

“The less there is to justify a traditional custom, the harder it is to get rid of it.”

— Mark Twain, *The Adventures of Tom Sawyer*

Have you ever been in an antique store and found, tucked away in a dark corner, some tool from a by-gone era that you have no idea what it was to be used for? Maybe it has handles and gears with openings to put things in and spit things out... but what? In my family, those spark an impromptu game of “I bet it was for...” with the shopkeeper eventually being asked to provide the maybe-correct (but maybe not) answer.

In contrast, we usually think of the standard Langstroth hive, one of many “standard” hive types that are used around the world (see [“Standard Equipment: How Standard is It?”](#)), as elegantly simple. There is a bottom with an opening for the bees to come and go, frame-filled boxes stacked on top of that, and a cover to keep the rain off. Yet there is one standard component that makes me wonder if Rube Goldberg had been a beekeeper. It invariably confuses beginners, especially with respect to placement when using Miller-type top feeders. That article of confusion is the inner cover.

(For those with short attention spans, I’ll jump ahead to the end: the proper place for an inner cover, when using a Miller-type top feeder, is your closet. Bring it back out when feeding season is over and you have removed the feeder.)

My questioning began many years ago when a long-time Master Beekeeper I respect highly, John Wallace, told me, “You don’t need inner covers. They aren’t necessary.” Over time I’ve learned that he is correct, with certain caveats. Common sense and observation prove it but beekeeping tradition and much of beekeeping literature tells us otherwise. Hence the profound confusion that exists. But indulge



An inner cover is part of every beginner beekeeping kit. The design is simple. But what are all the holes, notches and rims for? Am I using it correctly? Or could it be that this is not an “inner cover” at all, but instead a piece of forgotten equipment that has been repurposed to serve as an inner cover?

me while I try to explain why I think inner covers really exist. It may not be why you think.

I began by searching both the current and historical literature. My favorite go-to authority, the 2015 edition of [The Hive and the Honey Bee](#), says, “Inner Cover – Creates a dead air space for insulation from heat and cold. Center hole may be fitted with a bee escape to aid in removing bees from honey supers.”¹

But wait! Another well-respected bee authoritative source, [The ABC and XYZ of Bee Culture](#), says, “Inner Cover – Most include ventilation port for maximum air movement, aids in colony manipulation.”² I cry, “Foul!” “Dead air space” and “maximum air movement” are completely opposite, mutually exclusive concepts! And what about “colony manipulation” ... that sounds intriguing but details aren’t provided.

Without any consistent explanation, I went back to the Father of Modern American Beekeeping, Rev. L.L. Langstroth, and his original moveable-hive design.³ No help there: he didn’t have an inner cover. Hmm.

¹ Joe M. Graham, ed., [The Hive and the Honey Bee](#), Dadant & Sons, Hamilton, Illinois, 2015, p 465.

² Roger A. Morse, ed., [The ABC and XYZ of Bee Culture, 40th Edition](#), The A.I. Root Co., Medina, Ohio, 1990, p 158.

³ L.L. Langstroth, [Langstroth’s Hive and the Honey-Bee](#), Dover Publications, Mineola, New York, 2004 reprint

How about an old version of ABC and XYZ? The 1882 edition⁴ goes into exhaustive detail about how to construct every piece of a hive, but gives no mention of an inner cover.

E.F. Phillips, head of Bee Culture Investigations for the USDA's Bureau of Entomology in the first part of the 20th century, described the standard colony configuration as:

The plain box rests on a bottom board, so made that there is an entrance space, and over the hive is a cover which can be entirely removed to permit the removal of frames. There are various types of bottoms and covers, with no marked advantages in one over the others. The telescope cover over a thin inner cover is a good type.⁵

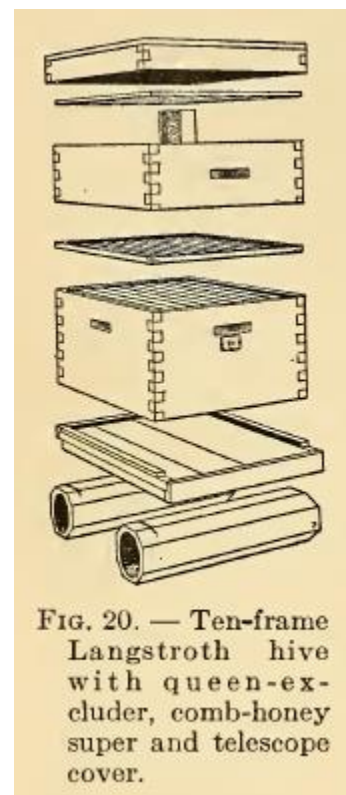
There we finally have mention of our friend the inner cover, but without any purported benefits or purpose ascribed to it!

Rewind just a few years to Frank Benton's 1895 USDA bulletin, The Honey Bee: A Manual of Instruction in Apiculture. In it, he describes hive components:

Above the sections or the upper set of frames a piece of carriage cloth, enameled side down, should be laid during the summer season to prevent too great escape of heat above and to keep the bees from getting into the roof or propolizing it. The cloth is more suitable than a board, since the latter when propolized cannot be removed without considerably jarring the bees. If the carriage cloth be weighted with a board which has been clamped with a strip across each end to prevent warping, there will be less propolization of the sections above or building of bits of comb on the tops of the frames when these have been used. To dispense with this extra piece and also to render the gable cover flat on the underside, the board which rests on the carriage cloth may be nailed to the cover

⁴ A.I. Root, The ABC of Bee Culture, A.I. Root, Medina, Ohio, 1882.

⁵ Everett Franklin Phillips, Beekeeping, MacMillan and Co., New York, 1915, p 27



E.F. Phillips' 1915 diagram of a standard Langstroth hive shows an inner cover underneath a telescoping outer cover.

permanently. During very hot weather the quilt may be turned back and the cover propped up.⁶

Now we see the purpose of placing something between the top frames and the hive roof: preventing the bees from propolizing the frames to the underside of the cover. Benton noted that a board can be used for that purpose, but he thinks a piece of canvas is preferable. Then he describes how the design can be made even better by combining the cloth with a board. [Paul Kelly](#), Apiary Manager at the University of Guelph, spoke at a NCSBA Conference several years ago and showed how he uses canvas covers in his research apiary. They now have a cult following in my area.

⁶ Frank Benton, The Honey Bee: A Manual of Instruction in Apiculture, Government Printing Office, Washington, DC, 1895, p 47.



FIG. 31.—Dadant-Quinby form of Langstroth hive, open: *a*, front of brood apartment; *b*, alighting board; *c*, movable entrance block; *d*, cap; *e*, straw mat; *f*, carriage-cloth cover for frames; *g, g*, frames with combs. (From Langstroth.)

Frank Benton describes an inner cover, albeit a canvas one, and explains its purpose in 1895.

What about the oblong hole in the center of a standard inner cover? One may assume this is a hand-hold, making manipulation easy, or an opening so the bees can access the entrance notch above. One would be wrong. The correct answer is described in the First Edition (1922) of Starting Right with Bees:

When the beekeeper desires to remove full supers of honey a board (called a bee-escape board) is slipped between the supers and the brood-chamber below. In the center of the board is a trap called a Porter bee-escape. The bees can then pass down from the supers into the chamber below, but can not get back again. By using this bee-escape, in twelve to twenty-four hours the full supers of honey can be removed with scarcely a bee in them, and actually without the knowledge of the bees in the broodchamber below. This escape-board, without the Porter bee-escape and with the hole closed, is generally used as an inner cover.⁷



A disassembled Porter Bee Escape, showing the springs that allow a bee to leave but not reenter. The device fits perfectly into the center hole of an escape board aka inner cover.

This explanation may seem odd to those who have never used a Porter Bee Escape, but the center hole in a properly-constructed inner cover is exactly the right size to insert the device. That's what it is for. Since it also, coincidentally, serves the anti-propolization need, people use one piece of equipment instead of two. Note that Porter Bee Escapes don't work well – they are slow and are easily jammed – so don't rush out to get one. But they are clever.

All of that background brings us to the answer of the question, "What am I supposed to do with an inner cover? Why do they exist?" Foremost, keep in mind that inner covers are only ever mentioned as an accompaniment to telescoping covers. Remember that E.F. Phillips said there are lots of different types of covers and they all work, but "the telescope cover over a thin inner cover is a good type." Another common cover used today is called a commercial cover or migratory cover; it is essentially the same as a telescoping outer cover except it does not have sides that overlap the sides of the hive. The front and back protrude and overlap but not the right and left sides. This allows commercial hives to be stacked flush, side by side with no space in

⁷ H.G. Rowe, Starting Right with Bees, The A.I. Root Company, Medina, Ohio, 1922, p 14.

between, on flatbed trailers for transport. Not only does that allow more hives to fit on a trailer, they are more stable. With that design, if the bees propolized the cover to the upper hive body or to the frames, all the beekeeper needs to do is insert her/his hive tool underneath the side edge to pry the cover free. But with telescoping covers, the side edge is obscured by the overhanging sides of the cover. If the cover is propolized in place, how can it be freed without a lot of banging and bumping? The solution is to put a second cover underneath the first, one without overhanging edges. The bees will not propolize the outer cover to the inner cover anywhere near to the extent that they will glue the inner cover to the hive body. The second cover can be wooden or, as Frank Benton and more recently Paul Kelly suggest, canvas.

So why don't we all use commercial/migratory covers? The common feeling is that overhanging edges on all four sides provide better protection against wind and rain. Maybe it does, maybe it doesn't. You get to choose. People love options.

What about the little upper entrance notch in an inner cover? Those are optional in inner covers, but again, the function isn't dependent on that design. Migratory/commercial covers typically have a slot beveled into the underside of the front edge; as an entrance, it works exactly the same as the one in the inner cover.

What about the dead space/improve ventilation argument? Since the two propositions are mutually exclusive, my guess is that this comes down to a feature in search of a function. I suspect that neither "benefit" is significant or even true. But that's just me.

I hope this lengthy explanation helps with the puzzling question of when an inner cover should typically be used on a hive. It is totally

unnecessary unless there is a risk that the bees may propolize the cover to the boxes below, as is the case when using a telescoping cover. When using a Miller-type feeder, the bees don't have access to propolize the feeder rim to the cover. And if an inner cover is used over a Miller feeder, the upper entrance would allow every bee in the neighborhood access to the colony's syrup, perhaps inciting robbing. So not only is it not necessary in that circumstance, it could cause big problems.

What have we learned? The historical evidence indicates that the flat board with a hole in the middle, what we call an inner cover, isn't really an inner cover... it is an escape board that doesn't work very well. But rather than have two pieces of equipment, people used one for both purposes. Apparently, a hundred-plus years ago, before the Porter Bee Escape became popular, an inner cover was a canvas sheet laid over the top bars. That type of inner cover is still used today, although it isn't described in popular textbooks. The important thing is to realize that an inner cover, when properly used, does serve a purpose, but it isn't a magical item that will determine whether your bees live or die. Like almost all pieces of our equipment, its original purpose, and its purpose today, is to make life easier for the beekeeper, in this case by reducing banging and bumping when removing the outer cover and thereby reducing stings. Use it when it is useful but don't think you must use it when it isn't!

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