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GLEANINGS

A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS.

BEE CULTURE

ILLUSTRATED SEMI-MONTHLY PUBLISHED BY A. I. ROOT. MEDINA OHIO \$1.00 PER YEAR

Vol. XXII.

MAY 1, 1894.

No. 9.

STRAY STRAWS

FROM DR. C. C. MILLER.

I HOPE to get bees out of cellar April 18.
 APRIL *Review* has a nice picture of the editor inside a veil.

LETTUCE is one of the best things for fall sowing, Bro. Root.

VASELINE, I think, is used in England more than elsewhere. [If a good thing there, why not here also?—ED.]

THE *Review* says I made a failure with sweet clover. Yes, only because I couldn't get a stand. I think that can be remedied.

"EVIL COMMUNICATIONS corrupt good manners." Who would have thought that, when Prof. Cook went among those extracted-honey men, he'd become one of them?

EXPERIMENT STATIONS, H. W. Scott suggests in *A. B. J.*, should communicate freely with each other, each one being fully informed as to what the others are doing. Why not?

APICULTURE seems to grow in importance in the eyes of agricultural journals. *The Farm and Stock Ledger*, a new paper, devotes nearly one-fourth of its reading space to bee-keepers.

C. THEILMAN, in *A. B. J.*, reports his bees in cellar all right at 36°, but they have unusually well-ripened stores. He thinks it bad to have them 45° or higher the first part of the winter.

A PERCOLATOR is my latest acquisition. I'll tell you how it works, next time. [Yes, yes; we are all anxious. We shall not have time to try one till fall, so should like to know a little in advance.—ED.]

SPECULATIVE FEEDING is much spoken of by Germans, and seems valued. I'm not sure just what it is—perhaps a compromise between giving a big lot all at once, and the scanty supply of stimulative feeding.

GRAVENHORST relates that part of his colonies were taken at time of rape bloom to a large domain and returned after, free of ex-

pense, the owner getting double crop from the rape by the work of the bees.

J. A. NASH thinks the vanilla-flavored honey is from sweet clover. Possibly; but I've had samples of so many different things as sweet clover that I'm doubtful whether any one knows what sweet-clover honey is.

THAT ECHO on p. 327. It may be true that honey gets its aroma from fresh-bulit comb, but I can't swallow it, Rambler, unless you give us something to help make it go down. Is new white comb as fragrant as wax from black combs?

DR. J. P. H. BROWN, speaking in *A. B. J.*, of the big freeze that went all over the country, says, "It is the *most complete vegetable-kill* that ever I experienced in the South." The effect on southern bees has been somewhat disastrous.

THAT RULE that friend Schaeffle gives, p. 325, that queenless bees bring in no pollen, is a very old one, but I think it has been laid aside for some time as untrue. Hasn't a queenless hive an unusual supply of pollen? But I doubt whether they bring in as big loads.

NO WONDER Rambler's nose looks so long after playing *Eugenia* the slip when she thought he was going on the cars with her. But fate is on his track. In all his rambles, the fear will always haunt him that *Eugenia* will turn up in some unexpected place.

DR. KARL RITTER, a Pole, caged 132 bees that had lost their stings. After 48 hours 80 were still living, and flew away as lively as ever when freed. But bees are slow to show the effect of injuries. Cut one in two, and it doesn't seem to hurt it for a long time.

THE SECRET of the control of fertilization of queens, according to a writer in *A. B. J.*, is ready to be made public whenever a liberal reward is pledged, as the secret is now positively known. May be so; but then, it has been positively known so many times before.

DOOLITTLE, p. 329, doubts a wintered colony having no pollen in spring. I think I knew just one exception about 30 years ago. A colo-

ny in early spring was eggless and broodless when others had brood, and I could find no pollen present. I gave pollen, and all was lovely.

M. M. BALDRIDGE deserves a vote of thanks for defending father Langstroth against unkind insinuations in *American Bee-keeper*. He squarely denies Robinson's statement that Mahan imported first Italians. [Yes, and Baldrige confirms what we said on page 941, Dec. 15th last.—Ed.]

AND NOW I'M TOLD, in *Progressive*, that a foundation-press is not a press if the wax is very warm. That won't do, Observer. If you put thin pomace in a cider-press, is it a mold? But I own up there are no such presses in this country (there's one on the way), and I was all off about the Given press.

A NEW WAY of having extracting-combs is reported in *Illus. Bienenzeitung*. Nail a sheet of tin on one side of your frame, then put in foundation close against the tin. Then you've only one side of the comb to extract. [But on a thousand such combs, wouldn't the tin be rather expensive? and how about so much metal in the super?—Ed.]

IN AMERICA there are more than twenty societies, with a million of capital each, which they employ in covering a large part of American territory with apiaries. Each farm has its apiary, not only for the honey, but principally for the fecundation of flowers.—*From a speech in Elsass-Lothringischer Bienen-Zuechter*. Go from home to hear the news.

HUTCHINSON agrees with Dayton, that cleats are better than hand-holes in hives. Sensible. [The trouble with hand-holes heretofore, they haven't been made deep enough and long enough. We now make them $\frac{3}{4}$ inch deep, and long enough so that all the fingers can get a good grip. Of the old hand-holes, only one finger could get a good fair hold.—Ed.]

THERE YOU GO again on p. 331. Won't give us Given foundation because it isn't "pleasing to the eye." What I want is something "pleasing to the bee." "That nice clear transparent effect" comes from a hard polished surface, doesn't it? and that's just what we don't want. [No, that clear transparent effect doesn't come necessarily "from a hard polished surface." See editorials.—Ed.]

I'M GLAD to LEARN that the V edge on end-bars is not sharp, but $\frac{1}{16}$ wide. How would it do to make it still wider, say about $\frac{3}{8}$? ["There you go again." This sounds like your suggestion that, if an eight-frame hive is better than a ten-frame, then a six-frame is better than an eight. As Mr. Taylor says in this issue in reply to this, there is a Scylla and Charybdis; so we say there is here regarding the bluntness of this V edge. In Trade Notes we explain again, more fully why this V edge is preferred by us and by friend Hoffman.—Ed.]



Our Symposium on Large vs. Small Hives.

R. L. Taylor on One Side of the Discussion, and Hatch, Dadant, and Seeley on the Other, with Dr. Miller on the Fence.*

DR. MILLER'S ARGUMENTS REVIEWED: SOME OF THE ELEMENTS OF UNCERTAINTY.

By R. L. Taylor.

Dear Bro. Miller:—I note that, in the last number of GLEANINGS, you make a reply to my letter to you of Feb. 1 upon the above topic; and inasmuch as I have become interested in what you say, and in the way you say it, and as the editor seems to expect me to say something in response to your argument, I venture to undertake to make some further suggestions which, it seems to me, should have weight in the consideration of the questions involved.

In relation to the experiment you propose for the purpose of testing the comparative advantages of the two kinds of hives, you see some of the difficulties, but I fear there are many others. Taking a colony from an eight-frame hive and putting it into a ten-frame hive would not do, because one which had been in a ten-frame hive for a year might be stronger, which would, perhaps, be an advantage, but more likely a disadvantage. The difficulty would be hardly less if one had plenty of each kind of hive containing colonies which had occupied them for years; for in selecting the colonies for the experiment there would be no really satisfactory standard to be applied in making the selections. I have just been selecting colonies for some other experiments, and I find that, with care, by examining when closely clustered I can pick out pairs that appeared to be twins in all material points; and then by dividing each of a sufficient number of pairs so as to form two lots, I could make the two lots practically about alike; but if I were to undertake to compare a colony in a two-story Heddon hive with one in an eight-frame hive, or one in a one-story Heddon, I should be lost—the result would be no better than a rough guess. So if I were set to select colonies in eight and ten frame hives for comparative experiment I should not know how to proceed. There would be no common standard that could be applied in making the selection. It would not be an attempt to get colonies of equal strength, but it would be an attempt to settle the average relative normal strength of the two classes, and then to select, from each, colonies having the same proportional ratio to each average. So far no plan of procedure has been suggested to me that seems to give promise of results that would

*We didn't know exactly where to put the Doctor, so we have put "him on the fence." If he doesn't like it he can get off.—Ed.

have any binding force unless it be the keeping of an equal number of each class together under the same treatment for a series of years; and owing to the unstable footing which apiculture has as yet secured at our experiment stations, such a plan would have small chance of success unless it were acted upon on his own account by some bee-keeper who, like yourself, still has faith in the virtues of the ten-frame hive.

So the question between the two hives is a very complicated one, and is not simply one between what the bees say on the one hand and theory on the other. On each hand are both facts and theory. In each case the bees say something; and in each, what they say must be supplemented by a vigorous exercise of the reasoning faculty, or no sound conclusion can be reached. So I affirm that we do know something about it now. The bees have spoken—not, indeed, to the main question directly, for, as has been seen, that is too complicated to admit of a categorical answer unless we first put them in a position to give such a one by making extensive preparation for it, but to detached points that are material to the general issue, and decisive of it. But, of course, we must be careful of our process of reasoning.

You say, "I beg you will believe —and I am sure you will take my word for it—that I am not saying a word for the sake of mere argument." Of course, I take your word for it; but I can not help seeing that, through the deceitfulness of language, I suppose, you have permitted your pen to say what is more unfair and more dangerous than talking for the sake of mere argument. What sort of tangle-leg does your pen (or is it your typewriter?) imbebe that could have made it charge me with the statement that "we'll get all the bees we want by June 15th in an eight-frame hive"? What I did say was, "We want all the bees we can induce the colony to rear" up to that point of time. Your pen also puts the correct statement alongside the false one, so that it also practically charges me with inconsistency or want of intelligence.

Then what could have possessed your typewriter to record this: One "might ask whether the bees had ever stated in a positive manner that a lot of brood late in the harvest was a damage"? That is worthy of an adept at party-platform construction! What a blessed state of unanimity it is calculated to produce! for, of course, a lot of brood then would be no damage but an advantage! Whether we favor a five, eight, ten, or twelve frame hive, we would all agree in wanting a lot of brood then. But one might ask, "How big a lot?" and the strife would be renewed.

I feel pretty sure that the soundest argument would have little effect in solving the question so far as you are concerned if you are habitually willing to use such an ultra-diplomatic ex-

pression as a shield; and I am just as sure you would not expect me to be satisfied with such an elastic argument.

Now, I admit that here I feel the ground trembling under my feet, for I understand that you are editing a dictionary of apicultural terms, and I have noticed recently on several occasions that you have shown an inclination to "fix" the meaning of words to suit your own ideas without entertaining much respect for usage, so I am in doubt whether "lot" will not turn up as an apicultural term with some new signification, and I nightly dream of the pit preparing for him who is so foolhardy as to attempt an argument with the dictionary man.

Of course, I take your word for it when you affirm that you say nothing for mere argument; but I feel a mighty strain when I read the place where, in response to the reason I give for my statement that more bees will be produced early in the eight-frame hive, viz., that there is less space to be kept warm, you say: "If that counts for any thing, then a six-frame hive is still better." Better for what, pray? If you mean better for rearing brood early, I assent as a matter of course; but what significance has that fact in this argument? If you mean better for comb honey, I as certainly dissent. It looks a little as though you meant to get this admission from me, and then turn on me, and, by the use of the same kind of logic, insist that, since I admit that an eight-frame hive is better for comb honey than a six-frame hive, I am bound by an analogous course of reasoning to admit that a ten-frame hive is better for that purpose than an eight-frame hive. But, don't do that. We must admit that there is a Scylla as well as a Charybdis to be shunned. A hive may be too large as well as too small.

Once more: In the paragraph wherein you speak in derogation of theories, it seems to me you confound two ideas to the detriment of clear conceptions of truth. You place the theory of parthenogenesis and the theory of the eight-frame hive on a level with the theory of last year's non-swarmers and last year's hivers. You may well call the latter pretty theories which the bees refuse to accept; for the theories, though fine, we can clearly see, do not provide for all the conditions as they exist in our practical apiaries; they are not accepted by practical intelligent bee-keepers; indeed, such men clearly see, without the trouble of a test, that they could not be successfully used; but because such theories are and will be promulgated, furnishes no reason for including the former in the same condemnation, for they are supported by sound reason; they have been subjected to the scrutiny of practical men for many years, and the fraternity accept them. *Vox populi vox Dei.* Of course, in one sense I may say of them correctly, "I don't know;" but that is not in accordance with the ordinary usage of the language, but only in the sense

which one employs when he says, "In the realm of mathematics I can say I know; but outside of that, my knowledge all breaks down, and I can not say I *know* any thing;" but this is agnosticism.

REASONS WHY THE EIGHT-FRAME HIVE IS BETTER THAN THE TEN-FRAME.

As I have already said, the bees have spoken on many of the material points of this matter; but I am disappointed to find that you are in no way inclined to listen. I find you agree with me in nothing but in those points relating to the things we want. You agree that we want plenty of bees early, and that, at the proper time, we want all the bees that can be spared from the brood-chamber to go to work with alacrity in the supers; but not a step further will you go. You will not even admit that, other things being equal, more bees will be produced early in the smaller hive than in the larger one. That there is less space to be kept warm has little or no weight with you. I just said that, though the bees talk, you are not disposed to listen; but perhaps *your* bees do not talk. Mine do.

My bees say, and have reiterated it a thousand times in the most unmistakable manner, that, the smaller the hive, the more comfortable and healthy they are, and, consequently, the more rapidly they increase at the opening of spring. But, half convinced, you ask if I have settled positively that colonies in eight-frame hives will average as strong at the close of winter as colonies in larger hives. I have had much experience with hives of different capacities. For a number of years I used only ten-frame hives; then eight and ten together. Now I use the eight-frame hive; the two-story Heddon, equal to the ten-frame hive; and the one-story Heddon, equal to five L. frames; and the answer my bees have all along given to the question is, that you can not increase the strength of the colony—i. e., at the end of winter, by increasing the size of the hive after a certain limit is reached, which in most seasons is about that of the eight-frame hive; that other circumstances are more potent in that matter than the size of the hive, and that even the one-story Heddon, if the previous fall was *favorable to it*, will contain colonies nearly as strong as those in the ten-frame hive, and strong enough for profit. They say that, in seasons favorable to the *larger* hive, the colonies may average a little stronger than those in the eight-frame hive; but they do not say that they are, therefore, better. They have told me, time and again, that it is not safe to wager that those strongest in early spring will produce the most surplus; and I venture to add that, as it is cheaper to keep a cow warm in winter with the aid of a good roof and tight walls than with grain, so it is more economical to aid in the protection of the brood in spring by sawdust pack-

ing than by an otherwise useless wall of live bees.

Then you further ask: "And if there's enough honey in the larger hive, may not the empty space be less than in the smaller hive?" To that my pocket-book speaks up and says pine boards make cheaper dummies than do combs of honey.

Again, you suggest that one "might ask whether the bees had ever stated in a positive manner that a lot of brood late in the harvest was a damage." After again turning over this expression I can not escape the conclusion that by "lot" you mean an unusually large amount—or, as the schoolchildren say, a "big lot;" and my heart sinks when the proper words come to my mind to characterize your argument as it seems to deserve, for you fall into a device used by those who argue for victory, not for truth. Whether it was intentional or not, I admire the ingenuity of the false logic. You first use "lot" in the sense of an unusually large amount, and then, with exceeding skill, drop it, but carry it along by implication in the sense of a "small lot," for a wife is the smallest lot in the way of a family a man can well have. It would at least have been a fairer statement if you had said, "A young man may get ahead faster after he has a wife and twelve or fifteen young children to support," though that might have interfered with the hoped-for effect.

But hear what my bees say to the supposed question. They say the extra brood requires a large amount of food; that to prepare food, to feed and otherwise care for that brood, requires a considerable force of bees, which are detained from work in the supers; they say that the first lot emerges from the cells a little before the end of the early harvest, too late for use then, and too early to be of much use in the fall harvest, if there should be one; that, as the first extra brood emerges while nectar is still coming in, its place will be taken by a second extra brood which requires the same expense of food, and which, having hatched about the first of August, will cut no figure the ensuing spring, having, in the mean time, furnished no reason for their being, unless in exceptional cases where there is a fall harvest, and that they are not even of use in keeping up the strength of the colony, as the bees reared in an eight-frame hive are abundantly sufficient for that. Without going further into details, I think most bee-keepers would have no difficulty in finding that those two broods of extra bees have been no small damage, and that it could not well be otherwise where the honey harvest comes as it does pretty generally in this latitude.

Further on, in response to my remark, "The ten-frame hive having more space below, and, as a rule, more brood that will prove a damage, and greater accumulations of honey in the brood-chamber, all of which circumstances

have a powerfully restraining influence to keep the bees from going into the sections in full force, is manifestly at a great disadvantage," you ask how I know all that; whether the bees say so; and whether it is a fact that a greater amount of brood and honey below restrains from going into the sections. Yes, the bees say so, and it is a fact. As regards property and children, bees are very human; and it is hardly necessary to say more on this point than that He who spake as never man spake said to the human family, "Where your treasure is, there will your heart be also." And the greater the treasure, the stronger the restraint. You certainly must admit that the extra spaces between the combs will be occupied by the bees, and that the extra brood must be fed and kept warm, and that a large number of bees will be required to do all this.

Then you ask, "If you take away all the brood and all the honey from below, will the bees go up into the sections with a rush?" Most assuredly—at least, that is what my bees tell me, always sniting the action to the word.

"If the brood-chamber be chock full of brood and honey, will the bees be entirely restrained?" you ask. No, not entirely, but powerfully; and especially is it so with honey when the bees are permitted to put it in quantities in the upper part of the brood-combs. When you accept this truth, and adapt your practice to it, you will no longer spend your time fiddling with "bait sections."

But there is so much to say that strength and space would fail, and I may as well close abruptly here, and will do so with this question: If brood and honey do not powerfully restrain the bees from going up, what influence is it you so sedulously seek to overcome with your bait sections?

R. L. TAYLOR.

Lapeer, Mich., April 7.

[The foregoing was sent to the Doctor, who replies:]

By Dr. C. C. Miller.

Dear Brother Taylor:—If all the readers of GLEANINGS enjoy the reading of your letter as much as I have done, I'm sure there's one number of GLEANING worth the subscription price. You've such a good-natured way of knocking a body down that he feels he must get up with a smile, even if he has hard work to keep from crying. You've pretty nearly persuaded me that I'm arguing for the sake of argument, and mixed me all up in general. But I'll try to hold out for another round.

I confess you make the difficulty in the matter of experiment look a little greater than it did, and perhaps I must agree with you in that, but it seems to me it ought not to take so many years. C. P. Dadant thinks it ought to take three years; and when you say "a series of years" I'm afraid you mean even more than three. But it seems to me that two years ought to tell a good deal about it.

You object to my making you say that we'll "get all the bees we want by June 15th in an eight-frame hive." Then you quote what you did say, but you don't quote the words from which I tried to condense your statement. Here's what you said: "In 99 cases in 100, the eight-frame hive would contain all the brood that can return a profit, etc.," and then you spoke of rearing unprofitable bees afterward, so I had no thought of quoting you unfairly, as I thought you didn't want the unprofitable bees that would be afterward raised. I'm sorry I tried to shorten and didn't quote verbatim, for I see how that word "want" may be understood wrong. I think I meant it right.

It isn't a bit kind of you to poke fun at me because I'm trying to get bee-terms somewhat straight in the dictionary. I'm having a hard enough time of it without having one of my friends make me cry out, "Et tu, Brute!" [Printer, be sure to use a capital B there; and if you have any Latin letters, use them so that will not be understood to be an English word.]

I don't quite understand you, in speaking in your former letter, about "brood that will prove a damage," and now speaking as if it would not be a damage; and I'm sure I'm willing the word "lot" shall stand for just the amount of brood you meant, whatever that may be. In any case, I think the question remains open as to whether "brood that is a damage" and "unprofitable bees" are raised in the larger hive.

While I don't quite get the drift of some of your talk, some of it is quite reassuring, and makes me think that, after all, the small-sized hives that I like so much better to handle may be all right.

But to come back where we started. What troubles me is, that I am using small hives just because others do, with some theoretical reasons for doing so, but with very little evidence from actual practice that, in the long run, the smaller hives are better. You and others tell me they are better. Still others, and among them bright men and successful men, tell me the smaller hives are not so good. But from neither do I get much in the way of figures as practical proof.

I am troubled, too, by that question of Dadant's: "If large hives are better for extracted, why are they not better for comb?"

I don't get as large crops with the small hives as I did with the large. Just how much of that is to be charged to the seasons, I don't know.

I have much more trouble with swarming, or, in other words, have much more swarming, with the smaller hives.

It is difficult to get enough stores in the eight-frame hive to last through winter and spring, as the bees occupy so much of the combs with brood that there is not enough room for stores.

But the eight-frame hives are, oh so much nicer and lighter to handle! A super that holds 24 one-pound sections is, I think, better

than a larger one, and it doesn't go at all well with a ten-frame frame hive, but it goes perfectly with an eight-frame hive.

If I had been smart enough to keep part of my ten-frame hives going, so as to compare the two kinds, I might have some practical certainty about the matter; but, as usual, I went headlong, and now I'm trying to get some one else to tell me what I don't know.

Marengo, Ill.

C. C. MILLER.

[Here is something, Doctor, that is short and pithy, and perhaps is what you are looking after.—ED.]

HAS TRIED THE EIGHT-FRAME HIVE, BUT FOUND THEM WANTING, AND WHY.

By C. A. Hatch.

Friend Root:—Although you do not invite a general "pitch in" on the discussion of eight vs. ten frame hives, I feel just like having a hand in the fight any way, for I can not agree with the statement that it is settled that the eight-frame hive is best for comb honey. When the general stampede for eight-frame hives was, I concluded with the rest that I wanted only that kind; so I commenced to change over all my ten-frame hives as fast as was convenient; but when I had some 30 or 40 changed I began to grow suspicious, and gave closer attention to results; and I became so thoroughly convinced that I had made a mistake that I sold all my eight-frame hives, and now no man could sell me an eight-frame hive except at about two-thirds the price of a ten-frame. After using eight frame by the side of ten for some three or four years I found that, as nearly as I could estimate without carefully weighing, I got at least 25 per cent more honey from the large than the small hive, no matter whether the colony was worked for comb or extracted. And by the way, Bro. Root, has it ever been proven that we need a different number of frames for one kind of honey from what we do for the other? If so, for what reason? and who proved it? I had supposed that it was an axiom in bee-keeping, that, the more brood surface to a hive, the greater chance for getting sections just over the brood, where they are so sure to be filled; and Taylor admits the ten-frame hive will have the most brood; then why not the most honey?

We all know how loath bees are to put brood into the two outside frames, instinct seeming to tell them that these two should be filled with stores; and it is this very instinct which spoils theory about eight frames being best; for the queen, unless compelled to do so, will not fill six frames only; and it is a poor argument to say that six frames full of brood are as good as eight filled in the same way. True, you can compel the queen to occupy the outside frames by shifting them to the center of the hive; but you have run against nature by destroying these reserve stores. Is it not a fact, that, to get a queen to do her best, there must be at

least 10 days' food-supply in the hive? Nature tells the mother-bee better than to rear a family of children to prospective starvation. Most of our bees for business must be raised before any honey is found in the field, and hence must depend on that in the hive, or you must feed; and if you must feed, how much nicer to just hang a frame of honey at the side of the brood-nest than to fuss with feeders, as one must where he has compelled the queen to fill all the frames.

Bro. Taylor's assertion, that, other things being equal, more bees will be raised in an eight-frame hive early in the season, would be conclusive if it were proven; but the reverse has been my experience. I think, for the reasons heretofore stated, viz., aversion of the queen to occupying the outside frames, and the requirement of these two reserve frames for stores to get bees to do their best.

Bro. Taylor's assertion, that there will be more bees in the eight-frame because there is less space to warm, is nice in theory; but comparing the one story of a Heddon sectional hive in practice, side by side with ten-frame Langstroth hives, I found the latter built up farther, notwithstanding the space to warm was over twice as large. I *wanted* the bees to prove the smaller hive the better, but they would not.

In regard to experiments, I think that it is very important, as Dr. Miller suggests, that bees to be used for the experiment should be wintered in the same hive, or, rather, on the same number of frames. Also let a half of each lot be worked for comb honey, and the other half for extracted, and I am thinking there will be a reversal of some of our opinions, and some of the things which are now thought to be settled will be unsettled. You know the statement that it takes 20 lbs. of honey to produce 1 lb. of wax went unchallenged for years, but was finally proven to be almost if not twice too much.

The eight-frame hive has many things to recommend it in a mechanical way. It is cheaper, easier made, for it requires narrower lumber for tops and bottoms; is lighter, and easier handled; but as loath as I was to give it up, the "dollars" argument was too much, and I had to yield. Yes, Dr. M., we are too much like sheep. When some bell-wether jumps the fence, and cries "Good!" over we go, right or wrong.

Ithaca, Wis.

TEN-FRAME HIVE PREFERRED.

By H. M. Seely.

I see there is a discussion started in GLEANINGS as to which is better for comb honey—eight or ten frames. I have been using both, side by side, for the last four years, and prefer the ten-frame hive every time, as I can get just as much comb honey, the bees winter bet-

ter, and build up fully as soon in the spring, and I often have nine and ten frames full of brood.

Harford, Pa., April 9.

TEN-FRAME LANGSTROTH VS. QUINBY HIVES.

By C. P. Dadant.

To begin with, I will say that we are entirely unfit to discuss the question as it is put; viz., 8 or 10 frame Langstroth hives, for the reason that we have never had a single Langstroth 8-frame hive. Our experience runs between 8-frame Quinby or 10-frame Langstroth, against 10-frame Quinby hives, which are much larger than any thing that is used by the majority of bee-keepers.

We must, therefore, put the question as follows: Do we want a 10-frame Langstroth hive, or a smaller one or a larger one? Tally Dadant on the side of the larger hive, for we consider the 10-frame hive too small. To me, the answer to the public feeling on the subject is, that the smaller the hive they have, the smaller they want it; and last fall at Chicago, when a vote was taken on the subject, I heard several say that an 8-frame hive was *even too large*. Why don't the folks try some large hives instead of disputing between the 10 and 8 frame, which are both, in our opinion, too *small*.

Your answer to Mr. Taylor, that a large hive will have more bees and more honey, is just the answer I should have made him. There are undoubtedly circumstances in which a small colony will find itself in a large hive, and will not be warm enough; but I will not do you or Taylor the injury of supposing that you do not know what partition-boards or followers are for. When we have a small colony in a hive, and we see that they need warmth, we reduce the capacity of the brood-chamber. But when we keep hives on 10 Quinby frames, we have a large brood-chamber, lots of honey, lots of bees, and lots of brood; and we winter a more powerful colony than you can in any 8-frame L. hive.

What do the bees say? That is just what we have been wanting you folks to find out. We have found out what ours had to say, in this locality, and we transferred nearly every one of our 10-frame L. hives and all of our 8-frame Quinby to large hives several years ago. We can give you the names of half a dozen people on whose farms we have or have had bees, and they will all tell you that the big crops always came from the large hives, comb or extracted. Nay, did not Ernest Root tell me, personally, that one of the leading comb-honey producers had said (in private, not wanting to be known) that Dadant was right, that he himself used a large hive in comb-honey production, but that there was no use in trying to educate people to a thing that they did not want to try, and which, if they tried, would only cause honey to be more plentifully produced and be still cheaper?

There may be something in location, and it may be that we should see the thing differently if we were further north. It may be that the bees' answer in Michigan would be different from what it is here; but one thing I will say: If an experiment is to be made, it will not be conclusive, in my mind, unless it is tried on at least 25 hives of each kind for at least three years. Unless the season is very good, a colony in a very large hive will not attain its full power during the first season. Again, there must be more honey left to winter a strong colony than a weak one; but just depend on them to take care of that if you do not rob them too close.

Now, my dear sir, I know we are in the minority, and I am afraid I am preaching in the desert; but I don't care a straw for that; and, in fact, we had just as lief be quoted as an exception on this subject for the rest of our lives. We can raise the honey just the same. One question: You all say that a large hive is better for extracted honey, and a small one for comb honey. Please give us the reason for that. We want a hive to accommodate the capacity of the queen, and that is all, for we do not believe, as Hutchinson does, that queens cost nothing.

Hamilton, Ill.

[Our friends have given us very fair, candid opinions, based upon their extensive experience. Yes, we know of a few extensive bee-keepers who think the Quinby none too small. We would refer, for instance, to Capt. Hetherington and P. H. Elwood, of York State, who have, or did have, in the neighborhood of 4000 colonies. We made many inquiries of the bee-keepers in Mr. Dadant's vicinity, and found that all, or nearly all, were using the large hives. For example, we would mention the Axtells, Hon. J. M. Hambaugh, and A. N. Draper.

Regarding the 8 vs. the 10 frame Langstroth hives, some of our readers will remember that we first made and recommended the 10 frame hive. Yes, for a time we *opposed* the 8-frame; but the pressure got to be so great that we finally made it the leader. Speaking of large hives, we can't for the life of us see the difference between a large hive spread out in one story, like the Quinby, and the *same* capacity in 8-frame Langstroth or half-depth L. frame hives piled up one on top of the other. We had one colony two summers ago, occupying five 8-frame bodies, and a score or more occupying three such bodies. The 8-frame hives may be tiered up so as to make large hives: by using only one body we have a small hive. Mr. Dadant uses a division-board because it is evident he finds it necessary to reduce the capacity of his Quinby hive at times. When *he* would give a colony its full capacity of brood-chamber, *we* would give the same capacity by adding an extra 8-frame story, and putting in the required number of frames. When this same discussion was up a few years ago, the testimony was overwhelmingly for the 8-frame. Again, this matter was brought up at the last Chicago convention in this wise: The question was asked how many favored and used the 10-frame Langstroth hive. A show of hands revealed that there were only 10. When it was asked how many used the 8-frame, 42 responded. When it was asked how many had changed from 10 to 8 frame, 24 held

up their hands. The reverse of the question showed that only one had changed from 8 to 10 frame.—Ed.]

COMB-BUILDING.

IS WAX SECRETION VOLUNTARY? A DISCUSSION
BY MOBLEY AND DOOLITTLE.

By G. H. Mobley.

Friend Root:—Mr. Doolittle said, in answer to a question some time ago, that beeswax is a fatty substance peculiar to the bee, and produced by the consumption of honey, etc. While this is true, yet I take the ground that it is misleading in this: He seems to convey the idea—and others too, I admit—that bees consume more honey when building comb or secreting wax than they do at other times. This I believe to be a false idea. Bees are like cattle or hogs or other animals. If they can obtain sufficient food they will eat all that is required to produce an abundance of fat. They never stop to inquire whether they need the fat for any particular purpose or not, but eat away as their appetites demand and require, without regard to consequences. Now, I hold this to be true as to the honey-bee: It eats all that its appetite requires, and no more, at any and all times, whether the process of comb-building is in progress or not; and the claim as made, that it takes 20 lbs. of honey to produce one of comb, is all bosh—as the same bees would consume the honey if no comb were built at all. Now, the facts are here: Bees will not build comb unless they need it, possibly because they do not want it in the hive unless they have something to put in it. But the moment the combs are all occupied, then the building of combs is at once commenced, and kept up as long as the honey is coming in and there is room left for it to occupy. As a matter of fact, the colony having combs built will store honey much faster than the one that has to build the combs as they gather the honey. But each colony will consume just as much honey as it needs, and no more, to satisfy their hunger. Now, if there were any difference in the consumption of honey in the two hives, I am forced to the conclusion that the other one—the one that had all combs built—would consume the most, from the fact that they exercise more, have more active work, and work much harder than they would in the hive-building comb, which business requires, seemingly, much less exertion than it does to go out into the fields and fly from flower to flower and battle with the winds and obstacles that they are constantly encountering. Often, when a bee returns with its load of honey or pollen, it is so tired that it will fall short of the hive-entrance, and have to rest for a while before it can fly again. Who ever saw comb-builders stop to rest? I think this consumption-of-honey idea originated with foundation or extractor men as an advertising medi-

um, and has no foundation that will stand the test.

Walker, Mo., Dec. 8, 1893.

[The foregoing was sent to G. M. Doolittle, who replies:—Ed.]

In replying to the above, I wish to state, first, that Mr. Mobley exposes his ignorance of the past when he charges that the idea of its taking 20 pounds of honey to produce one pound of comb originated with foundation or extractor men, as an advertising medium to sell comb foundation and extractors. This 20-pound "theory" or "idea," as it is so often called, is no theory or idea at all, but the result of the most carefully conducted experiment by that prince of apiarists, Huber, who conducted these experiments and gave the results of the same, years before either the extractor or comb foundation was thought of. In fact, this matter of the consumption of honey in building comb has been talked of far less since foundation and the extractor came into being than it was before the advent of these. Such a thrust at those who are working for the good of all in giving us improved extractors and foundation is very unkind, to say the least.

It seems strange to me, and has all along in the past, that the idea obtains with many, that, because a man has something to sell, he is unqualified thereby from giving an unprejudiced opinion relative to the merits of any thing he has to sell. If the man who has spent his life-work in producing something to meet a long-felt want is not qualified to tell us of the advantages arising from the same, pray tell us who would be. Are we so selfish ourselves that we look with suspicion upon everybody else? Are we so jealous of some pet scheme of our own that we think no one can give the unvarnished truth about something they have to do with? Because Mrs. Atchley is the largest queen-breeder in the world, does it follow that she can not tell the truth about queens, and how to rear them? Such thoughts come only from a selfishness that can not take in the great brotherhood of man. When it comes to pass that we are not willing to accord to others the sincerity of purpose which we claim for ourselves, we are not doing unto others as we would have them do to us. Brethren, let us be more as we should be, that we may be of the greatest use in the world.

Huber's experiments were, to shut a swarm of bees up long enough so that they would consume what honey they carried in their honey-sacs, when they were fed till they produced a pound of comb; and from several experiments along this line, and then striking an average, it was found to take 20 pounds of honey or sugar syrup to produce one pound of wax or comb. I have never heard a doubt expressed but that these experiments gave the truth in the matter, where bees were confined to the hive; but it has been thought that, where the bees had the

liberty of the fields, that pollen might take the place of honey to quite an extent in producing wax, or that the bees could produce wax by eating pollen in connection with less honey, so that not more than eight or ten pounds of honey would be consumed, when bees had their liberty, in producing one pound of comb. If I am correct, Mr. Elwood places the amount at about 8 pounds under such circumstances, and that comes very near the conclusion I have arrived at, after close observation for years.

The comparison of bees with cattle or hogs can not hold good, in that the latter never use the fatty matter secreted, for any purpose outside of their own persons; while the fatty substance or wax of the bee is secreted only on the outside of the person, and detached therefrom for a separate use from the sustenance of the individual bee. It does not hold true in the least, that wax will be secreted while the bee has all the honey to eat that its appetite requires, as other animals secrete fat under those circumstances; for if it did, wax would be secreted all through the fall months as well as the winter, and no surplus ever provided or kept on hand. That bees know what they are about is proven from the fact that, if the hive is full of comb, and from 20 to 30 pounds of honey in these combs, the bees will not secrete a particle of wax till honey comes in from the fields in the spring; while under the same conditions as to honey, they will at once begin to use on this honey, and secrete wax to supply the place of a comb which the apiarist may chance to take out from the center of the cluster. I have tried this several times, and have always found the bees required hanging in festoons, with abdomens gorged with honey, when in a few days the scales of wax would appear on the under side of the abdomen, and comb-building be in progress.

No, Mr. Mobley, bees do not secrete wax at all times "without regard to consequences" when they have all the honey they need to eat, or that their appetites demand, as do the hog, cow, or sheep; because this wax is of no earthly use to keep them warm, to supply wasting muscle, or for any other purpose whatever, save for manufacturing combs as they require; and when secreted, and the chance of using it as they intended can not be accomplished, it is thrown out of the hive as so much waste or useless material, and no more secreted till it is needed for building new combs, lengthening out cells already too short, or for capping honey. When neither of these is needed, bees do not secrete wax, no matter how much honey they have access to; and when these are needed, and supplied, it always takes an extra amount of feed and hanging in festoons to produce the wax for the needed work, because wax is not kept stored up in the person or on it, as is the case with fat in other animals.

G. M. DOOLITTLE.

Borodino, N. Y.

RAMBLE 107.

BEE-PARALYSIS.

Again I have rambled to the western end of this great San Bernardino County. A good horse with a staying gait, and Bro. Wilder for a driver, made that feature of the journey very pleasant: but a norther, with its accompanying dust to face a portion of the way, was very distasteful, especially when we opened our mouths to speak, and inhaled a handful of fine dust. As we neared Ontario, however, we left the norther behind us. The San Antonio Mountains seem to shield this portion of the valley from its worst features, and the people are not slow to laud the feature to the skies. No wind here, no frost. This is the veritable garden of Eden.

Our first call was upon Mr. P. S. Douse, who has erected a brand-new shop, with all new machinery for the manufacture of various things in wood, and especially bee-hives and supplies. From the number of Dovetailed hives and Hoffman frames piled up, there must be quite a demand for them hereabouts. Mr. Douse is a six footer, or a little more so, and Bro. Wilder and I felt like quite short men beside him. Mr. Douse has had much experience as a bee-keeper; and the experience that has cost him the most is in losing many colonies of bees through the disease known as bee paralysis. This disease seems to be particularly virulent around Ontario; and though Mr. D. had lost quite a number of colonies, some of his neighbors suffered greater losses than he did. A Mr. Nichols had 35 colonies, and lost every one of them. I was referred to Mr. P. W. McFatrige as the man who could give a full history of the matter in Ontario.

A few months ago the (then) editor of the *Apicultural Department of the Rural Californian* reflected severely upon A. I. Root for sending a queen to a man in Ontario, and introducing bee paralysis into California. Mr. McFatrige was the man referred to. We found Mr. McF. in his cosy home among the orange-trees, well up toward North Ontario. Several of the household were picking those large handsome navel oranges, and Mr. McFatrige was superintending the job. Like all good bee-keepers, Mr. McF. was ready to talk bees, and we adjourned to the apiary, which was near the house and among the orange-trees. The hives, however, instead of being placed out in business order, were piled up near the end of the honey-house, presenting a forlorn appearance. The wind does not blow in Ontario; but in the photo it will be noticed that the tall eucalyptus-trees were bending under a slight zephyr, and sighing a sad requiem over the dying apiary.

Mr. McF., referring to his journal, said that, in 1839, he received several queens from Mr. Root; but the one which arrived on the 25th of



BEE PARALYSIS AND ITS EFFECT ON A CALIFORNIA APIARY.

July was the one to which he traced his troubles. It was her progeny that first showed signs of the disease. The disease, however, did not become virulent until 1892. That season the apiary numbered 60 colonies, from which were obtained 9000 lbs. of honey. The apiary was increased to 102. In 1893 the bees died off so rapidly that no honey was produced; and at the present time there are about 20 hives that have bees in them, or, as Mr. McF. says, not enough bees to make 5 good colonies, and still dying. The queens seemed to lay rapidly, and young bees hatch; but about the time they were old enough to fly, the disease would take

The progeny from these queens were all more or less affected with the disease. Mr. Douse has discarded the Italian bee entirely, and substituted the black bee, and claims they are not much affected by the disease.

Mr. McF. believes in the microbe theory, and believes that the drones carry the disease. Males from a diseased queen, mating with queens from colonies heretofore healthy, would communicate the disease. In that way the queen of July 25, 1889, would thus hand the disease down from generation to generation. As Mr. McF. lives only four miles from Claremont the case has been presented to Prof. Cook, and



PACKING-BOXES FOR BEE-HIVES; THE EFFECT CALIFORNIA CLIMATE HAS ON BOARDS.

hold of them, and the mortality was so great that double handfuls of bees could be taken up in front of the hives. The entrances would also become clogged with the rapidly dying bees. The few remaining hives in the apiary gave us a chance to see the results, and nearly all of the bees in front of the hives had the appearance of healthy bees, and only a very few had that shiny look which so often gives warning of the disease. Further inquiry revealed the fact that, after the preliminary stages of the disease had developed in 1890, queens were purchased by Mr. M. and by Mr. Douse, from Doolittle, Trego, Mrs. Atchley, and others.

it is hoped he can give us some light upon the subject. Prof. C. has certainly a good subject to study.

I asked Mr. McF. if he had tried the salt remedy.

"Yes, sir, 'e," said he; "I have tried salt weak and strong; sprayed and dipped almost to the verge of killing the bees with the remedy."

Mr. McF. had practiced migratory bee-keeping with good results in the past, moving the bees from among the fruit-trees to the sage in the foot-hills. In front of his honey-house I noticed three large hives which were explained, and used for rearing early queens. Although

Ontario is in the frostless belt, the nights do get to be quite uncomfortable, and the queen-rearing hives need protection. The hive proper is surrounded with a case made from packing-boxes, and the spaces packed with absorbents. The entrances will be noticed well up on the front of the hive. Under the bottom of the hive proper was a space large enough to put in a five-gallon honey-can through a door in the rear. At night in early spring the can is filled with hot water, and placed under the hive, keeping up the temperature for a whole 24 hours, when another can of hot water is inserted. But what is the use of rearing queens when they are sure to develop bee-paralysis? The disease in this case is worse than foul brood.

Before departing, Mr. McF. treated us to some of those delicious oranges. A tree reserved for his own private use had oranges upon it which had been on the tree for two years, and were sweet and toothsome with age. The orange is a persistent climber, and it is no unusual sight to see the yellow fruit and the blossoms thickly studding the tree. On Euclid Avenue, Ontario, we found the horse-cars still running as of yore. The mules draw the car up, and then are mounted on a little truck behind, and all merrily and swiftly ride down. On the avenue we found Mr. J. V. Caldwell, recently from Illinois. Mr. C. is here with his family to stay; is an enthusiastic bee-keeper, and already has an apiary out a little from Ontario. Though in the "paralysis belt," his bees have not been much affected with the disease, and that the disease will get under control is the wish of the

RAMBLER.

[It will be remembered that, some time ago, there appeared some libelous matter in the *Rural Californian*, to the effect that we were disseminating "bee-paralysis" on the Pacific coast, and that a certain bee-keeper in Ontario, Cal., who had purchased queens of us, and whose name was not given at the time, claimed that his apiary was being rapidly decimated by a disease alleged to have originated from a queen purchased of us. We afterward learned that the editor of the apian department of the *Rural* was evidently giving vent to a little personal spite on account of a difficulty we had with him some years ago. Our attorney was notified to look into the matter; and at the same time our special correspondent, Rambler, was instructed to hunt up the bee-keeper in Ontario, referred to. So far as the matter between ourselves and the publishers of the *Rural Californian* was concerned, the latter pursued a policy that was satisfactory to us, and the legal aspect of the matter was dropped.

The article above is the result of the Rambler's investigation, and we wish to say at the outset that we have every reason to believe that Mr. McFatridge is a straight and honorable man. We find, too, that we did send him a queen from our apiary about the time he specifies; but, as we can show, he is certainly laboring under a great mistake in attributing the source of the disease to that queen. By consulting our records we find that we did *not* have bee-paralysis, or "nameless bee-disease," during 1889. In the second place, we do not find from our records that Mr. McFatridge ever

wrote us regarding the queen. If he did, they do not show it. Of course, if he had had even a suspicion of such a thing he ought to have let us know it. In the third place, we call attention to the fact that bee-paralysis was and had been raging pretty severely during that season in certain parts of California—yes, right in Mr. McFatridge's *own county*, before we sent the queen in question. As an evidence of this we would refer to a single paragraph from an article written by W. A. Webster, p. 583, GLEANINGS for July, 1889:

You will doubtless remember my letter of last winter, about the new bee-disease. If you are not too much pestered by ignoramuses, and entirely out of patience, I will try to show that my trouble was not due to a local cause, but *was the forerunner of what threatens to seriously cripple the bee-keepers of the State*. With the opening of spring I find my entire stock of 170 stands "gone where the woodbine twineeth," and the monster making serious inroads among my collaborators. From what little I am able to gather, I believe the same thing is at work in *Inyo, Ventura, and San Bernardino Counties*. Developments are a little different now, as to symptoms, from my previous description; viz., of mature bees, abdomen distended and hard; trembling, listlessness, death; brood baldheaded; many dead, two-thirds or fully developed sticking in the cell; queen a failure, and moth completes the work of destruction. So far as I am able to learn, there has not been over two per cent of natural swarming through apiaries in this county. We have arrived at the goal for which our eastern brethren sigh—non-swarming; but, like the man whose cow had learned to live without eating, death closes the scene.

The italics in the above are our own, and we would call attention to the fact that Ontario is in San Bernardino Co. The letter that Mr. Webster refers to was published on page 165, Mar. 1, same year; and in that article he began to notice the presence of the disease the previous September, 1888, and reports he had a loss of 50 or more colonies as the result of this disease.

Now, then, having shown conclusively that the disease was raging on the coast, and was threatening "to seriously cripple the bee-keepers of the State," before we sent the queen from which Mr. McFatridge alleges the disease originated, and having shown, too, that there was no bee-paralysis present in our home apiary, nor in any of them, in fact, during that year, 1889, it would seem altogether improbable that the disease could have come from the queen sent to friend McFatridge in July of that year. Another thing, notice that he says the disease appeared in colonies having queens purchased from Doolittle, Trego, Mrs. Atchley, and others; and that the progeny from all of these queens were more or less affected by the disease. Now, we do not believe for a moment that any of those breeders sent that disease with the queens. The disease was *already prevalent*, as the extract above clearly shows, and simply made itself manifest in colonies having queens shipped from the East.

We were interested in those drygoods-box hives shown in one of the half-tones. This picture shows better than any thing else the effect of the California climate on joints or corners merely nailed together. Doesn't it show the need of dovetailed or lock-corner joints?—ED.]

CALIFORNIA ECHOES.

By Rambler.

Why are Dr. Miller's Straws like the busy bee among the flowers? Because it is a harvest of small things.

The report of the Vermont State Association says the membership reported a yield of 59,413

lbs., comb and extracted honey, which was considered about half of the product of the State, or, say, a total of 60 tons. It is a little curious to note, that Mr. Richardson, of Ventura County, this State, produced 64 tons, or more than the whole State of Vermont.

I hear of quite a number of bee-keepers who cut out pollen-laden combs, and let the bees build new combs. I don't believe the plan pays. Admit there is much pollen, I have never seen combs so full of pollen in the fall but would use it in the spring for brood-rearing, and that, too, here in California. Cutters and slashers, haven't you got a whim in your heads?

A Stray Straw gives us a point on larvæ in honey, and I fear there is much of it in honey in California. Many honey-producers are very careless in their methods of extracting, and much larvæ is thrown out with the honey; and where so many larvæ and so much larval food are mixed with the honey it certainly has an effect upon the flavor. The queen-excluding honey-board is a sovereign remedy for the evil.

Wonder if Somnambulist ever has the nightmare. If so, he can sympathize with the Stinger. I have slept in the same hotel with the latter, and I know that he has the doubled and twisted kind. Oh, no! Stinger's best girl has not gone back on him. The Rambler used to run a sawmill; it would run very slow or stop altogether when the pond ran dry. Wonder if that is what's the matter with the Stinger.

Mrs. Atchley, says, in *A. B. J.*, that it is hard to introduce drones to a colony having a laying queen. Quinby taught that the drones of an apiary were rather promiscuous in choosing their habitation: that they would be tolerated in any hive during the swarming season. I have an idea that Quinby was right. But I will not contradict a woman; no, sir, 'e; there's trouble enough around the Rambler's shanty now.

I will continue to use propolized burlaps for fuel for smokers, seeing that no less an authority than J. E. Crane, of Vermont, advocates it. Bee keepers in this State have told me that propolized fuel of any kind would set bees to robbing. I have seen no such effects. Burlaps are good fuel for smokers here. Straw, *a la* McIntyre, does very well, but soon clogs the smoker. This is not a rotten-wooded country, therefore give us the next best thing—burlaps.

Yellow flowers carpet the ground through March, and the head beauty of them all is the poppy, the State flower. Mrs. Kellogg describes it thus: "Think of finest gold, of clearest lemon, of deepest orange on silky texture, just bedewed with frostlike sheen, a silvery film; multiply this by acres of waving color, and you have a faint impression of what an *eschscholtzia* is." The modest *alfilaree*, barely peeping from the ground, spreads a purple carpet; the little blossom less than a half-inch in

diameter gives up its nectar early in the morning, and bees work on it all through March.

That is splendid advice given to would-be emigrants, by Mrs. Atchley, and emphasized by Editor York on page 295, *A. B. J.* If we do live in the far West, Mrs. A. and I, and ramble around some, we do not have apiaries all cut and dried for you to sit down on where you can make untold wealth. We have had to write to quite a number that we are not in the locating business. Messieurs Emigrants, please paste the following in your hat, and look at it often:

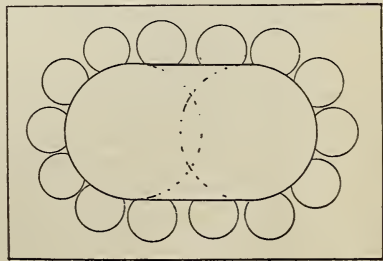
While on this subject, let us say that we think that no one should rush off to a strange part of the country, intending to locate permanently, without first having thoroughly and personally investigated the advantages and disadvantages of the new place. We believe in people trying to better themselves if possible, but we also feel that every right-minded person will agree with us in urging deliberation upon those who expect to make a permanent move.

PLURALITY OF QUEENS IN A HIVE AT A TIME.

SENDING QUEENS TO AUSTRALIA A FAILURE;
A WASHING RECIPE FOR DR. MILLER.

Two or more queens in one hive seems to have had a good deal of attention recently. Last summer I caught six black queens and put all in a small box together. They fought some, but none were hurt, and I dumped the whole lot into a queenless three-frame nucleus, and next day I found five—four apparently all right, and one pretty well "polished off" (no wings left); but the bees were not offering to molest her. I saw three of the sound ones in the act of laying. Next day one of them disappeared, and then for a week there were three good queens and a crippled one, all in a three-frame hive, and there was no honey coming in at the time. I removed all of the queens at the end of a week, and did not experiment further.

I sent 9 queens to Australia, Sept. 14, 1893; and of eight reported so far, only two live *bees* in the lot are able to fly, and the other nearly dead.



Now, friend Root, are you not a "little off" (p. 941) about a dose of sea-water? I never saw an ocean steamer, but I doubt very much whether the mail would be allowed to get wet. The cage I used was like this: I took a $\frac{1}{8}$ -inch board about $5\frac{1}{2} \times 7\frac{1}{2}$ and bored two $1\frac{1}{4}$ -inch

holes near the center; then I bored fourteen $1\frac{1}{4}$ -inch holes around the outside for the bees, and put the candy into the center holes. I shall not take any new orders for Australia, as it does not pay. I have shipped to England successfully, but never to Australia.

Now, Dr. Miller, I can beat your washing-recipe all to pieces (p. 842). Soak the clothes half an hour in soft water, and rub soap on the dirty spots; then boil 20 minutes in the following preparation: Enough water to cover clothes; $\frac{1}{4}$ bar soap; 2 tablespoonfuls of "wash-o-lene." Do not put clothes in till the soap is dissolved; stir occasionally, rinse thoroughly; blue, and hang out. This will not injure any kind of clothing; but, of course, you must not *boil* those that are likely to fade. Try it, Rambler, and I will bet a last year's drone that you do not get any kerosene into your flapjacks.

Give us the footnotes. They are as essential as the salt in our food—"little, but all there." I always want to know what the Roots think of other people's views.

I use tin-can transplanting-tubes (see p. 67). I melt both ends off; and when I go to take up a plant I lay a small block on top of the can and work it down with a rocking motion, much as you sink the tile-spade. If one end gets bent, use the other; when both ends are too crooked for further use, get new ones.

I shall move 600 strawberry-plants a mile in the spring, and will go with a wagon and 600 cans, and get all at one trip. S. F. TREGO.
Swedona, Ill., Feb. 5.

[We don't like your export queen-cage "a little bit." With the large-sized Benton we have delivered at times nearly all the queens alive; but during the past season it was the exception when we succeeded in getting queens through alive. If it wasn't the sea-water it was some peculiarity of the climate at the time the queens were sent last season.—ED.]

CALIFORNIA HONEY-YIELDS PAINTED IN TOO ROSY COLORS.

A FEW FACTS ON THE "OTHER SIDE;" A VERY READABLE ARTICLE.

By *W. G. Hewes.*

On page 100, F. L. S., of Minnesota, wants to know what is the net profit per hive of bees in California; and the editor answers very correctly that a "fair colony under good management in a fair season ought to yield 75 or 100 lbs. of extracted honey," and then calls upon Rambler to help him out. On page 222 Rambler answers; and his statement, 150 lbs. as the average yield per colony, is so excessive an overestimate that I feel called upon to correct it. Rambler's neighbors may have been playing him for a tenderfoot by feeding him on yarns; or he may have reached these conclusions from a discussion on this subject which took place at a recent meeting of the State Bee-keepers' Asso-

ciation (see GLEANINGS pages 146 and 176). From another source I learn that Messrs. Corey and Wilkin are among those to whom these statements of large averages are attributed. I believe these gentlemen were misunderstood, for I know they would not knowingly make inaccurate statements. From Rambler's report (page 146) one would infer that there are seasons when the general average throughout the country is 400 lbs.

Some one, page 176, has led Prof. Cook to believe "that from 300 to 500 lbs. of honey were often secured from each colony in the apiary." In my ten years' experience as a bee-keeper in California I know of but one instance where an apiary of one hundred colonies or over has made an average of 400 lbs. of honey; and I believe all such cases throughout California, from the beginning of time up to March 25, 1894, can be counted on the fingers of one hand.

Mr. Wilkin and Mr. McIntyre are accounted as among the best bee-keepers in the State, and the location of their famous Sespe apiary is better than the average. In GLEANINGS for 1891, page 774, and page 173 for 1893, is to be found a report giving the averages of the Sespe apiary for sixteen years. According to that report, the average for that apiary was 73 lbs., or less than half of Rambler's estimate.

The best yield of any one year was 275 lbs. per hive. Only four years in the sixteen did the average exceed 100 lbs., and three seasons no honey at all was secured, and half of the bees starved.

My own average for ten years has been only about 50 lbs.; yet in only one year was my yield surpassed by the generality of my neighbors. There is something of a rivalry among bee-keepers as to who shall average the most honey to the hive. Some get big averages by bare-faced lying, calling a four-ton crop fourteen, etc. Others, with a little more conscience, arrive at similar results by a process of reasoning something like the following:

He has, let us say, 100 hives, and cans up 5000 lbs. of honey. He loses a few swarms, he doesn't know how many, but estimates them at 50, and that each one would have given a surplus of 100 lbs. of honey. He lets his tank run over, spills about a gallon, but it looks like a ton. He calls it so. He's delayed in extracting for a few days from not having cans or tanks into which to put his honey, and promptly persuades himself that he has lost two extractings, which he estimates at 40 lbs. per hive for each extracting, or 8000 lbs. By this reasoning process a 5000-lb. crop and a 50-lb. average are changed into a 20,000-lb. crop and a 200-lb. average; and when his neighbor hails him with "Hello, Spooendyke, how much honey did you get?" he promptly answers, "Ten tons."

C. W. Dayton seems to have sized up the weakness of the fraternity better than Prof. Cook or Rambler; for, when he speaks of aver-

ages of 300 and 400 lbs. per colony he qualifies it with "even if this is true" (see page 137). Messrs. Wilkins and Corey are both old-timers; and if they have kept exact records it will be of interest if they will have them published.

The season of 1893 was an exceptionally good one. If all the California readers of GLEANINGS will send to Mr. Root a correct statement of their averages for last year we can at any rate have some definite idea of what a good season is.

My record is, of hives in spring, 187; honey extracted, 28,431 lbs. Average per colony, 152 lbs., the same as that which Rambler states is the average one year with another. Why, if we could get 150 lbs. per colony each year we should be on the high road to wealth; but now as the fact is, most of us are so impoverished that we live in shanties which the tax-collector scorns to place a valuation upon.

It is my belief, that, taking the bee-keepers as they come, from the mountains and from the valleys, from the fog districts and from the rainless districts, the lazy bee-keepers and the energetic bee-keepers, that the average of the whole, one year with another, will not be found to exceed 35 lbs.

But few bee-keepers have kept exact records of their yields; and, if called upon for an off-hand estimate of their averages, even if perfectly truthful men, they are apt to remember the good years, forget the bad ones, and jump at conclusions; and if one goes hunting for big yields he can get them as big as he wants, for the sage-brush is as full of prevaricators as it is of ticks.

Newhall, Cal., Mar. 27.

[Now, Rambler, we will hear from you. Let's have the facts and figures for a series of years by all means from a large number of California bee-keepers, and we will save them up till we get enough to make a symposium. Regarding our estimate, we have to say that it was made after looking over a number of average reports from that State of gold and honey.—Ed.]

SPECIES AND RACES OF BEES.

By *Rev. L. J. Templin.*

The question of the unity or the multiplicity of the species of the common honey-bee is one of both scientific and practical interest. Judging from the current literature on the subject, there seems to be considerable confusion in the minds of many writers on the subject; and especially is this true in regard to the Italian (or Ligurian) bee. By some this is spoken of as a race, by others as a species, and, at times, I believe, both by the same writer. No dogmatism can settle the question. Only a careful study of the relations existing among the various groups of organic beings will lead us to an intelligent conclusion. Even the most careless

observer has noticed that the various organic objects, both vegetable and animal, with which he is surrounded, are arranged in groups, the members of which resemble each other much more closely than they do the members of other groups. It is on these resemblances and differences that the general classification of organic beings is based. At the basis (or foundation) of this classification we find the two great kingdoms, animal and vegetable, embracing all organic beings, whether great or small, simple or complex. These kingdoms are divided into sub-kingdoms; these into divisions, and these into classes, and these into orders, families, genera, and species. These groups gradually narrow down the objects embraced in them till, in the smaller groups, there comes to exist an actual likeness in most essential characteristics. But all these groups, except species, are artificial divisions, arranged simply for the convenience of comparison and study. It is not pretended that there is any relationship or affinity among the different members of these great groups—only a very general or remote resemblance in some features or characteristics by virtue of which they may be loosely thrown together into a group. But with species the case is different. Here we have both a resemblance and a relationship. Cuvier, the father of comparative anatomy, defines species as follows: "A species includes the individuals which descended from one another, or from common parents." Linnæus considered species as including "all those individuals propagated from one stock, and having in common certain distinguishing characteristics which will never vary, and which have remained the same since the creation of such species." Quatrefages, author of "The Human Species," gives the following formula: "Species is a collection of individuals more or less resembling each other, which may be regarded as having descended from a single primitive pair by an uninterrupted and natural succession of families." From these definitions of the term by the masters of classification, it is seen that species comprehends the compound idea of both filiation and resemblance. But specific identity is not predicated on every resemblance, because there may be general resemblances between members of different genera, or even different orders or families. Nor do we exclude from specific relationship for every difference, for we find a constant tendency in all organic beings to vary. No two objects, however close their affinity, are exactly alike in every particular. When the divergence from the specific type is marked, a variety is formed. Inasmuch as every individual may vary from every other individual of the species, the number of varieties that may be formed is practically unlimited. Any one who has studied the lists of varieties of cultivated roses and chrysanthemums among florists, and of fruits, both standard and small

fruits, must have been impressed with the great variability of members of the same species. The same is true in the animal kingdom, as may be seen in any herd of so-called native cattle, or in a flock of barnyard fowls, where no care has been given to breeding to any particular type. Yet the variation is always within specific limits. It is not within the experience of men that these variations ever carry the variety across the boundary that separates different species, except in the case of monstrosities. In the vegetable kingdom, nurserymen and florists preserve and propagate useful variations by grafting, budding, cuttings, etc. In the animal kingdom this can be done only by selection and weeding out the undesirable individuals.

While there is a tendency in species to produce varieties, there is also a tendency in varieties to reproduce their varietal characteristics. When this tendency is established, and becomes hereditary, a race is formed. As every variety may become thus established and hereditary, there may be as many races or breeds in a species as there are varieties. One has to give but little attention to the breeding of our domestic animals to be impressed with the vast number of races belonging to each species. The horse, the ox, the sheep, the pig, the dog, the hen, etc., have each split up into numerous races.

At a bench show in England, some years ago, at which very rigid rules were enforced for excluding all but pure representatives of different breeds, seventy distinct races were exhibited. Mr. Darwin mentions 150 races of pigeons with which he was acquainted, and yet he was not acquainted with all the races then in existence. So great was the difference in these races, that, had each breed been considered a species, it would have required at least four genera to have contained them. And yet Mr. Darwin, who was so desirous of proving the transmutation of species, did not dare claim that, in all these distinct races, there was a single new species. The fact that impresses our minds at this time is, that all our domesticated animals have varied greatly under domestication, forming many very distinct races without, in any case, overstepping the limits of the species. Now, the honey-bee has been under domestication probably as long as some of the species named above—certainly from great antiquity. It has been bred in a great diversity of climates and conditions, and in a great variety of ways; and though it has not, until recently, been bred with the care that our common domestic animals have, still it seems reasonable to suppose that, under such a diversity of conditions and treatment, there would be considerable variation in racial characteristics.

As a matter of fact, we find quite a number of very distinct groups of the honey-bee. Are they distinct species, or are they simply

races? For the further consideration of this question I must wait till a future time.

Canon City, Col.

SUGGESTIONS TO EXPERIMENTERS

ON THE SUBJECT OF FRUIT FERTILIZATION.

By *Thaddeus Smith.*

The time for sunshine and flowers is fast approaching, and some of the friends will soon be thinking of making experiments in regard to the connection of bees with the fertilization of the bloom of fruit-bearing trees and plants, and I wish to make some suggestions.

Mr. Gilliland's article on the "Elements of Uncertainty" in making such experiments should show us the necessity of being very careful; and yet Mr. G. winds up his article by suggesting "covering a whole tree with cheese-cloth." The use of cheese-cloth or mosquito-netting will never "eliminate the elements of uncertainty." Such a covering places the plants in an abnormal condition, and prevents the pollen from other plants reaching them in the natural way by catching it in the lint and fuzz upon the threads forming the meshes of the cloth, straining and excluding most of the floating pollen in the air from the plants.

In order to keep the bees from the flowers, and at the same time permit the pollen floating in the air to have access to them, I suggest the use of wire-cloth netting for covering. The meshes of the wire cloth should be quite open—say not less than an eighth of an inch—just small enough to exclude the bees, and no more. Experiments carefully conducted under such covering ought to have some weight in deciding this question. Plants, under the abnormal condition of being in a greenhouse, or covered with cheese-cloth, would naturally be expected to fail in perfect fertilization in the natural way, and require the assistance of bees or man; but it is no evidence that such assistance is needed when in their natural condition.

In reading Mr. Doolittle's theory—that plants furnishing nectar require bees to fertilize them, while flowers that do not contain sweets do not require the assistance of the bees—I thought of some seeming exceptions; as, the honey placed so deep in the red clover, in the columbine, and other flowers that the hive-bee can not get at, and consequently do not visit them; and how often, when a boy, I have plucked these flowers and sucked the drop of honey contained low down in the end of the petals! And the corn-plant—how different in its manner of fructification from other plants? The "tassel" is the male flower containing the stamens with their pollen, which the bees often visit for both pollen and honey; and the "silk" is the female flower—the pistils—which the bees never visit. I here call attention to this, not for the purpose of continuing the discussion, but to note

that beautiful and wonderful provision of Nature for fertilizing such a common and useful grain as corn. Each individual silk-like strand of the female flower is connected with each and every embryo grain of corn, and some of the subtle dust-pollen from the tassel must fall upon and enter into each and every thread-like strand of the "silk," and be conveyed in some occult way through the whole length of this silk, which is sometimes several inches or a foot long, to where the grain of corn is to be formed, in order to fertilize and make a perfect ear of corn. It is as mysterious as that other wonderful provision of Nature that enables a queen-bee to lay thousands of fertile eggs with only one meeting with the drone.

Pelee Island, Ont.



TRANSFERRING BEES, A LA HEDDON.

Question.—I have some colonies of bees I wish to transfer about the first of May, or during fruit-bloom, which comes about that time. Would it not be well to drum out one colony, having straightest combs and most brood, and give each of the other colonies transferred one frame of this brood after fitting it into frames, to help them, and put into the super of their new hive the honey they may have, to help them, as they will have no brood?

Answer.—By the tone of the question I should judge that what is known as the Heddon plan of transferring is to be used; that is, the bees are to be driven from their hives and hived in new hives, the frames of which are filled with foundation. If I am correct, Mr. Heddon never advised this plan of transferring, where the same was to be done in early spring, or before the hives were filled with bees and brood. With me, the time of fruit-bloom is just the time the bees are beginning to rush things by way of brood and a general preparation for the main honey-harvest; and if we transfer by the Heddon plan at this time we make a break in the plans of the bees at a time when we wish every egg possible, laid by the queen; and, if I am any judge of such matters, transferring at this time, and in this manner, may make all the difference with us between a good crop of honey and no surplus at all. Five hundred dollars would not tempt me to allow any man to transfer 100 colonies of bees for me in such a way in fruit-bloom, as I should then calculate that I should lose that much by so doing, in an average season. Our correspondent shows that he knows something of the worth of brood at this time of the year, in that he proposes to give each colony after the first a frame of the same. If one frame of brood is a good thing,

five frames would be five times as good; and the old plan of transferring is the only one I would use when transferring in fruit-bloom, and the one I prefer at all times, unless the colony to be transferred has such crooked combs that it makes great labor in fitting them into the frames. I have always failed to understand the logic that clamors for the melting up of good straight worker combs for the sake of making the wax coming from them into foundation, fitting it into frames, and obliging the bees to draw it out, and add more wax to it in the process, that we might have only good worker combs again. If any wish to go through with this process, of course I have no objections; but I have often noticed that the very men who recommend such a waste of time to themselves and the bees as this are the very ones who cry out about the foolishness of beginners when spending a little more time than seems good to them in the pleasure and profit which comes from the manipulation of bees. Fruit-bloom is a good time to transfer bees by the old way; in fact, transferring at that time, where their own combs are fitted into frames, seems to give them renewed vigor, so that they make better colonies for gathering surplus honey than they would have done if left undisturbed.

SPACING FRAMES.

Question.—I think of spacing my brood-frames $1\frac{5}{8}$ inches apart. At present they are $1\frac{3}{4}$. My apiary consists of about 100 colonies. What do you think of the venture?

Answer.—Well, to be candid, it is a venture that I should not want to go into. If I thought I could see some gain in such close spacing, I would try it on, say, ten of the 100 colonies for a year or two; and then if it pleased me I would fix the other 90 in the same way. Here is something that so many lose sight of, and rush headlong into any project which seems good to them, using the whole apiary to experiment with, when they could try the experiment just as well with half a dozen colonies; and if the pet project proved a failure, as is apt to be the case four times out of five, but little loss would be the result; while such an experiment, carrying the whole apiary with it, often results in a loss hard to be borne. I really wish some one competent would tell us, in a logical way, what there is to be gained, in a real practical dollar-and-cent way, by this close spacing of frames, which seems to be a craze just now. I have carefully experimented for several years to find out whether I was wrong in using $1\frac{1}{2}$ inches from center to center of frames, that being the average, as I measure it, of combs built by the bees when they have their own way, and so far see no practical reason for changing to either a greater or less distance. If there could be artificial heat used, so that the hive could be kept warm enough for brood-rearing in any part of it during the spring months, then the

case would be different from what it is where it is necessary for the bees to create the heat sufficient for brood-rearing inside of the *cluster of bees*, and not inside of the hive. To thus create and preserve heat inside of the cluster, the bees must have more space than for a single tier of bees between each range of combs. In my experiments I have found that far more brood will be brought to perfection, during the cool days of April and May, with $1\frac{1}{4}$ spacing, than there will with $1\frac{1}{2}$ spacing; but when we come to July weather, then the most brood will be produced with $1\frac{1}{4}$ spacing. But all know that, as a rule, one square inch of brood in May is worth ten square inches in July; and as we do not wish to be continually spacing our frames, we can not well adopt $1\frac{1}{4}$ for May and $1\frac{1}{2}$ for July, so I strike the happy medium of $1\frac{3}{8}$ inches, and use the same the *whole* year through.

CONTRACTION FOR SWARMS.

Question.—At the Chicago International Convention some favored having new swarms on four or five L. frames to obtain the most surplus comb honey, according to the report of that convention. In so doing, is it necessary to fill the empty part of the brood-chamber, where comb foundation is used in these five frames, to prevent the bees building comb therein? Also, is it necessary to use a queen-excluder over such colonies?

Answer.—It will be necessary to shut the bees out of the vacant part of the hive while it is thus contracted to four or five combs, otherwise the bees will build comb in this vacant space in preference to going into the sections and working there, for it is more natural for bees to fill up the apartment where the queen resides, rather than to go into separate apartments, away from her. In fact, bees will store more surplus honey in an apartment with the queen, if that is large enough to accommodate them, than they will in any other way; and the object of contraction is for the purpose of compelling the bees to enter the many surplus apartments made by the different sections. The best thing I know of to fill up this vacant space at the sides of the four or five frames given is what are termed "dummies." After you are satisfied regarding the number of frames you will use, then make dummies out of thin lumber, so that one on each side of the frames used will exactly fill up the room. This is easier than to use a number of division-boards, although the latter will answer the purpose, but will require more labor in handling. You will also need to use a queen-excluder, for in a contracted hive the queen is quite liable to go up into the sections and deposit eggs, which the bees will nurse into brood; and brood in sections is one of the most provoking things that ever confronts a bee-keeper.

[We have recommended the Heddon short way of transferring considerably of late; but we

were not aware that we or any one had advised that good combs should be destroyed; but the combs in box hives, and in frames from farmer bee-keepers, have been so crooked, as a rule, that it has seemed cheaper not to fuss with them, saving only those that were good and true. In advising this short method we have generally recommended its application *after* the honey-harvest, because at that time it will cause the least disturbance. When the old way is to be followed we recommend fruit-bloom time.

Regarding spacing, we have never recommended the $1\frac{1}{4}$ inch, because that seemed too close; but we have invited free discussion for the purpose of getting more light. The $1\frac{3}{8}$ -inch distance is what we recommend; first, because we secure better combs, just as much worker brood, less drone brood, and because the majority of bee-keepers are using it. Another fact to be observed is, that many have changed from $1\frac{1}{2}$ to $1\frac{3}{8}$ inch; but we do not recall any one who has changed from $1\frac{3}{8}$ to $1\frac{1}{2}$ inch. When we had $1\frac{1}{2}$ -inch spacing in our apiary we were always bothered with combs bulged at the top during the honey-harvest. By the $1\frac{3}{8}$ spacing, and fixed distances, we have combs that are like boards over the entire surface.—Ed.]



A correspondent from the far North wants me to give in GLEANINGS my preference as to separators, tin or wood, also for 1 or 4 piece sections, with reasons therefor.

If you nail on a wood separator, when the wood shrinks and swells, the nails holding it to place, it must curl; whereas if it lies loose in place, simply held there by being squeezed, then it can come and go and still lie perfectly flat. So I never would nail on a wood separator, but let it be loose. A tin separator will not curl sidewise, like the wood, no matter whether it is nailed or loose. But it is inclined to shrink endwise, if I may use such an expression—that is, it will assume a wavy form; and to prevent this a tin separator must be stretched taut, and nailed. So I would say, if a loose separator is to be used, let it be of wood; if a nailed separator is to be used, let it be tin.

I prefer a one-piece section because cheaper, and because the bees will put less glue on the bent corners.

C. C. MILLER.

Marengo, Ill.

HOW TO SETTLE THE GLUCOSE PROBLEM.

Would you please tell us for what purpose glucose is manufactured? Has it any real legitimate use? If it is, as I understand it, used only to adulterate molasses, syrups, honey, and the like, why is its manufacture permitted by the government? If it would be unconstitutional to stop its manufacture, would it not be possible for the combined efforts of the beekeepers and their friends to succeed in having

a revenue tax placed on the manufactured article. This would increase the price to the extent that it could not be used profitably for the purpose of adulterating. In detrimental effects it certainly ranks next to distilled liquors and tobacco, and has, I believe, no more redeeming qualities than either of these, and should be as much subject to taxation. This would be a good scheme for the honey-producer, and a jolly scheme too. What think you?

Franklin, Pa.

ED. JOLLEY.

[Yes; as we have intimated recently, the shortest way around this glucose problem is to suppress its sale or manufacture, if it is never used for any honest purpose.—Ed.]

OUR GLUCOSE POLICY INDORSED.

I want to give you a word of encouragement in regard to your course in the glucose-honey business. Rest assured you have the hearty support of all honest bee-men the country over. Let your motto be, "Let no guilty one escape." While it is sad to think that any one with influence and position should be found with even the "appearance of evil," it is encouraging to know of the healthy sentiment of bee-men in general on the question.

C. A. HATCH.

Ithaca, Wis., Apr. 9.

ARTIFICIAL QUEEN CELLS; A NOVEL IDEA.

I have raised some hundreds of queens this season by Fooshe's drone-cell plan; but occasionally suitable drone comb was not available, in which case I would procure a sheet of thick worker foundation and cut it into strips about $\frac{3}{4}$ in. wide. I would attach these, three or four sheets, to a bar, and at every third cell punch a hole about $\frac{3}{8}$ in. deep, with the end of a stout pen holder or other conical stick. These would then be manipulated exactly the same as Doolittle cups, and accepted just as readily by the bees. There is no fussing with melted wax with this plan, and fine strong cells result, which are very easily detached from the stick. A large number of cells can be prepared in a short time.

H. L. JONES.

Goodna, Queensland, Aus., Feb. 16.

[We were interested, not so much in the artificial cells as in the fact that you made drone comb *a la* Fooshe a success. We knew Mr. Fooshe made it work, but till now we had seen no reports of any one else doing so. How is it, queen-breeders?—Ed.]

CANDY FOR SHIPPING QUEENS; HOW THE ATCHLEYS MAKE IT.

I see on page 57 a caution offered by T. J. Dugdale. After reading his caution regarding the kind of sugar, etc., I see the editor calls for me as a witness. It is the XXXX, or confectioners' sugar, that I use altogether for mailing queens. Almost any kind of sugar will do for a short distance, say when queens are not in transit more than 48 hours; but for long distances *nothing* equals the finest grade of confectioners' sugar; and when the candy is properly made it will keep soft and in good

shape as long as there is any of it left, or for a long time at least. I had one customer write me one year after he had received the queen, and the candy was still soft and in good order. Candy should be made so that it will appear tough, or, when you pull it, it will hold together somewhat like wax; then it seems to hold moisture. It should be thoroughly kneaded, and the sugar ought to be damp, or the candy should be made in damp weather, as the sugar gets so dry and hard in dry weather that it is very hard to get the honey and sugar thoroughly mixed; but if the sugar is steamed a little, or made in damp weather, the honey and sugar will congeal; otherwise it is very hard to get good candy, as the hard dry sugar will not dissolve as it should. This is why I say it is hard to get *real good* candy every time. It is no trouble to get candy that will be good to ship queens to any part of the United States or Canada; but when they are to be 30 to 40 days in transit, and going through different climates, it means something to get a candy that will keep good. I gently boil and skim, or use honey from the solar wax-extractor, as this honey is not so apt to candy.

Beeville, Tex.

JENNIE ATCHLEY.

[Yes, indeed, it is hard to get *real good* every time.—Ed.]

YELLOW JASMINE, POISONOUS.

I note what was said in your paper lately about yellow-jasmine honey being poisonous. I am well satisfied that new jasmine honey is poisonous, not only to human beings, but also to bees. I base my conclusions as to bees being poisoned by it from ten years' experience here in Florida. Every year during jasmine blossoming, our young bees are found crawling out of the hive and dying about the entrance. We never see them doing so at any other time of the year. It is a common opinion here that jasmine honey should not be used till it is sealed over; and I am inclined to the opinion that it is better not to use it till capped.

Lake Helen, Fla.

GEO. W. WEBSTER.

THE ITALIAN BEE.

Many men of many minds,
Many bees of many kinds;
Some are bad, some are worse,
Some a blessing, some a curse;
Some will work without excuse,
While some are of no special use.
But very rarely do we find
All virtues in one bee combined.
Such is the case, though, with the breed
That now is taking fast the lead;
For th' Italian bee no rival knows
In any breed that nature shows.
To give a special virtue to a bee
Is what some do, as you see.
Th' *Italian* is itself possessed
Of *all* the merits of the best.

Columbus, Wis.

SUPER LIFTER.

WHISKY AND STINGS.

I have been among bees little or much from a boy; have been stung most severely many times, without feeling much ill effect but once. Some 15 or 16 years ago I was stung by a single bee on the back of my head, just under my hat, and in a few minutes I was swollen from head to foot, with great blotches on the veins of my arms and legs. It was a warm day, but I had to go to bed and cover up to keep warm. I was losing strength fast—extremities getting cold and numb; after trying all and every thing we could think of, with no benefit, I thought to try whisky. I drank nearly a teacupful, and in half an hour I was all well again, and felt no ill effects whatever.

S. SMED.

Walterville, Oregon.

[Whisky should never be used except as a last resort.—Ed.]

I was very much interested in an article on page 713, 1893. The article is entitled, "Serious Results of a Single Bee-sting." I have often been seriously ill from the effects of a single sting. I have had spasms once; and only a year ago last winter I was stung and obliged to go half a mile to obtain medicine. While taking it I became unconscious, and remained so for some little time, and did not recover wholly for nearly two weeks. Although I am a Prohibitionist, my remedy is a strong dose of whisky or some other strong liquor. It has saved my life a good many times. A sting seldom affects me seriously unless it is inflicted on a vein, and I never take the liquor unless I feel the poison working toward my heart; then I take one poison to kill the other. I am intending to give up bee-keeping, as I feel that the risk I am running is too great.

A. M. WARD.

Newhall, Cal.

DOVETAILED CHAFF HIVE; 8-FRAME HIVE.

In the fall of 1893 I went into winter quarters with seven colonies. Two of these were in Dovetailed chaff hives covered only with the regular hive-cover, and left on the summer stands. During the winter the snow blew in and clogged one of the entrances, and the bees died. The other I managed to keep open, and it fared well. I think that the Dovetailed chaff hive is a good wintering hive if the frames are covered with a cushion, and the telescopic cover used.

The other colonies were in single-walled Dovetailed 8-frame hive. I packed them in a large box, and used dry leaves for packing, which always kept very nice and dry. I had three openings to the north and two to the south, and find the south side the best. These colonies all winter-d well. I am of the opinion that nice dry leaves are as good and cheap a packing as any one would wish to use.

The honey-flow was very poor in this locality the past summer. My 7 colonies I increased to 11, and got only 75 lbs. surplus honey, and all

colonies gathered enough for the winter. Most of my neighbors who keep a few stands of bees did not get a pound of surplus honey. There was no yield from white clover, as most of it had been winter-killed; but there is a good stand of young clover for next summer.

As to hives, I will say that the Dovetailed 8-frame hive is the best hive here, and I think 8 frames are just about right. Lastspring I had to take a frame or two out of several of my hives. These were completely filled with nice sealed honey. These I replaced with frames of foundation, in order to give more room for brood-rearing. I did this about the time of fruit-bloom.

The new Hoffman frames with V edge are good, and I found no trouble in handling them. The bees build a few brace-combs, but not many; and as to the bottom-bar, I find no difference between the narrow and wide. So you see I should not like to see the frames materially changed unless they could be improved.

Roselle, Iowa, Dec. 14. I. W. HOFFMAN.

AGREES WITH DR. MILLER ON THE T-SUPER QUESTION; IN HEAVY SEASONS THE THICK TOP NOT PROOF AGAINST BRACE-COMBS.

I prefer the T super, and can honestly corroborate the statement made by Dr. Miller, page 190. My frames have square top-bars, $\frac{5}{8}$ by $1\frac{1}{2}$ in., and made on the same plan as your new frames; end-bars $1\frac{1}{8}$ in. scant, but I find they are not proof against burr and brace combs. When the honey comes in rapidly the bees will build them fast to the super, and in Dovetailed hives too; but when the honey is gathered slowly they are a success. I find them superior to the old narrow top frames, though, because the narrow space between the super and hive does not permit the storing of much honey. About the only inconvenience I experience is the scraping of the bottom of the sections. By using bee-escapes the bees never fail to clear up the honey on the bottom of the super before leaving it. I can not see any advantage, though, in favor of the $\frac{5}{8}$ -inch-deep top-bar over the way you made it. They are all proof against brace-combs in ordinary seasons. Last year was an excellent season, however, my best colony storing 75 lbs. of comb honey.

J. L. MULFORD.

Lebanon, O., March 29.

[We do not know that we ever had a report before, showing that the thick top-bars, when $1\frac{1}{8}$ inches wide, and spaced $1\frac{1}{8}$ in., were not proof against burr and brace combs; but we have had plenty of the other kind. In Mr. M.'s case we should say that there was something the matter with the bee-space above the frames.—Ed.]

I would rather lose all my bees in wintering than have foul brood among them.

Grantsville, Md. J. E. HERSHBERGER.

[Yes, so would we.—Ed.]



and were devoted principally to scientific research; and, although not pretending to be a scientist, he was pretty well up in all that pertained to it, especially regarding germ-life.

WE wish to repeat what we have said a number of times before, that it is folly to send old comb a distance by express or freight to have it rendered up by your foundation-maker. There is not enough wax in the stuff to warrant the expense; and then the foundation-maker is annoyed because it usually comes right in the height of the season, when he does not wish to bother with rendering it up, dirtying up his tanks, etc. But unless it is rendered up very soon it is very liable to be worm-eaten and ruined. We have decided that we will no more accept such comb when sent us. A far better way is to render it in a solar wax-extractor at home, and then send the pure wax to your foundation-maker. There is no use in paying transportation charges on dross.

At this date, April 23, our colonies are all alive. They went into winter quarters exactly 106 in number, and came out this spring exactly 106, so that we have not had to unite. A while ago we stated that the number was 125; but our apiarist says the exact number is 106. This seems like a small number; but as we advertise and sell nuclei and full colonies, our stock of bees is reduced down to about 100 every fall, and increased to about 200 during the fore part of the season. In this number of 106 was one colony under a sealed cover, and it wintered just as well as the rest under absorbing cushions. Indeed, our apiarist thinks it has wintered a little better than any of the rest. Yes, we shall keep on trying sealed covers, but we do not advise any one else to do it unless he is perfectly willing to take the consequences.

SPONGE FOR WATER BOTTLE FOR QUEEN-CAGES.

On page 284 we referred to the use of a sponge, to stop up the water-bottle in queen-cages, as being a valuable idea. At that time we had overlooked an editorial in the *Review*, which reads as follows:

Years ago, when I was using a water-bottle in queen-eages, I stopped the mouth of the bottle with a cork made of a piece of sponge. If the sponge is of the right size it does not slip out, neither does the water run out nor evaporate too rapidly, yet it is furnished to the bees at all times on the moist sponge in the best possible manner. This plan was a success in every sense of the word.

Although, years ago, we used the sponge for holding the syrup itself, we did not use it as a plug to the bottle. The Good candy was a great improvement over the hard candies that had been used in queen-cages heretofore, but it was a mistake, we believe now, to drop the water-bottle, particularly for long distances. We shall certainly give it a trial this coming season.

The blind receive their sight, and the lame walk, the lepers are cleansed, and the deaf hear, the dead are raised up, and the poor have the gospel preached unto them.—MATT. 11: 5.

WE have in our apiary a queen purchased of the Atchleys, whose bees are actually five-banded. Two-thirds of the so-called five-banded bees show only three or four bands—at least, most of those we have examined failed to show any more than the fourth band.

Our large Boardman solar wax-extractors are busy at work on sunny days, rendering up old combs. They are doing so well that we shall put more of them in the yard, more especially to assist the wax-room in rendering back to good wax what we call "water-soaked wax."

WE thought at one time last fall that we should run out of basswood lumber; but we now have plenty of it on hand, although we have had an extremely heavy run on sections this year. The dry and beautiful spring, with its good roads, enabled the farmers to bring in the logs, and hence the lumber.

REFERENCE was made in our March 15th issue to the fact that we were working on a new edition of our A B C book, and that we feared the old edition would be exhausted before we could get out the new one. Some inquiries have come as to when the new books would be ready. From present indications, not before the first of December next.

As we were looking over the bees this spring we noticed that cushions under tin covers were damp near the top side, while those under wood covers were dry throughout. Metal is a conductor of heat and cold; and the warm air under the cover, being heavily charged with moisture, coming in contact with the cold metal, would discharge its moisture and thus wet the cushion.

WE have been having some beautiful warm days; and in the corner of the evergreens, when the sun was shining brightly, we noticed the bees flying stronger in this portion of the apiary than elsewhere. Why? Because those great big trees broke the force of the cold breezes from the north and west, and made this part of the inclosure the warmest part of all outdoors about the Home of the Honey-bees.

It is with much regret that we announce that Mr. S. Cornell, one of the leading bee-keepers of Canada, died suddenly on the 7th of last month. He was working in the garden, and was found there dead. Mr. Cornell was a very enthusiastic bee-keeper. Though not a prolific writer his articles were written with care,

FROM a private letter we learn with regret that Dr. Miller has been in "bad shape," so far as his health was concerned, and that "the doctor threatened to stop all mental labor, from danger of brain trouble." This is unwelcome news to us, and we are sure it will be to our readers. We are glad to learn, however, that he is on the "up grade," and we trust his wonted activities through the journals will continue. Dr. Miller has been doing a large amount of work in Sunday-school and other religious lines, besides his general correspondence relating to bees. Say, doctor, prescribe for yourself a bicycle, and get, along with it, a new lease of life.

DEATH OF J. M. SMITH, GREEN BAY, WIS.

WE learn from the *Ohio Farmer* that the great gardener—in fact, one of the greatest gardeners the world has ever produced—departed this life on the 20th of last February. He died in the harness, although his death was rather sudden. Several questions in regard to his favorite industry were left unanswered on his table. While we lament the loss of one of our great teachers, we rejoice that he left a family of boys (I do not know how many) who are almost if not quite able to carry on his gardening operations as well as the father himself. God grant that they may be able to teach and write intensive gardening as did their father.

HEDDON'S HONEY.

IN the closing paragraph on page 335 we by no means intimated that Mr. Heddon could not occupy further space if he had *important testimony* to bring forward; and right in this line we are pleased to announce that he has finally submitted to us the "original manuscript" of testimonials from men who purchased his honey, nearly all of whom speak well of it. These testimonials are filled out on printed blanks that Mr. Heddon placed before his customers, and are in answer to a series of questions.

Now, it *seems* to us we have given Mr. Heddon not only a fair hearing, but the advantage of his strongest points in rebuttal of the analyses; but if Mr. H. thinks we have not, we have decided we will go one step further: We will allow him the space of one page of GLEANINGS to bring up any other or new points (i. e., any thing that will explain how that large amount of glucose got into the honey he sold to us and to his customers), over his own signature. Certainly Mr. Heddon could not ask more than this. After this we hope it will not be necessary to prolong this matter further.

TOMMY STRINGER.

THE items regarding Tommy Stringer, in this issue, were taken from the Seventh Annual Report of the Kindergarten for the Blind, located at Jamaica Plains, Mass. I omitted to mention that Tommy speaks some words and a few sentences quite distinctly. The tones of his voice are pleasing, and there is no doubt

but that he will soon speak and talk readily. He is very much interested in making garden, and he watches with most intense delight some peas which he planted. He waters them, and takes care of them. Just think of it, friends—how should he know the weeds from the plants? When the peas were grown he gathered them, and ate them after they were cooked, with a delight, no doubt, that you and I can hardly understand. So far as I can gather, there is still need of help in the way of funds to finish his education. Here is something I want to quote, from the *Sunday School Times*, that has a bearing on this matter of child-training:

Says Dr. Stanley Hall: "The most honest and embarrassed child's first answer to a direct question, as, for example, whether it has seen a cow, sheep, etc., must rarely or never be taken without careful cross-questioning." Nor must such cross-questioning lead the child to suppose that he is mistrusted. The questioner—teacher, parent, companion—must rather mistrust his own power of interpretation. He must sharpen his wits and quicken his sympathies in order to do justice to his most delicate of subjects—a child's soul.

A FEW FIGURES SHOWING THE AMOUNT OF GLUCOSE USED IN THE UNITED STATES.

ON the night of April 12 there occurred one of the greatest fires that ever took place in Buffalo, involving a loss of about a million of dollars. It was none other than the extensive glucose works of that city.* Several years ago the extent of this Buffalo glucose-factory was measured by the daily consumption of 500 bushels of corn; but just prior to the fire the capacity of the works involved the daily consumption of over 20,000 bushels, in Buffalo alone. Employment was furnished to upward of 400 men, who received annually in wages over \$200,000. The enormous steam-plant to run the factories consumed 150 tons of coal daily, and the product of the works averaged 70 loaded freight-cars, or 840 tons of freight. The company had invested a million and a half of dollars, in part represented by four other factories, located in Peoria, Ill., Leavenworth, Kan., Iowa City, Ia., and Tippecanoe City, O. While the Buffalo concern represents the largest, there are other independent glucose-factories all over the United States.

While it is no doubt true that glucose is used principally for adulterating syrups, it would be folly for bee-keepers to go on the assumption that there is so little of it used in honey that we had better keep still, because, forsooth, it might prejudice our pursuit. If glucose is not used for any thing but adulteration, then we shall always use what little influence we have, toward bringing about the time when glucose-factories shall be considered illegal because inimical to the public health. If it were a wholesome product—if it actually added something valuable to our food products, that would

* We get these facts from the *Buffalo Express* of April 13.—ED.

be another question; but it contaminates any thing it has to do with. It brings down the quality of other goods, and we are sure it injures digestion.

It would be a very interesting problem, for some one well skilled in political economy, to ascertain how much legitimate labor is displaced in our country by the daily dumping of 840 tons (to say nothing of the output of other factories) of glucose on our markets, hardly an ounce of which comes to the surface under its true name. We have no doubt it would exceed many times the labor employed in producing it. As an enemy to labor, it seems in all essential respects to be on a par with the brewery and distillery.

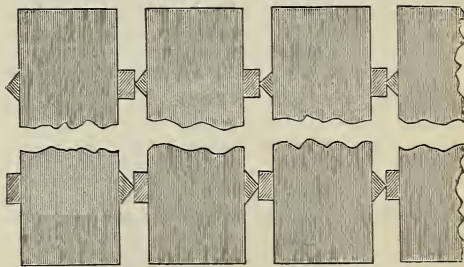
GIVEN FOUNDATION MADE FROM ROLLS.

AFTER making some experiments with the Given foundation-press we have finally come to the conclusion that *if* this foundation is softer, and more readily accepted by the bees, than the ordinary roller foundation, it is due to this fact: The side walls are made very thick and heavy, so that the surplus of wax is crowded into the walls, without any excess of pressure. With this fact before us we constructed a mill having extra heavy walls, and, to our great delight, the foundation from it seems to be very much softer because the excess of wax, instead of running out into long sheets, went into the walls. An ordinary sheet of wax, after being passed through this mill, increases in length only about 33 per cent of its original length, instead of, as heretofore, from 200 to 300 per cent. Whether this foundation is as soft as that from the press, can not be definitely proven just yet; but from present indications it is fully so. From some tests we have made, the bees seem to accept it very readily. In our next issue we hope to report further in regard to it; but at present we fear that this very soft foundation would give trouble on horizontally wired frames, because it has not strength enough to prevent it from buckling, unless, indeed, it is made excessively heavy.

how it was possible at that time to send out frames that way. There have been so many calls of late that we have finally constructed a special machine to do the work, so the frames shall not cost any more than the old style; and we now send out our thick-top frames of this description. An illustration of it will appear in our next issue.

THAT V EDGE TO HOFFMAN FRAMES.

SOME few bee-keepers object to the V edge of the Hoffman frame, more, it seems to us, on theoretical grounds than because they have used them alongside of Hoffman frames with end-bars whose contact edges are square. When we first introduced the Hoffman frame we likewise objected to the V edge, and for the first year made the frame with the edges square. Indeed, we placed in the neighborhood of 80 colonies on such frames. As the season wore on, we began to see that the square edge had a disadvantage in that the propolis would in time accumulate on the two opposing surfaces, and gradually increase the spacing between the frames. The following season we introduced alongside of them frames having V edges, the V coming in contact with a square edge. As propolis began to accumulate we found that it did not increase the spacing, because the V edge would push the propolis on either side—that is, it would divide or cut it like a knife. During warm weather, propolis—especially if new—is soft; and every time the V edge crowds against the square edge, the point comes close in contact with the blunt edge. Again, V-edge frames separate more easily than those having only square edges.



“But,” you say, “the square edges would be all right provided you wedge them up.” Well, during that first season’s use of them on 80 colonies we tried the wedging feature; and while it remedied the trouble some, it was unsatisfactory. We then tried thumb-screws, but finally gave these up. Well, we now use and recommend Hoffman frames having a V edge like the one shown in the accompanying diagram. In connection with them we use a division-board, but no wedge, thumb-screws, nor any thing of the sort; and we are firmly convinced that Mr. Hoffman, the introducer of these frames, who has used them for so many years, is pretty nearly right, on the V edge.



THE NEW TOP-BAR

Nov. 1, p. 831, 1893, Mr. J. A. Scudder described an improvement in top-bars that he had made for him especially, and also sent us a sample. The improvement related particularly to the end of the top-bar. He recommended that they be $1\frac{1}{2}$ inches wide; but such width would make it inconvenient to handle, unless the end of the top-bar could be narrowed down $\frac{3}{4}$ of an inch. In our footnote we acknowledged the improvement; but on account of the expense of making this change we did not see



ON THE WHEEL, APRIL 17.

I paid a visit to the farm of Jordan & Johnson, mentioned once or twice last season as having extensive celery and onion grounds near Creston, Wayne Co., O. Some time during the winter the two members of the firm paid me a visit, and we talked together concerning the matter of plant-greenhouses, plant-hotbeds, and cold-frames, all to be heated by steam when steam is needed. As they grow early celery largely, it was getting to be quite desirable that they have a convenient arrangement or arrangements for growing the plants. We talked about running steam through tiles, about sub-irrigation in the greenhouse, as recommended by our Ohio Experiment Station, and all these things pertaining to this new industry. I had never given my Victor Flyer a trial on an extended trip, and I was agreeably surprised to see with what ease I made the first nine miles in just 40 minutes. Some of the roads were quite rough, even then; but the little Victor has a way of bounding over roughness, especially where you have muscle to make it "fly;" and I was greatly pleased, too, to find that my second wind came in unusually soon, and that my muscles had lost nothing during the winter's rest.

Before I reached Creston I was pleased to see cloth-covered cold-frames on the south side of quite a few residences. These cloth-covered frames were on the plan given in the tomato-book. It illustrates the pleasant fact to me, that, when any sort of industry gets a foothold in a locality, the people round about are ready to "catch on" and make use of new and improved methods of doing things.

When near the premises mentioned, my eye was attracted by so neat an arrangement that I turned the wheel in at the roadway up near the hot-beds. The beds were four in number, and perhaps 50 feet long. They were on the plan I have given, side by side, with just room enough between them to walk through in handling the sash. But what attracted my attention particularly was, that the sides of the beds were raised up as much as 3 feet high on the back and perhaps 2 feet in front, and they were made of drop siding nailed to stakes. This makes a nice, tight-looking job, secure from the weather. Then these beds were all painted a bright red. You see, this is a very durable paint, and it is dark enough to attract the rays of the sun so as to warm up quickly. Of course, I was interested and delighted with the appearance from the outside; but when I peeped over and saw the bright dark-green rows of Pризetaker onions that filled every bed with a perfectly even, regular, thrifty stand of plants, such as I think I had never seen before, I was full of enthusiasm. This neat little plant belongs to Jordan & Son. The "son" is the younger brother of the one I have mentioned before. These four plant-beds are warmed by a little horizontal boiler in a building on the north side of the beds. A single pipe runs the length of each bed and back again. If I remember correctly it is $1\frac{1}{4}$ inch, and is about a foot distant all the way around from the drop siding before mentioned. I soon discovered why the sides of the beds were so well up. It is to make room for the steam-pipes just mentioned. The beds that hold the plants are an inch or two above the pipes, and there is, I should judge, a two-inch space between the

sides of the bed that holds the dirt, and the drop siding. This permits the air to circulate all around the bottom and sides of the plant-bed, and the most severe frost would not get through the drop siding and extend over to the sides of the bed holding the plants.

I was soon introduced to the father also. Neither father nor son had had any experience with Pризetaker onions, with the new method of transplanting; but the father gave us a reason for feeling sure they would succeed with their enterprise. Last fall he was traveling through Michigan, and while walking through one of the towns he saw a quantity of beautiful large onions, evidently Pризetaker. He stopped and made inquiry.

"Will you please tell me, sir, where you got those beautiful onions?"

"Why, a boy who lives near here raised them. He started the plants in a hot-bed, and then planted them out in the field."

"Can you tell me just how many it takes to make a bushel?"

"Well, stranger, that is just exactly what I was thinking about. I brought a peck measure, and we'll get it at it and count them."

They found that 28 onions made a peck; and without very much selection they could easily find 100 that would make a good plump bushel. A few figures soon decided how many bushels of such onions should be raised upon an acre. This is theory, I know; but our good friend Jordan was not long in taking steps to make the theory fact. His beautiful ground made it possible to prepare the soil and lay out the beds with mathematical precision. The brightest thing of all his undertaking was to hunt up the boy who raised the onions, and bring him down into Ohio and set him at work; and it was this boy who bossed the whole apparatus that had pleased me so much during my whole half-hour's stay. By the way, friends, there is a point right here. Notwithstanding the thousands who are out of employment, the world is clamoring for capable men and capable boys. Let any boy go to work and learn how to do almost any thing *skillfully*—even raising onions—and somebody *wants* him. Why, he is wanted to boss and direct the hundreds of carpenters, farmers, gardeners, and others who can not live unless they have a boss. Are *you* one of that sort, my friend?

Before I left I was desired to give figures on several thousand crates to hold the handsome onions that they were *going* to have. Were they counting their chickens before they were hatched? I think not, to an unreasonable extent. Father and son together, with that Michigan boy, can hardly make a failure. You see they are used to raising onions in the ordinary way; and I presume they have seen the way in which I manage to raise Pризetakers; for I am only an hour's ride (on a wheel) away from their plantation. Well, I was pretty well satisfied with this part of my visit. The mucky roads were almost too soft just then for my wheel and so I walked along to the large plantation, and we chatted by the way. Sure enough, there was the greenhouse that had materialized since I had the talk with the proprietors some time in February. Oh what beds of "living green" met my eye! and then what beautiful boxes of thrifty plants! These people work on a little different plan from my own. Their greenhouse is 20x100. There is a walk in the middle, and a walk clear around the outside; and the great beds, some seven or eight feet wide, were all occupied in raising seedling celery-plants. These seedling-plants are then transplanted into movable trays or boxes. These are of such size that I should say four of them can be placed under an ordinary

sash. This would make the dimensions of the trays about 3 feet by 18 inches. The transplanting is done by women, inside of the greenhouse. They sit down at a table, or stand up, as they choose, and set out the plants at so much per thousand. Yes, and some of them make over a dollar a day when the price per *thousand* is only *two and a half cents*. What do you think of that? Over 40,000 plants taken from the seed-bed, and successfully transplanted into the trays, for a day's work! The trays are filled with beautiful swamp muck mixed with well-rotted composted stable manure. After they have begun to root they are hardened by setting them in beds covered with cotton cloth. During a blizzard like one we had the last of March, glass is used in place of cloth, on very tender plants; and, besides this, steam-pipes run under all the beds so they can, on an emergency, ward off the frost or freeze, by steam underneath the boxes, as well as glass or cloth overhead. With enough steam heat, it seems to me that cloth might answer very well in place of glass.

The proprietors soon found out that, to run this quarter of an acre of plant-garden, required an engineer, or manager, of no ordinary ability—somebody who really liked the job of watching the steam, watching the clouds, and watching the rain, and, above all, watching the thermometer, barometer, and Weather Bureau signals, in order to anticipate any sudden changes. I was introduced to the man, and laughingly told him he was working out the very problem I gave in the tomato book; namely, how to support a family on a quarter of an acre of ground. Well, this quarter-acre ought to support a family in pretty fine style; and my friend remarked that, when it came to having one man do all the work on a quarter of an acre, he guessed he would need a wife to help, and a goodly lot of children besides; and sometimes it would make the whole crew fly around pretty lively. Well, this plant-garden is certainly the finest and handsomest thing of the kind I ever came across. Why, there was nothing in the whole line of horticultural displays at the World's Fair that could compare with it, in my estimation. This was a real live practical hive of busy workers and magnificent results. Too much that we saw at the World's Fair was only *make believe* business. The plant-beds inside of that greenhouse were watered by sub-irrigation. The wooden beds were made water-tight with water-lime cement; then rows of tile laid crosswise of the bed were placed, I should say, about every five or six feet. These tiles lie right on the cement bottom of the bed. In fact, the joints were also cemented around the lower half, leaving the cracks open on the upper half; then the end tile of each row was brought up on an angle so it rested on the side-board of the bed, making in convenient to run water into each line of tile, with a hose. They were enthusiastic in praise of sub-irrigation. You see, the celery-plants need never have their leaves and stems wetted at all; and where they grow as thickly as I saw them, there would be considerable danger of rotting if every thing were soaked with water.

In order to see how their machinery would work they have grown a few cabbage, tomato, and lettuce plants; and the wife of one of the proprietors had also tried her hand at raising flowers. Her trays of little plants with variegated foliage made a most beautiful supplement to the beds of living green I have spoken of before. These men have indeed put a pile of money into this apparatus for raising plants; but they have not gone into it recklessly. They have been working and experimenting for sev-

eral years, and all their plans seem to be the outcome of regular methods, step by step. The boiler that warms the greenhouse and plant-beds also works an injector pump that throws water into a tank; and long lines of pipe were just then being laid away out in the distance, through the mucky fields, in order to give them water handily when the plants are moved from their tidy cloth-covered cold-frames to the outdoor air of the middle or latter part of April. Oh glorious April! glorious and beautiful expanse of soft black soil, as smooth and level as a floor. A bystander informed me that, four or five years ago, the scene of this wonderful activity was nothing but a swampy bog where people sometimes went out to gather elderberries. Of course, these men were laughed at and joked about because they insisted that this black mucky swamp could be made *good for something*. Intelligence and genius have made the change. If it were only possible to get a camera that would catch the shades of green, how I should love to give you a picture of that plant-bed establishment! By the way, when something was said about the expense of the cotton-cloth covering, Mr. Johnson informed me that they got their cloth by the quantity at only 5 cts. per yard. Of course, this is only a yard wide; but when sewed together in the middle it cost only 10 cts. In the tomato-book I believe I mentioned the price as being 20 or 25 cts. per yard. Well, this latter is stronger, and, besides, it is $2\frac{1}{4}$ yards wide. This extra width is so that it may allow the pole on which the cloth is rolled up to drop down over the front end of the bed. Well, the beds we saw were all of them planned to take either sash or cotton cloth; and by having a strip of board on the top edge they managed to use cloth only two yards wide. The question might come up about cloth being cheaper than boards; but I presume their heads were "level," for they have made this thing their business and study.

Yes, they too have experimented a good deal with fertilizers, and they showed me some tomato-plants that were dosed with nitrate of soda. Sure enough, those that had the nitrate of soda were of better color, and a stronger and more robust growth than some other boxes that did not have any. But, wait a bit. They put on so much nitrate that it killed part of the plants, and these boxes were, therefore, not as much crowded as the others. Again, some boxes that had stable manure put under the muck soil made a better show than any of them. I feel pretty sure, however, that nitrate of soda does, on some soils, prove to be a fertilizer for tomatoes.

After I had gone about three miles on my way home I passed a hotel. It was after my usual suppertime. I should enjoy my ride very much more with a good supper than to get it after I got home. It is a good thing to learn to practice economy; but I think we sometimes make a mistake. If I were to eat such a supper as nature called for, just then, after I got home, it might not "set well." But if I were to take it then, and ride nine miles afterward, I knew from past experience that the supper would be all right, and I could eat just what I pleased, and as much of it. I wonder if there are any dyspeptics among my readers who would give a whole half-dollar to be able to eat a good square meal, and eat just what they like, regardless of consequences.

Another thing, people can not very well keep nice hotels unless they have encouragement by way of patronage. A man may be too lavish with his money, and on the other hand he may be too parsimonious. If one never patronized his neighbors who are in business, we shouldn't any of us get along very well. "Every man to

his trade and calling" is a pretty good rule, and I think we ought to enjoy patronizing our neighbors when we need what they have for sale. I thought I needed something they had for sale at that hotel. As usual, my first longing was for the pitcher of milk and plate of bread. Then I was ready for the nice steak, potatoes, fried eggs, and a nice dainty piece of fried liver. I think I have heard somewhere that liver is not fit for human food; but I feel in many such matters a good deal as Prof. Cook did. Somebody demonstrated, by scientific methods, that ensilage is not a fit food for cows. On giving the cows a chance, however, to express an opinion on the matter, they disagreed with the scientist; and I thought that night that that nicely cooked liver was a most delicious food. What a supper I did have! and after my nine-mile ride home my digestion was as perfect, and my sleep as sound, as that of any baby boy after he has had his supper.



and the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul.—GEN. 2: 7.

Some little time ago the readers of GLEANINGS made a contribution in response to a call from Helen Keller for Tommy Stringer, another deaf, dumb, and blind child, living in the State of Pennsylvania. Our older readers have the matter fully in mind, no doubt. But it may be well to explain a little for the benefit of the later ones. By the way, it was my good fortune to be present at one of these kindergarten schools for the deaf and dumb while at the World's Fair. The part that interested me greatly was the methods of teaching deaf and dumb children to talk and hear others talk. Perhaps I should say *understand* others instead of hearing them, for they do not *hear* a word. It was almost impossible to believe the teacher's statement that these children did not hear a word. It was not long before I suggested testing the matter by turning off the electric lights some evening when they were talking and visiting as only children can talk and visit. The teacher informed me that the thing had been done repeatedly to convince the skeptical. Of course, the deaf children could keep on talking, but none of their comrades caught a syllable after the lights were cut off. I was asked to talk with them; and as I put out my hand to a bright little fellow, and said, "Can you really talk?" he responded at once, "Oh, yes!" and when I told him my name he repeated it after me just as any child would who could hear perfectly. This is all accomplished by cultivating that marvelous power of judging by the motion of the lips, mouth, and face what the speaker is saying. When I reverted to the matter of Helen Keller, the teacher said at once, "Mr. Root, you must not expect to find any more Helen Kellers right away. She is not only the wonder of all the schools in this line of work, but she is probably destined to be a wonder to the world." I remember of once saying to our people, when the subject was before us in GLEANINGS, that Helen Keller would eventually stand before the crowned heads and the kings and princes of the world.

Now to get back to Tommy Stringer. Our friends will perhaps remember that Helen Keller, in her report in regard to him, admitted that he did not take hold as Willie Elizabeth

Robin and some of the others did. We excused Tommy by saying he was a boy, and everybody knew boys did not "catch on" as quickly as girls do. I remember feeling a little anxious about Tommy myself. There is something queer about his case; and even the teachers were obliged to think it was sometimes *don't care* rather than *don't know*. Tommy was "balky;" but it seemed to be more of a bodily balk than a mental one. He would get lazy, and seemed to expect that his teacher was going to do the whole of this matter of educating. He would get his spells of being contrary, and neither coaxing nor any sort of mild discipline would get him out of it. Perhaps some of you may smile when you recall to mind that poor Tommy is not the only small boy who is thus afflicted. Well, I am glad to be able to tell you that our young friend is coming bravely "out of darkness" and "into light." Let us remember that his early and perhaps most important years were lost or worse than lost. He was born in Pennsylvania in 1886, and was received into the kindergarten when he was about five years old. Before this, on account of poverty, he was, if I remember correctly, put into a sort of infirmary where nobody cared for him, and where his main accomplishment was creeping about on the floor. But, true to his natural disposition, he always crept backward, bumping against every thing and everybody. Please imagine, if you can, a child five years old, who has never beheld the light of day—has never heard a sound, and who knows little or nothing of loving care from anybody. Do you wonder that Tommy was not only ignorant but contrary and stubborn when they found him? One might almost weep to think of a child in such benighted darkness. The reason he was not educated like Helen Keller was, that it cost *too much money*. Somebody has said that the whole great State of Pennsylvania, with all its wealth, could not afford to pay for educating poor Tommy. But, hold on! It was not Pennsylvania alone, but the whole United States of America, that waited for a little deaf, dumb, and blind girl to hunt Tommy up, and with her childish voice plead for him. Hold on! I am making *another* mistake. She *hadn't* a voice to plead with; but such as she had she used for Christ's service. One is reminded of the words, "Silver and gold have I none; but such as I have, give I unto thee." Helen's appeal brought forth the funds, and *we* helped; and every one who had a part in that contribution ought to feel glad now when he thinks of it.

Poor Tom knew nothing about it. In fact, *could not* know any thing about it. All the wise men with all their skill and knowledge, in the whole wide world, could not tell him. This institution in Massachusetts, however, undertook the task of telling him. They also undertook the task of telling him about the great God above—the God who implanted, even in poor Tommy, the knowledge that he possessed "a living soul," even if he was made out of the "dust of the ground." And now let us consider the good news that comes. Tommy, with all his dullness, with all his obstinacy, proved to be a *joker*. Wouldn't it be funny if we should have a deaf, dumb, and blind *humorist*? And it was along the line of taking advantage of Tom's disposition for practical jokes and for playing tricks that they made progress. The work was accomplished by personal effort. His teacher had become *intimately acquainted* with the poor child. She took him home and let him help her bake cookies. This was something he greatly enjoyed. He was allowed to have a part in all the work, even putting the cookies into the oven and taking them out. Of course, he had one hot to eat, right from the

oven. Where is the boy who does not know how to "help" in that part of it? While he ate his cooky he was in the habit of sitting down on a little hassock. This time, however, he ate his cooky standing up. The cook looked around to see where his hassock was, and to find out why he did not sit down as usual. It could not be found. It was there a few minutes before it had suddenly disappeared. A peculiar smell, after a little, prompted them to look into the oven, and there was the hassock where Tom had dextrously whisked it as soon as the cookies were taken out.

Tommy sleeps with his companion. Like other boys, he does not always want to get up in the morning. Instead of calling Tommy, as your mother does, their plan of calling him to get up is to pull down the clothing until he wakes; and his room mate, Lyman, oftentimes performs this office. One night there was a disturbance, however, and the teacher looked in to see where the trouble was. Tommy was giving his friend Lyman a little treat in the way of retaliation by stripping off the bed-blankets, sheets, and even the pillow-cases. He did not seem to hold any malice, however; for when his teacher told him to restore the clothing, etc., he made up the bed very neatly and quickly, for that was one of his accomplishments.

Mr. Anagnos, one of the founders of the school, and one of Tommy's special benefactors, one day entered the schoolroom when the teachers were trying in vain to get Tom to spell *thread*. He seemed utterly incapable of managing that particular word. Mr. A. came up and touched him. That is the way in which friends make themselves known to these unfortunates. Tommy at once grasped for the hand, and commenced feeling of the sleeve-buttons, to see who it was. In an instant he was in the arms of his benefactor. Evidently considering, however, that it was not just the thing to break off lessons, even for a frolic, he stretched out his hand toward his teacher and spelled *thread* several times very plainly and easily. The question arises, Could not Tommy have done it all the time if he had had a mind to? or did the joy occasioned by meeting a dearly beloved friend stir him up to a new degree of intelligence? If we decide the latter, we shall probably do it because of former experience of our own that we recall. There are a thousand things that we can do, and do easily, if just the right motive be brought to bear to wake us up. Sometimes it does a body good to get *vexed* just a little. Such a weapon, however, is not to be unguardedly recommended. It might prove to be a dangerous-edged tool.

Tom had a fashion of amusing himself by pulling the buttons off his clothing when he had nothing else to do. His kind teacher cured him of it by teaching him how to sew them on; and after he had become a little tired of the task of making good the consequences of his mischievous habit he got over it.

Tom's special friend, Fred, had been away for some days. He came back; and as he too was glad to see his playmate, he gave Tom a hug and kiss. Tom was upstairs making beds at the time. After his friend had gone, however, he found it necessary to stop his work for a while, while he danced up and down, spelling on his boyish fingers the name of his playmate, "Fred." "Fred." You see, Tom is getting to be a *boy* like other boys; and even in spite of his afflictions he can dance up and down, and do the very things that other boys do, so far as the limited use of his faculties will permit him.

He had displeased one of his teachers by his disobedience—probably by his stubbornness—

and she was obliged to go away before he had had time to tell her he was sorry. When she came back, in the exuberance of his joy he began spelling the names of all the objects in the room, as correctly as he knew how. With his limited vocabulary he knew no other way to express sorrow and regret for his bad behavior than to recite his lessons in a way he was sure would please her. Here again we see the spirit of the saying, "Silver and gold have I none; but such as I have, give I unto thee."

Tommy is very cautious. Probably sundry bumps and bruises in the dark have made him so. For a great while he was afraid to ride in a little cart the children amused themselves with. His teachers, however, labored to overcome his unreasonable fear; and finally, when Tom was really tumbled out of the cart, and made haste to get up and climb in again, they felt they had achieved a victory. He knows the days of the week, and has a particular liking for what they call "clay day." This is the day when the children are permitted to take lessons in molding clay into different shapes—a favorite pastime for the blind. Entering the school on Friday he stood still for a few minutes, evidently thinking; finally a smile lighted his face, and he spelled "apron," for that garment was the concomitant of his dearly beloved clay-working. After he had learned what day it was, he was taught to answer what to-morrow would be, and then yesterday. As this was a new exercise he replied, somewhat hesitatingly, that it was Friday. He was pleased to see that he had got on to the idea; but his propensity for a joke followed right on to his new acquisition. In order to show the progress he was making, the teacher asked him to tell somebody *else* what day yesterday was. Instead of answering Friday, as before, he replied, "Yesterday was Fred." Of course, this was a poor sort of joke; but who is there who would not rejoice to see a little fun creeping in, indicating that Tom was boyish and boylike?

One Monday morning he would not eat his breakfast, and he would not tell any one the reason. Finally, when he was reciting his lessons, the fact came out that he was in a pet because he could not have corn bread for breakfast; and then they remembered that for some time previously there had been corn bread on the table every Monday morning. Tom decided in his own mind that *Monday* had something to do with corn bread, and that, according to the fitness of things, that should be the rule. He had got it into his head that there had got to be corn bread, and so he did not eat because he did not find it. I think I have known of some grown-up "Tommies" who behaved a little after that fashion. Did you, my friend, ever have any experience along that line? You see, he is beginning to make inferences and draw conclusions.

One day he had an exercise in word-lessons by being asked to bring his teacher certain objects with which he was familiar. He enjoyed the lesson very much, and was quite willing to go through with it again the next day; but because his teacher did not remember to call for the *same* objects in the *same regular order* as she did the day before, he was disconcerted; in fact, he would not go on until the matter had been carefully explained to him.

These little details that I have gone over, you may think are trifling and unimportant. Some of you may ask, "Well, what is the point to it, any way? We see such things every day right at home." My friend, there is to me a most grand and wonderful point. In fact, it has been a lesson to me such as I have seldom had. Tommy is a child, and a child in great affliction; and yet with the use of all of my

senses, and with 50 years or more of careful and constant teaching, I am in some respects but a child after all, and a child that *might* be pitied. Again, Helen Keller has astonished the world. The general decision seems to be that she was gifted naturally. I presume some credit is also to be given her teachers. They were discouraged about Tommy because he did not seem to possess Helen's natural talent. But suppose Tommy develops into a boy or man with a promise almost equal to that of poor Helen; and suppose that the other one of the three, Willie Elizabeth Robin, also manifests a wonderful and unusual intellect. To tell the truth, I begin to suspect such *will* be the result. What, then, shall be our conclusion? Why, it is *forced upon us* that it was the *education*, and kind and loving care, that have been bestowed upon these unfortunates—perhaps not altogether; but is it not probable that their progress is largely due to surroundings? to the careful personal work and training that have been given them? And, to go a step further, can it be true that, if the inmates of our jails and penitentiaries had had a like training when they were young—yes, very young—that they too might have been noble examples of Christian character and brilliant intellects? Oh dear me! can this be true? The bright gentle matron at the World's Fair who had these children in charge assured me it was a great mistake to wait till the deaf ones were five or six years old. Let us have them, she said, at the age of *two* years, or, better still, *one* year. She even declared (if I do not forget) that many things could be accomplished between the age of one and two that are almost out of the question if the child were neglected till it is seven or eight; and some pupils who have been allowed to grow to the age of ten or twelve before getting a glimpse of the world of intelligence that is hidden from them were almost dwarfed in intellect—so much so that they could never become *great* scholars. If this be true, just think, dear reader, of the responsibility that rests not only upon those of us who have a tolerably good education, but especially those who have felt the refining, ennobling, and purifying influences of the gospel of Christ Jesus.

Go ye into all the world, and preach the gospel to every creature.—MARK 16:15.

BEING POSITIVE GOODS WERE NOT ALL RECEIVED.

A LITTLE STORY THAT CONTAINS A GOOD LESSON FOR US ALL.

I have sometimes thought that a man needs to be forty or fifty years old before he can learn by experience not to be too sure of *any* thing; and almost every year's business brings us more or less unpleasantness in the way of deciding who is at fault when something can not be found. The following transaction illustrates the point so well that we have thought best to give it entire.

Friend Root:—Yesterday I was looking at my supply of foundation, and discovered a mistake. When I gave you an order, Oct. 28, 1893, I ordered with other goods (amounting in all to over \$27.00) 5 lbs. of thin foundation, which I have weighed on scales bought of you, which are correct, also 5 lbs. *brood* foundation, which is not here. In my hurry to get in shape for winter I put the foundation into a bureau drawer to keep it from freezing, and paid no further attention to it till yesterday, supposing it to be all right. I then unpacked and examined it, with above results. No person but myself opens or has any thing to do with my bureau. More, I have my own house, and keep my fixtures and clothes and tools in it, and lock it when I go away. The package was not opened till yesterday. What I

have is 5 lbs. of thin surplus foundation and nothing more. As I shall need the brood first, if you will kindly correct the mistake and send the 5 lbs. brood, less the price of GLEANINGS for the year, you will greatly oblige
C. C. EDDY.
Reinersville, O., April 3.

To this we replied, under date of April 6:

Friend Eddy:—On referring to the order in question we find both items checked, and they were packed with your goods, each in a separate package. It is altogether probable that you put away in the drawer the 5-lb. package of thin and left the other package with the other goods. You should check up your goods as soon as received, and report any shortage. When you wait so long there is no chance for us to make any investigation. Please make a thorough investigation, and see if you do not find the other package of foundation. Our shipper who put up your goods says he *knows* it was in, and he is generally very careful. A. I. ROOR.
Medina, O., April 6.

April 9, friend Eddy replies:

Yours of the 6th inst. is at hand. As you say, both items were checked on the order; but that they were *packed* is hardly possible. Being checked made me more careless, as I have always found orders correctly filed, or nearly so. To convince you I am not in error this time, absolutely no person handled the goods but myself. After they reached station at Caldwell I went for the goods, paid freight, loaded, unloaded at home, and unpacked them by myself, and I am perfectly satisfied they were not opened or tampered with *en route*; also, there was but one package of foundation, which I immediately put into a drawer, as stated, which remained unopened or undisturbed in any way until the day before I wrote you. To this statement I am perfectly willing to qualify. I knew from the first unpacking there was but one package of foundation. That I have been a little careless about being sure every thing was right, I admit; but there is *positively* no chance of my being mistaken this time. C. C. EDDY.

P. S.—I supposed the one package contained the 10 lbs. of foundation, but neglected to weigh it; further, every article has been handled over several times, all made up and painted; even the boxes containing goods have been worked over into fixtures; consequently I see no chance that I have made a mistake. C. C. E.

Now, a good many times the difficulty ends right here; at least, no one is able to say where the missing goods went to; and a good many times we send things a second time when we feel sure the fault is not ours. Sometimes we decide to divide the loss, each party bearing half; and I believe that, as a rule, we generally preserve pleasant relations and pleasant feelings. Sometimes, however, as time passes, the missing article comes to light. See one more letter from friend Eddy, below:

Friend Root:—I hasten to acknowledge my mistake. I found the brood foundation put away in an old trunk where I thought there was nothing but some rags; yet I felt sure I was right. But it is here—another instance of how positive one may be, and still be mistaken. I am sorry this has occurred, but can now only correct it and inclose stamps to pay the extra postage I have caused you. The only excuse I have is, I thought I was right. I will try to improve by this lesson in more ways than one.
Reinersville, O., April 10. C. C. EDDY.

As I look back through the years I have been doing business, I remember several similar cases. One man was *sure* we did not send all of a lot of goods, and with much protest we sent a part of them over again. Some time after, came an apology. When he unpacked the goods he laid part of them on a wheelbarrow belonging to his neighbor. The neighbor wanted the wheelbarrow, and sent a boy after it. The boy wheeled the barrow over home, goods and all. As they were in a hurry they took the stuff from the wheelbarrow, intending to have somebody carry it back; but it got tuckered away, and came to light only after many days. Our customer said it never occurred to him that

a wheelbarrow standing there could possibly have been spirited away, goods and all. Another man stoutly insisted that he did not have his foundation. After we had sent him another package, he discovered the first one was in the hive all right; but it fitted so nicely he concluded it was a chaff-packed division-board that we had generously "flung in" the bargain.

Now, in what I have had to say, please do not think I want you to be backward about telling us when things are missing. By all means, tell us about every thing that is not as you expected it to be; but do it pleasantly and kindly, and do not be in haste to decide that we try to cheat; and, on the other hand, dear brothers and sisters, we will try to have a big lot of charity stored up ready for use, so we shall not be tempted to think that *you* wanted to cheat us.

A. I. R.



GARDENING MAY 1.

Any step that we can take to secure good crops without so much expense for labor is a decided gain. Ever since Terry told about not having cultivated his raspberries for three or four years, I have been wondering if there were not other crops that could be handled in the same way, and I think I have found one. It is a dozen rows of pie-plant, perhaps 10 rods long. The rows are three feet apart, and the plants are only a foot apart in the row. The consequence is, that, when the demand for "pie material" is not too strong, the foliage covers the ground so that hardly a weed can get a chance to grow. But to keep up this enormous growth there must be heavy feeding; so we literally cover the ground several inches deep with coarse stable manure, not only between the rows, but all between the plants. So far it seems to be working nicely. Of course, the ground was worked up very fine and loose before the plantation was started, and under-drains were put through every 20 feet. The only labor now needed, besides gathering the crop, is to cut out the seed-stalks just as soon as one can be discovered; and a small boy can be taught to do this with a very little training.

THE ST. MARTIN RHUBARB.

Several are asking about the St. Martin rhubarb. Well, the truth is, our plants grown from the seed showed such a diversity of character that I thought best to drop it; and several old gardeners told me that the only way to keep an exact strain of rhubarb was to increase by dividing the roots. I have not had time to satisfy myself in regard to this matter. I wish the experiment stations would answer the question, Is the St. Martin rhubarb raised from the seed any better than the Victoria or Linnaeus? and is there any strain of rhubarb in the market that will come true from seed?

STRAWBERRIES UNDER GLASS, HEATED BY EXHAUST STEAM.

My experiment in this line is a decided success; but I very much prefer strawberries in a hot-bed where the sash can be taken clear off whenever the weather will permit. It is a very cold, hardy plant, and seems to be impatient of hot-house treatment. Last fall we put perhaps a hundred plants over our exhaust steam-heated beds. This is the line that goes over to the house; and in order to keep the

hot-water pipes up to the temperature desired it is too warm for the berries. As a consequence, the glass was off whenever we did not have severe freezing weather. They blossomed in December and January, and we had some ripe fruit in February. Once they were frozen, and at another time I forgot to take the glass off before going to church one sunny Sunday. When I got back they were all roasted, green and ripe. They tasted a good deal like baked apples; but I do not believe I am decidedly in favor of baked strawberries. Well, they kept on blossoming, and very speedily they had a lot more of green fruit, and now it is ripening up very finely. I do not think I ever tasted any more deliciously flavored strawberries than those ripened under glass, with steam heat beneath. Before another winter I shall make a different arrangement so as to have more bed surface, and diffuse the heat so as not to have it too hot in any one spot. The plants are now literally loaded with berries, and, what seems a little singular, there is but a very small amount of foliage—not nearly as much as we have in the open air. The treatment they have received seems to provoke fruit-bearing rather than the production of leaves.

EARLY PLANTING.

Like many of the others, we planted quite considerably during the fine weather in the fore part of March. In fact, the acre comprising the swamp garden was all planted. The largest part of it was put into onion seed for early plants. Of course, this was all in the open air. Then we put in cold-frame cabbage-plants, cauliflower, Eclipse beets, carrots, parsnips, peas, potatoes, radishes, salsify, and spinach. After the blizzard during the last week of March I was afraid that nearly all my stuff was killed. But, fortunately, very little had got above ground, and now we have a good stand of almost every thing. Even the potatoes, which were all covered pretty deep, were not hurt at all, so I am decidedly in favor of early planting—that is, such things as I have mentioned above. If they get killed it is not very much labor to plant them over again.

ECONOMY IN PLANTING AND GATHERING THE CROP.

There is just one feature of the above that I wish to allude to right here. Ever since Terry advocated long rows clear through the lot, for cultivating, most of us have been working toward this. Now, in our market it is not policy for us to plant largely of any sort of garden-stuff. "A little and often" has to be our motto, so we do not overstock the market. Well, sometimes we put in a part of a row of something. When we are asked to test certain new things they must be put in a part of a row—perhaps a single rod of row or less. Well, this always makes trouble. If part of the row is harvested, then there is vacant ground to raise nothing but weeds. Of course, you can cultivate half a row, and turn around and go back again. But the horse stamps on the stuff; and, unless I am present to tell where one row ends and another commences, the man who cultivates will dig up something valuable. I have about decided that we must have whole rows of every thing planted. If we can not do that, put it in plant-beds and give it hand culture. And now about gathering crops. I think every spring, that, in spite of all I can do or say, somebody will commence gathering parsnips and vegetable oysters—yes, and winter onions—right in the middle of the row, and perhaps that person will select a row in the middle of the patch. I do not see how anybody can want to see a great hole gonged out of the middle of a nice crop of any thing. This year

I told the boys, when they gathered these roots, to take the outside row every time; but somebody did not understand, and gouged into another row. The consequence is, when we come to plow, a great lot of ground is wasted unless we take up the broken pieces of rows and plant the stuff solidly together. Disorder and disorderly practices constitute one of the banes of my life. Somebody wanted some cabbage-plants; and before I knew it one of the boys commenced this spring, after the same old fashion of pulling a hundred or two out of the middle of a nice bed. Now, this ground is very valuable; but how could it be used in that irregular fashion? Had they commenced at the end of the bed, and taken the plants out clear across, a nice little square strip of ground would have been ready for lettuce seed, cabbage seed, and ever so many other things that should be put in at this season of the year. The objection was made, that the customer said he would not take any unless he could have the biggest plants, picked out here and there. Well, there may be some reason in this if the plants were not *all* of them good enough. Had I been present I should have said this: "My friend, we will pick out the best there is in the bed, for *just double price*. If you will take such goods, however, as we use ourselves, and send off to customers, you can have them at the regular printed list prices." But a good many times, when there is no difference in plants at all, somebody, without thinking, will tear up a beautiful bed, and leave it looking as if the hogs or chickens had got into it. Of course, it is the younger ones who are more likely to do such things thoughtlessly. But, just think of it. If you are going to make a success of a plant-garden—if you are going to have your grounds look neat and tidy, it behooves you to keep constantly in mind that you must endeavor to keep the ground cleared up clean, as far as we go; and then our grounds can be kept looking trim and neat and inviting in appearance.

Another thing, if a cold wave comes, how are you going to manage with plants scattered here and there, requiring a dozen sash to cover them, when, if they were in one compact bed, two sashes or even *one* might make them safe? Please do not understand that I mean you should push off culms and plants too small to be of any value. After the good ones are taken out, these culms should be put in without charge, or taken up and put in a straight row by themselves. By the time your bed is finished, these smaller ones will be nice handsome plants. If you push ahead in a slipshod, haphazard sort of a way, without any planning or looking ahead, you will find out where you are, and you will realize the truth of what I have been saying. There may be such a thing as overdoing this matter of taking too much time to keep things in order; but it pays, and pays big, to be *systematic*, and neat and tidy, even in a plant-garden.

ABOUT TOMATOES—HOW TO GET THE SEED TO COME UP QUICK.

Mr. Root:—I have just read about your getting tomato seed up in 8 days. Now, I never fail to get my tomato seed nicely up—*straight up*—in *four and one-half days*, and you can do it just as easily. Take a cigar-box, pry the bottom loose a little to let out water; fill with nice soft dirt; place the seed just where you want them; cover $\frac{1}{2}$ inch. I generally push them into the dirt with a match. Now listen. "Soak 'em" with *hot* water—not hot enough to scald the seed, but hot enough to warm up dirt, box, and all. Now, to keep them warm and retain the moisture at the surface, fold a newspaper, and tie it over the top of the box. Place

the box in a warm place on an iron mantelshelf in the family room, kitchen, or some place to keep the heat up pretty regular, and be sure to put the date on the box, and don't forget to take a look at them the fourth day after planting. If you wait many hours longer you will likely find your plants hunting for daylight, and two or three inches long, and *leggy*. I have always had at least 90 per cent of the seed up nicely in $4\frac{1}{2}$ days or a little less. I think I wrote you several years ago that I cut off all suckers from my tomato-vines, allowing only one stem, which is kept tied up to a single stake, fruit ripening in clusters toward the last of the season, near the top of the stake, five to seven feet from the ground. My tomato-patch is always the wonder and admiration of all.

Now about transplanting to the garden or permanent patch. My observation has shown me that, if the plant can be taken from the nursery, as it were, to the garden, without losing the adhering dirt and very small fibrous roots, the plant will grow right along, and produce fruit from the *first* fruit-stem, that has generally begun to form by planting-out time, although it is very often not noticed, and the first fruit will form and ripen very near the ground. Now, if the plants have been roughly handled, and put in the ground minus these fibrous or very small roots, this first fruit-stem will most certainly wither and drop off, unnoticed, usually; and it will put back the fruit bearing and ripening at least two weeks. I have several times ordered small plants by mail from you early in the season, two or three weeks before setting-out time, and put them into a cold-frame, giving each plant about 3 inches of space, when I could transplant them nicely when the time came.

Winchester, Ky., April 17. JNO. S. REESE.

WATER-CRESS PLANTS.

It seems that these plants are already in the market; at least, I judge so from the following letter from an old friend of GLEANINGS:

Mr. Root:—I send you some water-cress grown by spring water. I have 1000 plants. Amity, N. Y., Apr. 5. J. W. UTKER.

[The plants were very strong and vigorous; but they were a little yellow when received from the mails. However, they seem to be starting out all right to grow.]

WATER-CRESS, AND SOME SUGGESTIONS IN REGARD TO ITS USE.

I used to live near brooks abounding in water-cress, and am often hungry for the sight and taste of it again. I have a packet of the "vile weed"—upland cress—from Maule, but shall test it sparingly. Water-cress was prescribed by physicians in Wisconsin, where I formerly resided, as a remedy for kidney disease. It is a pleasant medicine to take.

Now, Mr. Root, about how we shall eat it. A celery glass with water, and a bouquet of the long well-washed cress hanging over, to be taken out and broken off as one requires, or a rose-bowl with a handful of the long stems loosely coiled and the ends brought up and over the sides, or a platter or large plate crowned with a mass of the luxuriant greens, are all fit dishes for the king (crowned or otherwise).

If one wants the delicate cress flavor, just a bit of salt is all the seasoning; but tastes do differ, and all must suit themselves with this most healthful and delicious of salad garnishes.

You mentioned, not long since, the use of nasturtium as a salad. Yes, it is a hardy, desirable foreign salad, and can be grown most satisfactorily in the house window in deep boxes, and the leaves used all winter. I have