitored.

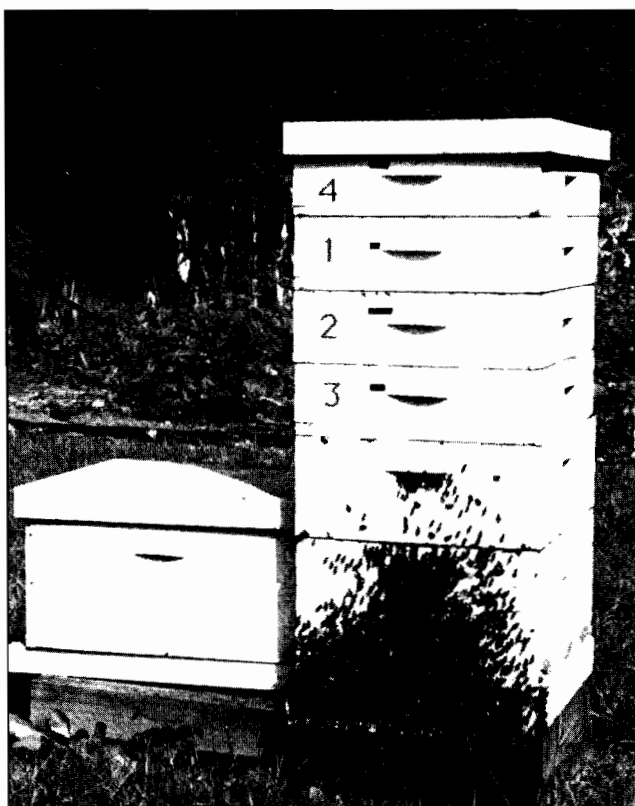


Fig. 13: Super rotation order when a fourth super is added.

(fig. 12). Cracks or holes allow cool air to enter and suppress comb building. This can be readily seen and corrected. A non-uniform start, centered or skewed, signals that the hive is not up to the desired strength.

The rate of filling after a uniform start tells you something about flow intensity.

Readiness to harvest is quickly seen; turned on edge, right on the top with cassette bottoms down, both top and bottom can easily be checked at once for complete capping.

7. A remarkable "observation super":

Using a glass or clear plastic inner cover, the top super becomes an observation super for watching comb building close up without disturbing the bees. (See also fig. 12).

B. Halfcomb Super Spacing: The key to minimizing burr comb is space control.

1) A flat inner cover or western cover on the top super is required: This allows the optimal 1/4" top space, assuming the conversion has been accurately installed. As stated earlier, the space between cassettes in adjacent supers is 1/4" also.

2) Never place a super of frames over



Fig.14a: Bees emptying their own unfinished supers from the top of the hive.

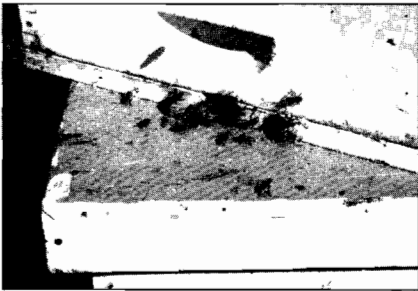


Fig.14b: Small entrance of fig.14a being defended by the bees.

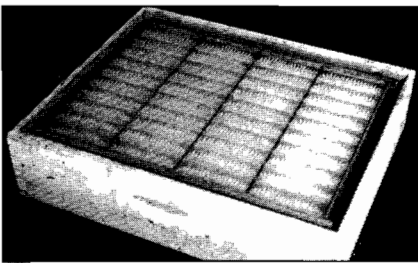


Fig. 15: A fed-back super showing intact comb; there is no midrib to be damaged.

a Halfcomb super: Not only will extensive burr be built between them, but, if the frames contain drawn comb, the bees will bypass the Halfcomb.

C. Management for Halfcomb Honey Production: The principle strategy common to classic comb honey production systems has been to simulate all or part of the conditions of a swarmed hive in order to cope with swarming without los-

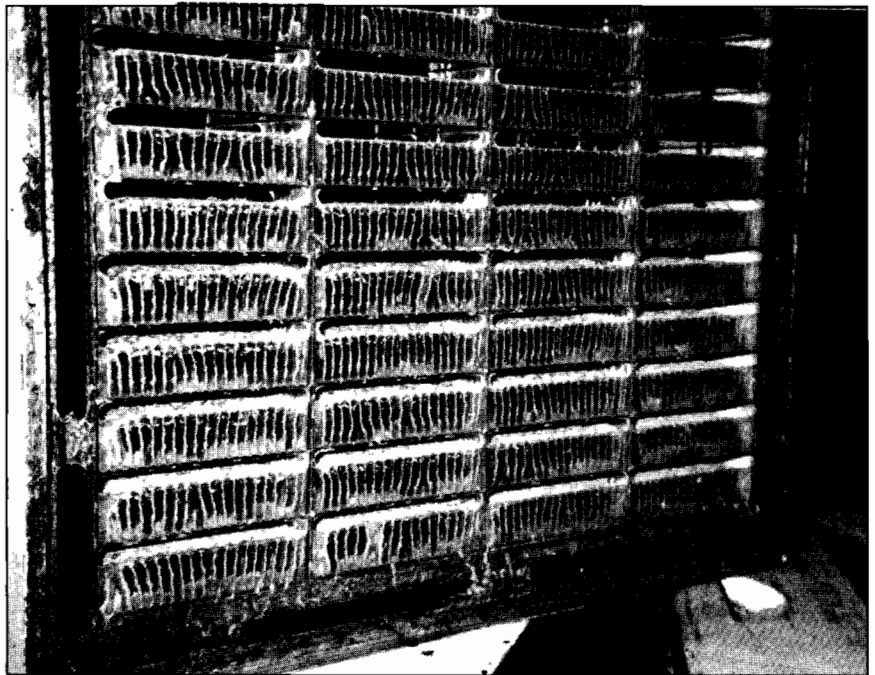


Fig. 16: A harvested super on-edge in position to be fine cleaned.



Fig. 17: Spaced supers stored on-edge in a lighted room to deter wax moths.

ing the bees. This strategy, to be dubbed "The strategy of Renewal", will be the subject of a forthcoming article in this Journal. The discussion here will be limited to the following recommendations:

1) Diversification in "The Heart of the Flow": A good choice for part time (or first time) comb honey production is that described by E.L.Sechrist (*ABJ*, 8/92, pg.529) for main-crop extract producers to diversify into comb honey; comb honey is produced on selected strong hives temporarily in the heart of the main flow.

By this plan, hives observed to be

already of the strength desired for comb honey production are selected. At the beginning of the main flow when work in the extract supers is seen to be exploding, exchange all of them for two or more Halfcomb supers and transfer the extract supers to a neighbor hive; return to extract production when the comb supers are finished.

This plan is about as fail-safe as possible. It is compatible with any extract-producer system and equipment and can be aborted if the required conditions fail; the extract supers will assure whatever surplus is to be had.

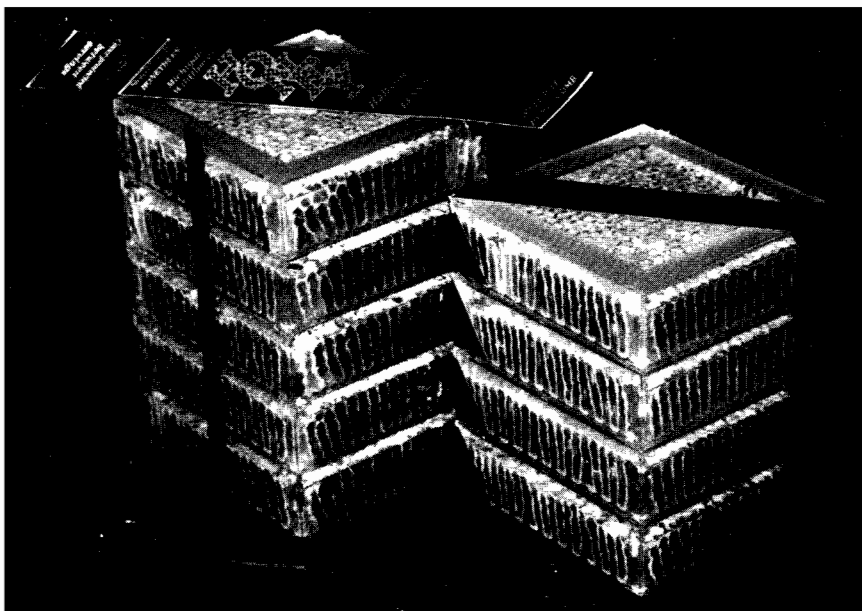
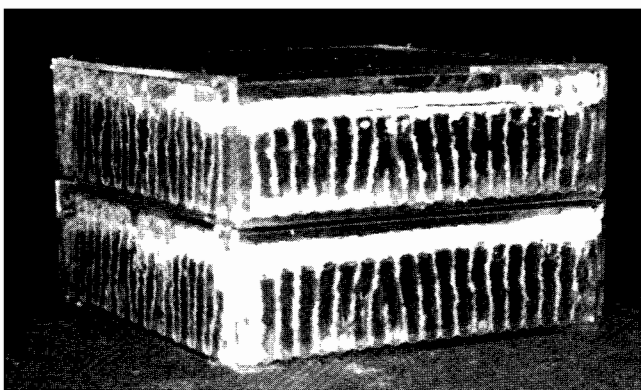


Fig. 18: Procedure for covering, labeling and then restacking cassettes



**Fig. 19:
The "naked"
Halfcomb cas-
settes alone com-
mand attention.**

2) **Super rotation:** It is important to follow a super rotation plan such as that recommended in the Killion plan⁶ for multiple supers. In their system of comb honey production; each new super is placed on top until about 50-60% full and then moved to the bottom while any other supers are moved up in order (fig. 13).

3) **Recovery of incomplete supers:** I have found that incomplete Halfcomb supers even if prematurely capped, can be recovered in good condition by feeding back to the bees, provided access to the super is restricted to a very small entrance, as advised by C.C. Miller⁷.

In this instance, feedback was conducted just near or just after flow-end on top of the hive (fig. 14a) over an inner cover with a small opening in the rim (fig. 14b). By using this small opening the super is not overwhelmed by hordes of robber bees which otherwise tend to destroy the comb or induce robbing elsewhere.

In the example of fig. 14a, the supers to be recovered were placed on top of the hive they came from with enough residual bees to return below and alert the

parent hive. In fact it can be seen that the "robbers" appear to be only from the parent hive, even crawling back and forth on the face of the hive and appearing to defend the small entrance above (fig. 14b) from other robbers.

Supers fed back in this way can be reused later in the same season if they had been prematurely sealed in an early flow, or carried over as first supers the following season. Such supers (fig. 15), if they have not been carelessly left on the hive too long off-flow, are indistinguishable from filled supers not so treated. Some beekeepers have reported reuse of cassettes several times on a small scale for home use; the cassettes need not be rewaxed.

IV. HARVESTING HALFCOMB SUPERS: It is here that the intrinsic value of "windows" and "on-edge" (vertical) handling work together to eliminate labor and improve efficiency.

Vertical handling is exclusive to the Halfcomb due to the obvious fact that when cassettes rest bottom-down there is no leakage from open cells. All manipulations throughout should be conducted

in the "on-edge" or vertical position because of the inherent efficiency.

A. Removal of Bees from the Super. With super turned on-edge, on the hive or aside, confirm visually that the super is full and capped. Rough-clean burr from both top and bottom flush surfaces with tool of choice and return to the hive over an escape; the bees will quickly clean up honey drippings. The cassettes will be nice and dry when removed a day or two later. Any further cleaning of cassettes required is most efficiently conducted with a putty knife before removing cassettes from the super.

B. Control of Wax Moths: It is best to remove the cassettes from the super and install the covers promptly to guarantee protection from wax moths. The chance for wax moth eggs is nil while on a hive of comb building strength and with no cracks between cassettes to lay eggs in. If, however, the cassettes are not to be removed from the super at once and covered, the supers should be stored in a lighted room, spaced and on-edge. By this procedure the light through clear plastic discourages egg laying by wax moths. Either way the costly and time-consuming freeze procedure can be eliminated.

C. Removal of Cassettes from the Super: With the super still on edge remove the springs and, using a hive tool, loosen the moveable follower (7 of fig. 5A) by a sharp upward rap inside the bee space against the follower end. Separate the stacks with any thin blade and set them aside. It is mainly the moveable follower only that need to be cleaned before the super is reused; however, propolis build-up on super rims should be removed to maintain 1/4" spacing.

D. Installation of Covers and Labels: The covers and labels are installed on each cassette in its turn while still on the stack. (fig. 18). Turn all stacks so that the side cells slope away from the operator, i.e. upward when on the hive, for uniform appearance when restacked with covers in place. Strip the tape as you go.

Engage one cover corner, logo down; rotate the other corners into position and snap in place. Interfering corner wax needs to be removed only when excessive. Install the label of choice. The cassette is then loosened by gently prying at the very end of the entry slot; and, with putty knife already in hand, the cassette is bottom-cleaned and set over onto the new stack. The cassettes have been largely prepackaged for you by the manufacturer and the bees.

When using the specially designed Halfcomb ribbon-label seen in (fig. 18) the slanting lines on the label are used to accurately position it on the cover as shown; then the label installation is completed by wrapping the ends around the

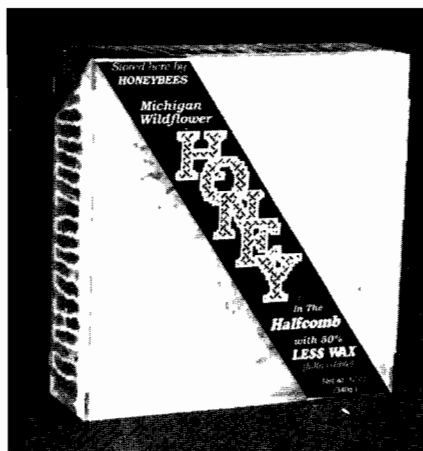


Fig. 20: The consummated "Honey in the Halfcomb" package.

two corners which automatically fall in place.

V. MARKETABILITY OF HONEY IN THE HALFCOMB: The value of "windows" is just as important in marketing as it was in the production of quality comb honey.

The producer of Honey in the Halfcomb has an entirely new and appealing story to tell in the marketing of comb honey.

A. Assurance of Quality: The hallmark of Halfcomb honey is the full view of honeycomb just as stored there by bees untouched by human hands and proof of naturalness; showing the deep cells with no midrib wax and hence only half as much wax, suggesting the name "Halfcomb" (fig. 19).

B. Blue Ribbon" Comb Honey Package, Net. 12 oz.: A new label, designed for exclusive use on the Halfcomb, is the crowning touch to the cassette design. This ribbon-like label (fig. 20) complements the eye-appeal of natural comb, seals the cover, and auto-promotes the basic Halfcomb message — especially the message that "the bees stored it here", that the comb is fully edible, and that the cassette is also a server on the table.

C. Designed to Enable Conspicuous Display: The cassettes have perfectly square corners (90°) so that they rest securely on any of the four edges in an upright position as well as the bottom. By combining this with the interlocking feature of covered cassettes in stacks (fig. 21), one has unlimited options for attractive arrangement on the market shelf.

When the cassettes are on-edge or in the bottom-down position there is much less chance of leakage on the market shelf than any comb honey. The preferred on-edge position is the same as when it was on the hive. The cells slope upward. The label is installed to indicate this position by its

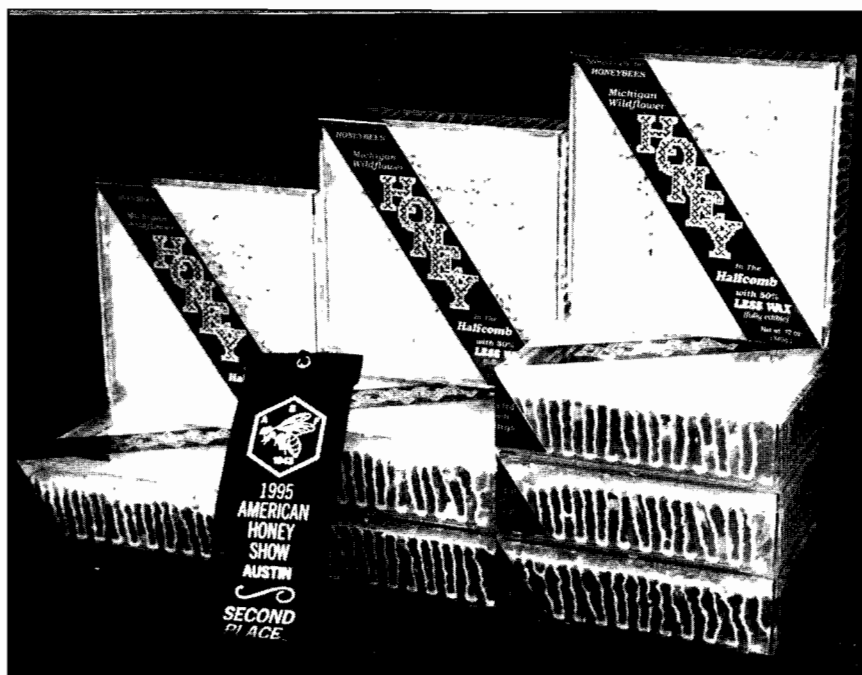


Fig. 21: One of the many display arrangements; note the patterns of label repetition.

readability.

D. A Natural for Creative Marketing:

Honey in the Halfcomb is a winner, we are told, when the customer also understands that "the bees put it there" and that edibility is improved because the wax content is reduced.

Recognized for its potential in specialty or niche markets, Honey in the Halfcomb has been especially sought after for its potential in the gift market.

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