GLEANINGS IN BEE CULTURE

A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS

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STRAY STRAWS

FROM DR. C. C. MILLER.

ARE YOU LOOKING for another big crop?

WHERE'S THE GENIUS among extracted-honey men to get up an uncapping-machine of value?

ARE DIVISION-BOARDS of real value, or do some hold on to them merely for old acquaintance' sake?

THIS SPRING isn't so very bad, and it isn't so very good. Up to April 20 we've had few days for bees to fly.

DOOLITTLE SAYS, in *A. B. J.*, that bees from choice fly two to four miles, and gives pretty strong proof for his belief.

THE PORTER ESCAPE, according to R. C. Aikin, in *Review*, lets bees through so slowly that they have time to get over their hurry and then go out very slowly.

IN CUTTING FOUNDATION I've long known that rapid strokes made smoother work, but I never thought of Doolittle's explanation (page 296), that the wax became heated.

ALSIKE HONEY has a slight amber tint in distinction from white-clover nectar, and experts claim to detect a faint taste like basswood honey.—*L. F. Abbott, in A. B. J.*

WARNSTORF'S COMB has got this much the start of the Weed comb, that it is now regularly advertised and sold. But it may, like the Weed comb, soon sink out of sight.

THE WHEELBARROW has been recommended to aid in uniting colonies and introducing queens, and now it is said a two to five minutes' ride will subdue the fiercest colony.

LAST WINTER I tried occasional fires in cellar. Thermometer sometimes down to 35° but heated up to 50 or 60 every week or two. Works fairly well, but I think it's better never to let it go below 40°.

SUCH PROGRESS has been made in bee-keeping that it would seem the end of improvement must be about reached, and yet there never was a time when there seemed so many new things coming to light.

LOOSE BOTTOMS, as shown by replies to a query in *A. B. J.*, have their friends and their foes. Each one is likely to prefer the kind of bottoms he uses. Of those who replied, two to one use loose bottoms.

DANDELIONS are changing their minds. Formerly they bloomed after fruit-trees; last year with them, and this year away ahead. April 17 I saw dandelions opening, when buds were not swelled on fruit-trees. Perhaps the warm blanket of snow they had all winter brought them on earlier.

RUSSIAN SUNFLOWERS are extolled in one of the journals. They make a big show of big seeds containing little meats, and I think the common kind will yield more to the acre of either nectar or meats.

STIMULATIVE FEEDING, in spring, is still valued by some, while others think if bees have plenty of stores they'd better be left undisturbed. Here's a good field for experiment on the part of experiment stations.

CURRANT-WORM CURE, from *National Stockman*.—Dissolve half a pint of salt in ten quarts of water, and thoroughly sprinkle the bushes with it. Two or three applications will do the business. Worth knowing, if true.

JENNIE ATCHLEY thinks she has had as many as a hundred queens reared in November and mated the following March, and, with few exceptions, turn out to be good queens. An excluder prevented their flying till spring.

SELF-HIVERS haven't fairly got possession of the field till along comes that man Langdon with a device to make all kinds of hiving unnecessary. I've seen one of them, and it certainly looks as though it might hold the field.

THE EDITOR of GLEANINGS may be sound on bees, but he's "off color" on horses. Any one that thinks as he does, on p. 300, that "git up and dust" in a horse always goes with buck or fractiousness has had an exceptionally bad lot of horse flesh to deal with.

EXCLUDERS are not needed over a new swarm, says H. R. Boardman, *A. B. J.*, if supers are not put over till the queen commences laying below, which is usually in 24 hours. I don't use excluders under supers, and it is a rare thing to find brood in sections.

A BEGINNER is slow in learning that it doesn't pay to fuss with a weak colony. Double a weakling with a stronger, then later make a new colony from the stronger. You'll get as much or more honey, and it won't be half the bother, to say nothing of the anxiety one always has with a sick child.

GOOD ADVICE Hutchinson gives when he says, "I say, don't fuss with weak colonies. Have enough bees so that you will have enough if some of them do die." But isn't he putting it it just a bit strong in the following? "Many of our most successful bee-keepers do not see the inside of the brood-nests of their colonies from one year's end to another."

HUTCHINSON, when he put his bees in the cellar, set three colonies on a pair of scales. From

Nov. 20 till April 5, the average loss for each colony was 9 pounds, or 2 pounds per month, but he could not detect by frequent weighing that there was any difference as to loss of weight between one month and another. I suspect that's as it should be, and the cases of variation reported have been outdoors with varying weather.

WRONG CONCLUSIONS are sometimes reached from not taking *all* the facts in the case. A writer in *C. B. J.* cites the two facts that I am an advocate of artificial heat in cellars, and that my losses were heavy the previous winter, 1891-92, and takes that as proof that artificial heat is a bad thing. But he leaves out of account the third fact that that was the only winter for years that I kept no fire in cellars, the loss being really due to *lack* of artificial heat.

LANGSTROTH'S REMINISCENCES.

THE INVENTION OF THE COMB-GUIDE.

The examiner had referred him to a cut from which he inferred that Huber had used a sharp-edged guide; but in this he was evidently mistaken. There is, however, a note in the English translation of Huber, to the effect that bees like to commence their combs from a salient angle. If this suggestion had been properly appreciated by me I might have utilized it when I first began to use a bar hive — especially if I could have read an article on bees, published in 1793, in which the celebrated John Hunter says that, by the use of a salient angle, bees can be induced to build their combs in any direction desired. As my acquaintance with bee-literature increased, I found that even Hunter had been anticipated in this matter by Della Rocca, and that such a device had been fully described, over and over again, long before any attempt had been made to patent it in this country. I must ever regard it as a very fortunate thing that no patent was granted to me on this comb-guide. I had already incurred many vexations, great loss of time, and heavy expenses, but was spared the pain which has come to so many honest inventors when apparent success gives way to the bitter mortification of finding their patent absolutely worthless.

Much has been done of late years for the wide dissemination, through our public libraries, of the drawings, specifications, and claims of thousands upon thousands of United States patents which have been granted: but in the very nature of the case there must always be a great waste of time by honest inventors who have no means of learning what has been already accomplished before them. Let me give, in this connection, an anecdote told me by a friend who had been an examiner in our Patent Office.

An application had been received for a patent on a machine for pumping or raising water, and the party making it was informed that there was nothing new, and, of course, nothing patentable, in his invention, as it involved the very same principle which Archimedes had used for that purpose in his water-screw. It never occurred to the examiner that any one with brains enough to be an original inventor of this famous device could fail to understand the meaning of his reference, until there burst into his room a man who had come a long distance on the very wings of steam to see him about his invention. As soon as his excitement and want of breath allowed him to speak, he demanded to know where the rival claimant lived, and who he was, for he was very sure that this "cussed scamp, Arky-meeds," was trying to cheat him out of his patent, that he might get one for himself, though he could not conceive how he had stolen his information about it. My readers can imagine the astonishment and dismay of this evidently honest but ignorant man when informed that the Archimedes to whom he had been referred was not a rival claimant for a patent on the screw, and that, although the place of his residence could not be given, he might learn, from the encyclopedia handed him, that he was a celebrated mathematician who was born more than 2100 years ago!

As the Commissioner had decided that the sharp-edged comb-guide was not patentable, I might well take it for granted that this ended the matter. This was very far from being so. It seems that the first of the three interfering parties, after a considerable lapse of time, made an application to have his case taken up again. As nearly as I can now remember, his claims were slightly modified, but they covered essentially the same device; and the first intimation I had about any reversal of the Commissioner's previous decision was the issue of a patent to my opponent. This patent was sold for a small consideration to a party who at once began to use it for our annoyance. Instead of suing Mr. Otis or myself, who were the principal owners of the Langstroth patent, he proceeded against an owner of only an individual right; and instead of a suit at equity, which would oblige each party to give notice to the other of all testimony to be taken, so that full opportunity might be given for cross-examinations, and the case decided by a United States judge, upon examination of all the depositions taken, he made it a jury trial, and we never heard a word about it until it was decided in his favor! It would be too long a story to give a connected account of the vexations and expenses to which we were now exposed. Fortunately for us, our opponent, emboldened by the success of his schemes, brought a suit against Mr. Otis and myself; but by this time we had learned what Della Rocca, Hunter, and others had done, and were well prepared for defense. The late Col. S. S. Fisher, so eminent as an attorney in patent matters, was employed by us; and in his answer to the charge of infringement, he so fully set forth the proof in our possession, showing how long that comb-guide had been known, that further proceedings against us were abandoned.

If all the money—counting time as money—wasted upon that comb-guide could be set down in black and white, the sum total would surprise most of my readers; and to think that it might all have been saved, if I had only known what a single one of many persons had previously written about it! While this ignorance was my misfortune and not my fault, I desire, before dismissing the matter, to refer to one important fact which, if it had not been entirely overlooked, would very early in the controversy have settled the whole matter.

An inventor is allowed by law to apply for a patent on any device which he has used publicly for less than two years; but if he takes no steps to protect himself, his invention, at the end of two years, becomes public property. Now, the testimony of my opponent showed that he used his guide only in secret. It was impossible, therefore, for me to have got my ideas from him. The proof on my side was complete, that I had publicly used and sold that guide more than two years before he applied for a patent; and it was, therefore, public property. How strange that so decisive a point as this should have escaped the notice of the Commissioner, of myself, and the able attorneys in my employ!

L. L. LANGSTROTH.

[We regret very much to say, that, owing to the continued ill health of father Langstroth, we shall be obliged to discontinue for the present his very interesting series of Reminiscences. We are sure that our readers will be disappointed; but, of course for the present we can do no better. But we will take occasion here, however, to make use of an engraving from a photograph which we took while Mr. Langstroth was here last June, that we intended to use later on. It is the companion picture to the one on p. 117. Our venerable friend and benefactor sits in the foreground, holding in his hands one of the modern Langstroth frames having thick top-bars and self-spacing ends. Beside him is a Dovetailed Langstroth hive. Back of him is a portion of the apiary, and a partial view of the buildings that help to make up the manufacturing plant at the Home of the Honey-bees. The rest of the picture will speak for itself. It presents a very pleasant subject for contemplation.]

L. L. LANGSTROTH AT THE HOME OF THE HONEY-BEES—JUNE, 1892.

AFTER-SWARMS.

WHEN TO CUT CELLS; ALLEY CORRECTED BY DOOLITTLE.

Probably there is nothing so perplexing to the apiarist, nor, in fact, to the novice or the farmer, with his few hives of bees, as after-swarms. They are rarely wanted by any one, but are ever present to annoy, unless they are prevented from issuing by the apiarist. With box hives, and the knowledge of 30 years ago, very few could do little else than let them issue at will. They were often returned, only to issue the next day, and often again on the same day. The cry of "bees swarming!" about as soon as we were in the hayfield, on some hot July morning, during the fifties, and "bees swarming" all through the day, decided my father to let this branch of agriculture alone: and as four-fifths of these swarms were after-swarms, not being wanted, they were the ones which gave the verdict, or caused it to be given. But since the frame hives came into general use, this after-swarming nuisance can be prevented; but in order to do this we must know the conditions causing them to issue, and when they are to be expected. On page 258 of GLEANINGS for April 1, I find these words over the name of Henry Alley: "A queen usually hatches on the eighth day after the first swarm issues, and it is on that day that the second swarm will come off."

Now, friend Alley is one of our oldest bee-keepers, having had years of experience with bees before many of us were born; yet he made a mistake here, or else the types did not make him say what he intended. After years of study on this point, and the most careful watching, I find that, where the colony casting swarms is in a normal condition, the egg intended for a queen is deposited in the embryo queen-cell from three to three and one-half days before it hatches into a larva. This larva is in the larval form from five and one-half to six days, at which time the cell containing it is sealed. After the cell is sealed it is in the chrysalis form seven days, making a period of about sixteen days from the time the egg was deposited in the cell to the time the queen hatches. When the queen first emerges from the cell she is a white weak thing, unless kept in her cell after maturity by the workers, as all who have handled queens well know, and is no more fit for leading out a swarm than she is for egg-laying; but during the next 48 hours she gains strength rapidly, so that, when she is about 30 to 36 hours old, she begins to "pipe," or "peep," as it is termed; and when she is from 48 to 60 hours old she is ready to lead out a swarm, where there are rival queens in other queen-cells. From the above it will be seen that the second swarm does *not* come on the day the young queen hatches, but about two days afterward. This, I believe, is according to Quinby in his "Mysteries of Bee-keeping Explained," which I have always found to be very nearly correct on all topics on which it treats. If any one objects to my using the term "leads out a swarm," just tell him that, with the first (or prime) swarm, having the old queen, the bees seem to be the leaders in the swarming movement; but with all after-swarms the case is different, for with these we find the young queen the first, or among the first, to leave the hive. When a colony is in a normal condition, or when an apiary is not affected with the swarming mania, the first swarm issues upon the sealing of the first queen-cell, unless kept back by unfavorable weather or circumstances. By issuing upon the sealing of the first queen-cell, I mean this: If the cell is sealed at some time during the hours of 8 to 12 A. M., the swarm is likely to issue from 12 M. to 3 P. M. of the same day; but if sealed from 2 P. M. to 8 A. M., then the swarm will issue during the forenoon, so that, in this latter case, which is the usual one, the cell may be sealed anywhere from one to eighteen hours before the swarm issues.

I have been particular in this matter, so that we could know just when to cut off the queen-cells to prevent these after-swarms. If we cut off all the cells but one on the fifth or sixth day after the issuing of the swarm, as has been recommended many times, we are not sure that the cell left will hatch; and, furthermore, the bees still have larvæ young enough to convert into queens, which they are almost sure to do, and in this case they will often kill the queen which hatches first, instead of allowing her to destroy these later-started cells, when we not only have as many after-swarms as we should have had, had we not cut the cells; but we have also the disadvantage of having queens reared from old larvæ, which, all concede, gives inferior queens. Now, if we wait about this cutting of cells till the eighth day we shall run no risk of the colony swarming; where the first swarm was not kept back by foul weather, there will be no larvæ young enough to convert into queens, and, as a rule, the first young queen will be hatched, when we can make a sure thing of the matter if we are sure we cut off all the queen-cells there are in the hive. For these reasons I now wait till the morning of the eighth day after a first swarm has issued, when I open the hive, take out the first frame, and hastily glance over it for nearly ripe queen-cells; and if none are found I shake most of the bees off near the entrance of the hive, into which they will immediately run, when the frame is closely inspected for queen-cells, peering into every nook and corner for them; for, should some small or crooked one be missed, swarming would surely result. All cells found are cut off, after a frame has been shaken to rid it of bees, for this shaking of the young queens in their cells is almost sure to kill them or cause deformity. The next frame is treated the same, unless ripe cells are found, in which case it is set outside the hive, awaiting the finding of a cell from which a queen has hatched, when all are cut off; but should none have hatched, then the best one of these ripe cells is saved and put back into the hive. In this way we can make sure that no swarm will issue, after the first, from this hive, and it is the only certain plan I know of.

G. M. DOOLITTLE.

Borodino, N. Y., April 17.

RAMBLE NO. 83.

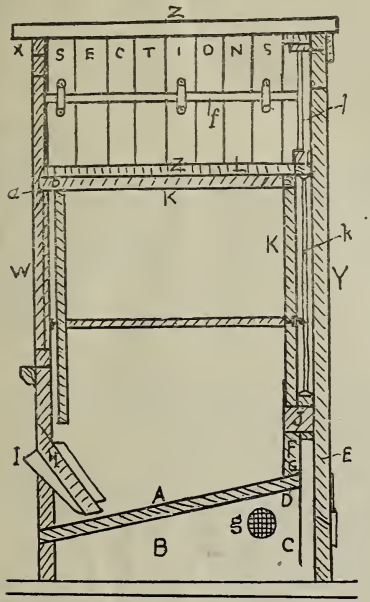
JOHN S. HARBISON AS PIONEER, BEE-KEEPER, INVENTOR, AUTHOR.

Mr. Harbison, who, since the year 1857, has had such a prominent place in the apicultural ranks, and an especial prominence in developing the honey resources of California, now resides in an elegant home in the city of San Diego, and with beautiful surroundings, such as only this favored clime can produce.

Mr. Harbison was born in Beaver Co., Pa., Sept. 29, 1826. He is a thorough American, and traces his lineage back through several generations. His grandparents were active patriots in the Revolution, and in frontier service against the Indians; and, besides their skill in arms, the Harbison branch of the family gave their attention to mechanical problems, and were the first to erect a gristmill in the then wilds of Western Pennsylvania.

Mr. Harbison's early life was spent upon a farm; and his father, being an extensive bee-

keeper, in the old-fashioned way, with log gums and straw skeps, the son became familiar with the buzz and industry of the honey-bee early in life, and imbibed a love for them.



SECTION OF HARBISON'S HIVE.

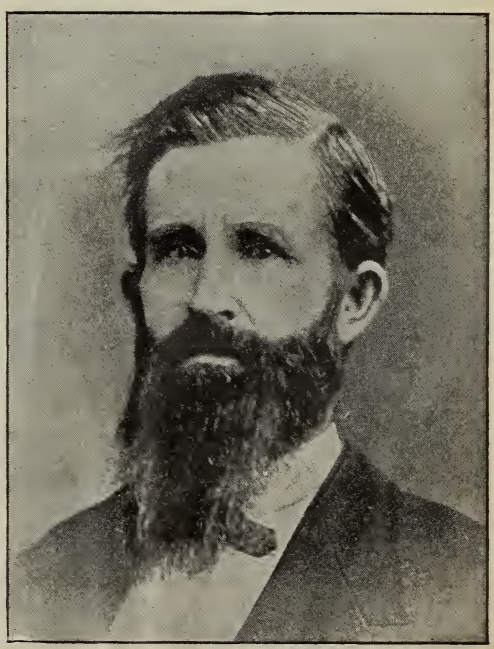
What may be termed the first real advance in bee culture in this country was made about the year 1843, in the invention and introduction of the Weeks patent chamber hive. Mr. Harbison, recognizing its advantages over the old straw skep in use, adopted the new invention, and used it quite extensively for several years. Like all young bee-keepers, he was possessed with the spirit of invention; and, thinking there was a good field for improvement, and greater possibilities for bee culture in the future, Mr. H. improved upon the Weeks hive, and, while retaining the inclined bottom-board, he invented a movable platform upon which combs could be adjusted; after which the bees would attach them to the hive. The improvement admitted of an easy transfer of combs, and the improvement was within a few steps of the later movable-frame hive.

Owing to heavy winter losses, and perhaps, also, to the "gold fever" that raged in so many minds during the early and wonderful discoveries in California, Mr. H. resolved to seek his fortune and a more genial clime, and came to this State in 1854. Soon after his arrival we find him in the Campo Seco mining camp, in Amador Co. His ventures here were disappointing, and, after several weeks of hard labor and but little yellow metal to show for it, he left the mines and found employment in the Sutterville sawmill, near Sacramento. This business was, however, distasteful; and after several months work he resolved to give up the avocation for which he had but little taste, and to devote himself to something with which he was familiar. He accordingly sent to his home in Pennsylvania for a general assortment of seeds, and for a small invoice of fruit-trees. They arrived safely, and he started the first nursery of fruit and shade trees in the Sacramento Valley; and from this and subsequent importations were started the great fruit-orchards that are found on both sides of the Sacramento River.

The first shipment of bees came to California the year previous to the arrival of Mr. Harbison. Of the first lot of 12 colonies that were imported, only one survived. This was taken to San Jose, and threw off three swarms the first season. The owner, Mr. Shelton, being killed by the explosion of the steamer Jennie Lind, the colonies were sold, and brought over $100 each.

The next importations were by Mr. Wm. Buck. Out of two importations amounting to 78 colonies, only 25 were safely landed.

In 1855 the first swarm of bees was brought into the Sacramento Valley, and soon died, which gave an impression that bees would not live there. These experiments coming under the observation of Mr. Harbison, he sent east for one colony of bees. It arrived with but few bees in it; but the building-up of this weak colony, under the experienced hands of Mr. H., and their rapid increase and the large amount of honey gathered, demonstrated that California was to be a golden State for bee culture; and in 1857 Mr. H. started for the East to make a large shipment under his own personal supervision. Sixty-seven colonies were prepared from his own apiaries in Pennsylvania, and, after a voyage via the Isthmus to San Francisco, and then up the Sacramento River, an entire distance of 5900 miles, the longest continuous voyage bees had ever previously been shipped, the importation arrived with a loss of five colonies. Others were, however, so weak that a doubling-down left 50 strong colonies. Other larger and successful shipments were made, and 240 colonies of these importations and their increase were sold for $100 per colony.



JOHN S. HARBISON.

These successes gave an impetus to the importation of bees to California; and in the fall of 1858 over 1000 colonies were shipped to the State; but, owing to the inexperience of the parties shipping them, less than 200 survived.

After the importation era had become a thing

of the past, Mr. Harbison gave his attention to the improvement of the bee-hive. During his visits to the East, in 1857, his attention was drawn to the newly invented Langstroth hive; and, giving it a trial, it did not come up to what he required in a hive; and upon his return to California he invented the well-known Harbison hive. That Mr. H. made a mistake in his line of reasoning, and in the conclusions arrived at, has been sufficiently demonstrated in the fact that the Harbison hive never made progress outside of California; and even here it is now being rapidly superseded by the discarded Langstroth or some of its modifications.

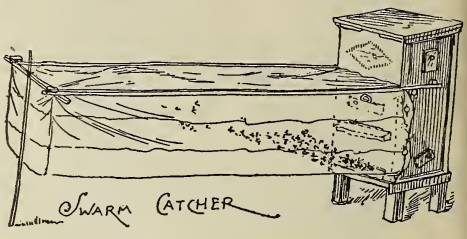
As long as the one product, comb honey, was the result of the labors of the bee and apiarist, the Harbison hive held its own remarkably well; and for a time one large section of country at least could boast of a standard hive. The invention of the honey-extractor, and its introduction into California, however, numbered the days of the Harbison hive, and the Langstroth was found to be a better all-round hive.

Along with the invention of the hive, Mr. H. made a great step of progress in introducing the section honey-box. This was first exhibited and excited much interest at the California State Fair, held in Marysville, in Sept., 1858. Mr. H. made several minor improvements in his hive, but never tried to adapt it to the use of the extractor, for he thoroughly believed in the production of comb honey only. Other parties have made a modification of the hive by sawing it off just above the fixed frames, and adjusting an extracting super with loose frames. In some portions of the State the H. hive is largely used with the 2-lb. section; and the producer regrets that the smaller size was ever introduced; but facts are stubborn things; and as the extractor has revolutionized one end of the H. hive, so the 1-lb. section has revolutionized the other, and both are hastening along to a complete victory.

HOW FRUIT-MEN DESTROY AN APIARY.

The next invention of importance, and which works well with the H. hive, was the Harbison stove smoker. Open the rear door of the hive, and set the smoker down in the rear, and a volume of smoke rolled up and against the exposed combs; but this smoker, used with a top opening hive, is of but little use, and the bellows smoker takes its place. The stove smoker holds a large amount of fuel, and its smoking propensities are continued for nearly a whole day from once filling.

The honey flora of the Sacramento Valley was trodden down and plowed under by the advance of grain-fields and orchards; and, failing to secure the large yields that at first rewarded the little toilers, Mr. Harbison, in 1869, formed a partnership with Mr. R. G. Clark for developing the virgin honey-ranges of San Diego Co. Great success attended their efforts, and in 1873 the first full carload of comb honey was shipped across the continent, giving California honey a world-wide fame. Mr. Clark sold out his portion of the business in 1873. Mr. Harbison at one time owned 3500 colonies, and one of his greatest yields was 60,000 lbs. of comb honey from 300 colonies of bees.



Mr. H. has had some trouble with fruit-raisers, and the result was a conflagration of a whole apiary. Usually apiaries are burned by saturating each hive with kerosene, and then applying the torch; but in the above case the hives were placed together and burned. Perhaps it was in view of the inroads of the fruit-raisers that Mr. Harbison said that California bee-keeping has seen its best days, and that the honey-yields would hereafter wane instead of increase. The statement would probably prove true if the present conditions continued. That the conditions will change, and for the better, is evident from the progressive tendency of the bee-keeping industry. Mr. H. now owns only about 500 colonies, which are either rented or cared for by hired bee-keepers.

In 1861 Mr. Harbison published his book, "The Bee-keeper's Directory," a volume of 440 pages. The illustrations are of a high order, and the subject is treated in an exhaustive manner; and instead of being a book merely to advertise the H. hive, it is a valuable work for any bee-keeper to have. It is, however, out of print, and hard to find. Many of the problems that are now agitating the bee-keeping world were under experiment in California thirty years ago. The control of swarming was as much of a problem then as now; and Mr. Harbison invented the swarm-catcher, a large net that could be applied to the front of the hive, and in which the issuing swarm was caught. When not in use it was collapsed in front of the hive.

Although Mr. Harbison may be regarded as the father of California bee culture, he has never come in contact with bee-keepers through the bee-periodicals, and the fraternity have a sort of vague idea of the man. The photo I obtained was taken a few years ago, and is natural, with the exception of at present a few more gray hairs.

Mr. H. was married in 1865. A son and two daughters were the result of the union; and, the son dying in infancy, the two daughters are the only remaining children. Mr. H. is inter-

ested in the grocery business, and various other enterprises; and, though nearly threescore and ten years of age, he is a very active business man.

Our interview was very pleasant, and will be long remembered by the RAMBLER.

THE HIVER—ITS COST.

R. L. TAYLOR REVIEWS THE MATTER.

In the whole history of apiarian inventions, perhaps there is nothing so specious in its character, so well calculated to deceive the unwary, as the hiver; and I feel that at best great disappointment is inevitable, for many will undoubtedly be so blinded by the glare of its false promises that they will make haste to demonstrate their faith in its supposed virtues by investing in it money which I fear will never be recovered. To prevent, so far as may be, the vexation and loss likely to result, is so evidently praiseworthy that I am moved to point out, for the consideration of those interested, some difficulties that must be encountered in any attempt to make use of what seems admitted to be the least objectionable of the hivers thus far brought out; namely, the Pratt 1893 pattern.

Taking it for granted that the hiver will operate in accordance with the claims and expectations of the inventor, what I have to say now may be conveniently considered in answer to the question: "What will it cost?" for, whether the outgo necessary to its possession and use is money, labor, or other thing of value, it is equally comprehended within the meaning of the item of cost.

The first cost of the device specifically called the hiver is, of course, not great; but of what possible use would it be alone? Of course, to complete the hiver there must be added a hive entire, and the hive must be furnished; and if furnished according to the practice of practical bee-keepers, the expense in an apiary of any considerable magnitude would soon be felt to be onerous enough. It is no answer to this to say that the hives in any case would be needed for the swarms, for that is not true. Under good management I think I may safely say that only about a third of the colonies on an average, in apiaries devoted to the production of comb honey, cast swarms; and when extracting is practiced, the proportion is less still; so that, in an apiary of 200 colonies, the wear and tear on about 150 hives, together with the interest on their cost, and their necessary manipulation and storage—no inconsiderable items—would be a dead loss unless in some way the use of the hiver brings compensation. Would exemption from the care of swarms be adequate compensation? At a venture, I should choose to have the swarms hived in the old way. I think the expense would be less.

But when the too sanguine purchaser of the hivers has paid for them, and got them in position, he finds himself in a dilemma. The road divides; but whichever branch he proposes to take, he finds himself confronted by items of cost springing out of the ground, demanding recognition, and refusing to be laid. By the choice of the right-hand branch he may expect to be able to produce comb honey, to keep up the number of his colonies, to get some benefit from the young queens reared during and in consequence of swarming, and to guard in some degree against damage liable to result from the uniting of swarms, but at the expense of much care and hard labor, and of sundry vexations and costly mistakes and misapprehensions. By taking the other he shirks the heaviest of the labor, but thereby sacrifices all young queens, and some old ones too; foregoes the production of comb honey, and suffers the number of his colonies to be rapidly reduced.

Mr. Pratt, after contemplating both, and presumably trying both, has chosen the left-hand road. His plan is, to place the hiver under the colony in the spring, and leave it undisturbed till fall. When a swarm issues, the only exit for the queen is through the hiver into the hive below, whither the swarm is supposed to follow her, and set up housekeeping anew. There is no exit for queens, young or old, to the open air. Now let us see what additional items of cost must accrue against the hiver used as the inventor recommends it to be used.

First, inasmuch as there is no provision for the renewal of queens, either at the swarming season or by superseding, the colonies must rapidly perish; and within three years, if the plan is adhered to, the apiary will be as quiet as a grave. At what sum shall this item be estimated? But Mr. Pratt will exclaim that it will not operate so, for queens will be reared or procured, and supplied in this way or that. Well, at what sum shall this item, *i. e.*, the securing of queens by his method, whatever it may be, be estimated? He may take the cheaper of the two courses, and find that very dear.

Second, there can be no success in the production of comb honey if the bees swarm, for it can not be supposed that the bees will carry their honey up through the old brood-combs, as they are becoming empty by the hatching of the brood, into the sections, but the combs will be filled first to the extent of fifty pounds or more if so much is gathered; and then, loth to go up through so much solid honey to the sections, they will proceed to fill the new brood-chamber. The great bulk of all this honey should have gone into the sections; and when no swarm issues, who can say what proportion of the colonies, rather than go into the sections, will work downward through the hiver, entice the queen down, and then go through the same process as though they had swarmed? Let any one at all skilled in the production of comb honey say what the hiver would be costing under such circumstances as these.

Then, third, though the proposed plan did not involve the destruction of the colonies, the sacrifice of all the young queens must seem, to all who know the difference between a vigorous queen and a decrepit one, a tremendous price to pay for a set of hivers. The queen-breeder's price list would give only an inadequate idea of the cost, and this is an item which can not be avoided except by dropping the Pratt plan.

Any one giving the matter candid consideration can not escape the conclusion that Mr. Pratt has made a very serious mistake in choosing this branch of the road. He no doubt will say that all this damage may be avoided, and he would be right, but only on condition that he turn sharp around, retrace his steps, and take the other way. Let us retrace our steps, and try that way. We have tried the way of ease and ruin; let us explore now the course that gives promise of success, it may be, but gives no promise of exemption from care and labor.

We have learned at least some of the things that must be obviated before we can indulge even a faint hope of success; viz., we must save the young queens or else rear or purchase and introduce others; we must know continually the condition of the old queen, and, in case of accident to her through the vicissitudes of the new method of swarming, be prepared to replace her; and the tastes and inclinations of the bees must be humored in order to any

success in the production of comb honey. At what expense, for the sake of the hiver, must we be to accomplish all this? Success in every one of these particulars demands that the apiarist have constant knowledge of the condition of the colonies with respect to swarming, queens, and the occupancy of the lower hive without swarming. This involves the almost herculean labor of lifting each hive with its supers off the hivers about twice every week during the entire swarming season. They must actually be lifted off, for the hivers must be examined carefully for superseding queens as well as for old queens deserted by their swarms; and this must be done in the sun of the hottest summer weather. One need try it but once to become satisfied of the magnitude of the operation. If any bee-keeper mourns because he is out of work he may now cheer up; let him attach the newest pattern of hiver to his colonies, and from that time forward he will have no cause for complaint.

These are some suggestions, hardly more than hints, at the inadequacy of the hiver. One might enter more particularly into the measuring and weighing of its disadvantages; but as they seem so absolutely to smother any possible hope of advantage, it is scarcely necessary. R. L. TAYLOR.

Lapeer, Mich., April 19.

PACKING VERSUS SINGLE-WALLED HIVE.

AN EXPERIENCE THAT SEEMS TO FAVOR THE LATTER.

An old farmer once said to me, "Keep your bees dry and they will not freeze." While his statement may not be strictly true, there may be suggestions in his ideas. My experience this winter very much inclines me to the belief that bees should not be surrounded with any sort of packing that will absorb and retain moisture. This March I had occasion to change a colony from one chaff hive to another, to widen an entrance for spring. When I took the bottom out of the hive in which the bees had wintered, I found the chaff a wet, soggy, half-rotten mass. Another colony was in a shell set inside of a larger shell, no packing except on top. The brood-nest was contracted, and two new chaff division-boards put in at the sides of the frames inside of the inside shell—no connection with the outside, except the entrance. The inside shell rested on a sheet of tarred paper on the bottom of the outside shell or case. This colony had the greatest mess of dead bees, mold, and dirt, on the bottom-board, of any colony. The two chaff division-boards were, I might say, soaking wet. This overhauling I am speaking of was done in March. I cleaned out this hive with a little fire-shovel. Other hives were cleaned out the same way.

Finding my chaff-packed colonies in such rotten messes, I took my shovel and hastened to the colony that had no chaff packing, to shovel the dead bees and dirt out of it. I raised the quilt, blew in a little smoke, and took off the quilt. I was astounded. Instead of moist-looking, sickly bees like the others, they had that dry, glossy, chipper look you see in fine weather. There hung the combs, dry and bright, with that glossy appearance you would expect to see later in the season. I began taking out the frames, and set them aside so I might shovel the mess off the bottom-board as I had done the others. I looked down, and was again struck. There was nothing to shovel out. The bottom-board was almost as clean as in the summer. I had worried more or less about this colony all winter, because it was so poorly protected. I covered it down again, and went into the house and told my wife we need not worry about that colony, even if all the others died before good weather. This queen was a daughter of an imported queen, the same as the others in the yard. Her mating might have had something to do with her wintering, scarcity of chaff hives was my reason for risking bees in this hive.

In order that others may with me further test this matter, I will give details.

This hive was a solid box, made of heavy pine boards, 1⅛ in. thick, heavily painted white, with good dry cover of ⅞ pine. Inside the ends was nailed another board, about ⅞ thick, against the ends, with no paper or dead-air space. This inside board was to hang the frames on, making the ends of the hive about a solid two-inch plank. The sides were just the outside boards. The bottom was painted, cleated ⅞ stuff, not nailed to the hive; but the joints were probably filled with dirt, etc. The entrance was full width, but contracted by loose blocks set against the outside; open entrance, about 3 inches by ⅜.

Early in the fall the brood-nest was reduced to six combs, spaced summer spacing. The chamber was contracted by two ⅞ pine close-fitting division-boards. The openings along the tin rabbets had a small muslin rag stuffed in them. Behind the division-boards were old rags down at the corner at the entrance, to keep the cold from getting behind the division-boards through the entrance that would be otherwise open. No attempt was made to stuff behind the boards for warmth or protection, except as spoken of about the entrance.

On top of the frames were laid two or three sticks to insure space over the top-bars. Over this was carefully adjusted a piece of duck that had been thoroughly waxed by the bees in summer, making practically a sealed cover. On this quilt was laid some kind of a cotton pad nearly ¾ of an inch thick, that some old lady had probably made at one time for a back-rest on a rocking-chair. On this pad were thrown some old coats, pants, or something like that. You can readily see how necessity was my master. I mourned during the cold weather because this colony was not packed in chaff.

This one test is not conclusive. Colonies for comparative experiments should be with queens from the same mother, from the same batch of swarming cells, put into winter on the same number of combs, about the same amount of honey, and fixed for winter on the same day, very early in the fall, so all cracks can be sealed. Also try one colony of the same, but to be changed to a new chaff hive, too late to be sealed or propolized, and put in brand-new chaff division-boards at the sides of the contracted brood-nest. See how wet those division-boards are in the spring, if the winter is a hard one. That colony will probably be dead, with the "absorbents" all around them.

My experience convinces me the ten-frame hives are not much if any too large. I am satisfied the eight-frame hive is a mistake. Most of my queens use nine and some of them ten frames. They must have some room for stores.

While watching my weak colonies building up this March and April, I think I should like to have our brood-frames shortened at least one inch, and that comb surface added to the bottom, thus making them just a little shorter and deeper. I should want the same comb surface as now.

I had another colony in a home-made box that had tar paper between the two end-boards. This colony came through in very bad condition. But it was so poorly protected on top that it was no test. I am afraid we do not want tar paper. But I am not sure yet.

Ingram, Pa., April 20. PHILO S. DILWORTH.

SEALED COVERS A FAILURE.

WINTERING IN THE DOVETAILED CHAFF HIVE; SUCCESSFUL MOVING OF BEES.

Friend Root:—As I had some correspondence with you, and also with Capt. Hetherington and Dr. Miller relative to moving my bees during the month of March from Bloomfield, Ky. (latitude 38°), to this place (latitude 37°) by freight, it may be that your friends, and the readers of GLEANINGS generally, will be interested to know as to the success of the move, methods adopted, and lessons learned in the school of experience. I am very sure that, prior to moving them, I should have been delighted to possess just such information as I am now able to give from experience.

I reached Bloomfield March 9. The bees had a good flight that day and the next. I found my 34 colonies, 15 in chaff and 19 in single-walled dovetailed hives, *all* alive. I had packed 30 of them in October for the winter, using a device, similar to Mr. Hill's, above the brood-chamber, over which I placed, in a super, several thicknesses of burlap. Four of them I left with "sealed covers," all on their stands. It will be the last of "sealed covers" with me. These four were by far the most depleted, and were all suffering from dysentery. The fifteen in Dovetailed chaff hives were in the best condition I have ever found my bees in the month of March, during an experience of 12 years in different localities. All honor to the Dovetailed chaff hives. Undoubtedly it is a superior hive for all localities and seasons, being warm in winter and cooler in warm weather. Those in the single-walled Dovetailed hives were in excellent fix, except the four under "sealed covers." I prepared 20 of the colonies for shipping, according to the suggestions in the A B C, using the wire screens on top *only*. The remaining six I arranged with thin pieces of wood, $\frac{3}{16}$ of an inch thick, under the corners of both bottoms and covers, securing the latter with two 2-in. screws in each. On reaching their destination I found more dead bees in these six on which I had not used wire screens than in all the other 28. I put a ball of wet rags on the brood-frames in each hive. I shipped in a fruit-car; but as the mercury had dropped to 28° the morning I shipped, I closed all the ventilators except the two front windows, which were near the floor of the car, on the sides. The hives occupied the rear half of the car. They were placed in the car with frames parallel with the rails. The chaff hives were placed in the lower rows. Across the tops of these, and parallel with the ties, I placed two strips of lumber (2 x 1 in.), securing the strips with one five-penny nail, just where it crossed each hive, driven into the frame of the wire screen in front and rear. The second tier of hives was placed on these strips, which afforded ventilation to the hives below; and the cleats of the bottom-boards, exactly fitting over the strips, prevented the upper hives from being jostled either backward or forward.

The bees reached Glasgow, a distance of 160 miles, the next day, in splendid condition. Mercury rose to 40° that afternoon. Not one comb was broken down, not a quart of bees had been killed by the trip. Many of the combs were new last season. Most of them were on improved Hoffman frames, which are good enough for me. I would not, however, object to the thicker top-bar.

The prospects are exceedingly bright for a fine season in this section. The fruit-bloom is very heavy, and white clover abundant. Some colonies have already become so strong that I have been compelled to put on one super for fear of swarming fever.

I find myself admirably located for queen-rearing, to which I am giving special attention. There are only two colonies of bees within a mile of me, and not half a dozen within three miles. I shall have little difficulty in keeping my stock pure.

As to the question asked in GLEANINGS recently, concerning the hardiness of the progeny of Southern queens, let me say my experience has been decidedly favorable. Much of my present stock was reared from a Southern queen, the remainder from a queen purchased from you season before last. They stood the test last winter equally well, where the thermometer ranged from zero to 10° below, often for a week and sometimes ten or twelve days consecutively. I have now a queen, purchased recently for breeding purposes, from Mr. A. F. Brown, of Florida. I shall have an opportunity to test the matter more fully, as to this climate at least. F. G. RAILEY.

Glasgow, Ky., April 12.

SEALED COVERS AND ABSORBENTS: A DIFFERENCE IN FAVOR OF THE LATTER.

In regard to wintering bees, I would say that all of our 13 colonies came through all right. We have not lost a colony since we began the business, but can't say how soon we may; however, there was quite a difference in the condition of our bees. March 7th, part came out with nice dry combs; but most of them showed that dampness had collected to quite an extent on the inside. Even the combs of some were wet. Now, the most were under sealed covers in large chaff hives; part were in your Dovetailed chaff hives, and were prepared for winter by fitting thin boards loosely into the bottom of a super. We next put in a thick quilt, and filled the super up with chaff, and set it on top of the hive. Now, between these and the others with sealed covers I could notice no particular difference. One thing seemed a little strange. One colony was set into one of those large chaff hives quite late in the fall. The cover was not fastened down at all. There was also a hole bored through the cover, and the chaff cushion placed on top, the same as the rest, with a piece of old carpet on top of that. Well, what of it? Why, this colony came out just as dry and bright as a silver dollar—no dampness in the least. My neighbor has a hive with a telescope cap made perfectly tight. When this cap is let clear down for winter there is a $\frac{3}{8}$-inch space over the frames. To experiment, he left the honey-boards (that cover the top of the frames) off, and every one so treated came out dry and in good condition. I noticed one thing, that hives with thin covers under the cushions came out dryer than those with thick covers. S. FARRINGTON.

Corunna, Ind., April 10.

CONFINING THE BEES WITH WIRE CLOTH IN CELLAR WINTERING.

I put my 34 colonies into the cellar the latter part of November, with sealed covers, but put a two-inch rim between the hive and bottom-board. This rim was made with an entrance one inch high and as wide as the hive, so as to afford bottom ventilation, and also for convenience in cleaning the bottom during winter, which I did three or four times without disturbing the bees. As my cellar is not mouse-proof, I nailed some wire cloth to pieces of blocks, and actually closed the bees in the hives. I could not see that this closing them in bothered them in the least, for they were more satisfied than any previous winter with a $\frac{3}{8}$-inch open entrance and top ventilation. They were put out on the summer stands April

4. One of the 34 had died of starvation; all the others were strong, and are out flying now every day. The sealed covers had made it very damp in the hives—so much that the unpainted rims were water-soaked. The temperature in the cellar ranged between 38 and 45° most of the winter, and 50 the latter part of March. Even as high as that, the bees were perfectly quiet, so I could lift the hives up to remove the rims before they were put out.

J. F. ROSENFIELD.

West Point, Neb., Apr. 10.

[We have usually not considered it wise to shut in bees absolutely with wire cloth; but by emptying out the trays occasionally it does away with the stench from dead bees, and so makes the live ones quieter. Have others tried this with success?]

IN FAVOR OF SEALED COVERS.

I wintered 8 colonies on summer stands—3 in chaff hives with sealed covers, all in good shape; two 8-frame thin-wall Simplicity sealed covers, with four to six thicknesses of newspapers around the body (inside the outer cover). One smothered and the other is in poor shape. Three single thick-wall sealed covers are in good condition; two Simplicity in cellar, sealed covers, came out in good shape; 7 wintered in an out-building (sealed covers); one died with dysentery; the rest are in good shape. Apr. 4th it was up to 70°; bees had a good fly. To-day, the 7th, the ground is white with snow. I shall stick to sealed covers yet awhile.

I like GLEANINGS very much better than any other journal I have seen yet.

Cicero Center, N. Y. S. H. EASTWOOD.

SEALED COVERS; A CASE OF "DON'T KNOW."

You ask for reports on sealed covers. I went into winter quarters with 40 colonies with sealed covers; 3 starved, 37 are O. K. I never saw so many young bees so early in the season. They are chock full of bees, ready for the harvest. But, oh my! how the water did drip out of the entrance every time it thawed! I can't say that I like sealed covers. I fear the dampness, although they did well this time. I had 40 colonies packed in chaff. They always seemed to be nice and dry, but are not so strong in bees as those in sealed covers. I shall have to say, like Dr. Miller, "I don't know."

Edgerton, Kan., Apr. 15. B. F. DE TAR.

SEALED COVERS AND ABSORBING CUSHIONS, WITH THE DIFFERENCE A LITTLE IN FAVOR OF THE LATTER.

The bees have wintered fairly well in this locality. I packed a few with sealed covers, and could not notice any great difference in their wintering as compared with upward ventilation; but in an out-yard where all were packed with sealed covers I had considerably more than the average loss; but I think it was mostly caused by the long-continued cold weather when the bees could not break cluster to find their stores, and do not put *all* the blame on the sealed covers. W. G. LARRABEE.

Larrabee's Point, Vt., Apr. 17.

ABSORBING CUSHIONS AHEAD.

Out of 7 colonies in Dovetailed hives packed in winter cases, with chaff all around, and top covered with burlap and chaff, one died. It was a late and small swarm. Out of 9 colonies in box hives (which I bought too late to transfer), packed with straw all around and over sealed covers, leaving only entrance free, four died. Part of their combs were wet and moldy. All had plenty of stores. One of the box hives in which the bees survived is a cracker-box of ⅜-inch lumber, but the cover fits so poorly that the bees enter under it instead of below, hence had upward ventilation. A neighbor who leaves his hives unprotected on the summer stand (an open shed) lost 75 per cent. Last winter his bees wintered well, kept the same way.

J. F. EGGERS.

Grand Island, Neb., April 18.

DECIDEDLY IN FAVOR OF SEALED COVERS.

You can mark me down in favor of sealed covers. I like your Dovetailed chaff hive with sealed covers. I wintered 13 colonies without a single loss so far. All but 3 colonies were under sealed covers. Absorbing cushions became so damp and moldy that even the combs became very moldy; while under sealed covers every thing is dry and nice. Our bees are in good shape, with plenty of stores. Our neighbors all around us have lost very heavily.

Bladensburg, O., Apr. 5. A. BLUE.

SEALED COVERS A BIG FAILURE.

The sealed cover did not succeed with me. I had 17 colonies under sealed covers, and sealed tight, with 5 inches of chaff over them, and 2½ in. on the sides. Eight of the 17 colonies are no more. They had lots of honey left in the hive. I had nine colonies under chaff cushions, and all wintered well. So my experience is overwhelmingly in favor of absorbents.

Flat Rock, Mich., Apr. 20. D. I. WAGAR.

SEALED COVERS INCLINED TO WARP.

My objection to sealed covers is, that moisture from bees swells the under side of the cover, therefore they warp up in this shape ⌣, or ⌒, thus breaking loose at the sides or ends, causing a draft through the hive. In my opinion there is nothing so handy as the enamel cloth, especially for handling in the working season: when you take sealed or flat covers off, the bees are apt to "sit down" on you rather hard. A. STEVENSON.

Tingley, Ia., April 6.

ABSORBING CUSHIONS.

I think the absorbing cushions the safest way to winter here when it rains. Here the entrances sometimes clog with ice, and are not safe with sealed covers; but with absorbing cushions will do no harm. I have always had good luck with chaff packing.

FRANCIS ORTT.

Darling Road, Ont., Can., April 8.

SEALED COVERS NOT AS GOOD AS THE ABSORBING-CUSHIONS.

Bees have wintered well. I have not lost one. I winter on the summer stands in chaff hives. We have had a very cold winter here. Bees have not done as well under sealed covers as in the large chaff hive. A. A. SIMPSON.

Swarts, Pa., March 30.

WINTERING POORLY UNDER SEALED COVERS.

Bees have wintered poorly around here. My loss is about 40 per cent. A neighbor lost 15 out of 16 swarms. They were packed in chaff, with sealed covers, but they were weak.

St. Clair, Mich., Mar. 29. J. M. RANKIN.

BAD FOR SEALED COVERS.

As per your request, I state that, under my observation, 97½ per cent of bees, under absorbents, in this locality, wintered; while from 50 to 75 per cent under sealed covers perished.

Sneedville, Tenn., Apr. 6. H. F. COLEMAN.

JAKE SMITH'S LETTERS.

THAT LECTER.

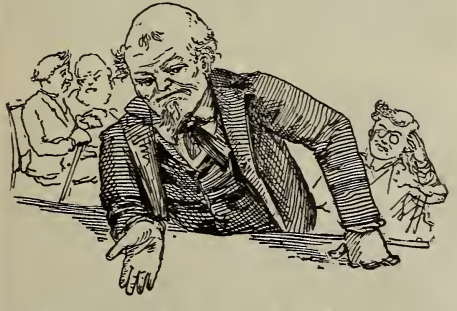
Mr *A. I. Gleenings — deer sir:*—They was a man in our naberhood a sellin a noo patent bee-hive. He give a leckter onto bees in the skool house. He said he wanted to instruck the peepel about the pewrest and best sweet ever concocted by nature. But my old woman sez he wanted to sell hives. I think Betsy izzent fur wrong. Ile give you a short report of his leckter. Leastways sum of it. It was as follows, viz: to-wit, namely:

"Ladies & gentelmen, from time immemoreal the hunny bee was diskuvvered ages ago. It was 1st diskuvvered in the carcus of a lion. The lion was ded. And no wonder, for a whole swarm of bees was enuff to kill enny lion.

"The best hunny is prodoost from a movable hive. You see be four you a spessamen of the movable hive. You see it has handles by whitch you can pick it up and move it ennywhere, and that's why it's called movable. They is two kinds of movable hives. Them whitch is made with handles in the 1st place is jist called movable, but I can fix enny hive soze to make it movable by puttin handles onto it, and when it's fixed that way it's called a fixed hive. The handles is secured by a patent.

"Improved bee-keepers keeps their bees in out aperries. An out aperry is one whitch is kep out doors. The free sirkellation of fresh air out door is condoosive to the health of the bees.

"Much of the hunny nowadays is made by contraction. The aperrist keeps a lot of movable hives, and makes a contract with the storekeeper for all his hunny at the beginnin of the season, and by this means of contraction he doant hev to trot round to sell his hunny to Tom Dick & Harry, but sells it all by contraction."



IZZENT THEY SUM MITY FINE HUNNY PRODOOST FROM WHITE CLOVER?

I hevvent time to tell you all the rest of his leckter; but when he got through he sed he wood be glad to heer questions or remarks from enny one. Then they all begun to holler out, "Jake Smith! Jake Smith!"

Then the man, he inquired was Mr. Smith in the house, and I felt it was my dooty to respond a reply. I coodent tock like the agent did, for he was very smooth spoken, but I could tell about how I hed dun.

I sed, sez I, I haint only a farmer, sez I, and I haint no improved bee-keeper, but I think hunny is a grate invenshun. Sez I. I have always kep my bees in a out aperry, but I diddent know befour that was the name. I doan't keep movable hives nor fixed hives, sez I, but jist common hives or scaps, and one pallus. I never practist contraction on the storekeeper, & most generally my fokes eats up what hunny we git, and most of you has tasted it.

Sez I, I haint nuthin to say agin the hunny prodoost from a movable hive, but I want to ask jist one question, izzent they sum mity fine honey prodoost from white clover? sez I. And, sez I, them handles may be secured by a patent, but they look like they was secured with screws. I jist sed that fer a joke, fer he ment you dassent make handles when they was patented. But I doant think yude git mutch more hunny with handles. JAKE SMITH.

RECOLLECTIONS AND EXPERIENCES; BY AN OLD BEE-JOURNAL EDITOR.

WAX-REFINING: A HOME-MADE BOILER; HOW EVERY FOUNDATION MANUFACTURER MAY HAVE GOOD FACILITIES AT A TRIFLING COST; A VALUABLE ARTICLE.

While engaged in the manufacture of comb foundation we accumulated a quantity of wax, unfit for foundation, much of it being very dark and filthy. Not only so, but we often made wax into foundation that did not please us, and which damaged our trade, but which, due to first cost, must be turned into money. To be able to refine such wax has been a luxury; for, to make the operation successful and expeditious, considerable investment has been necessary.

Recently we wrote to a manufacturer of foundation, asking his price for refining this stuff, and we found the cost on 500 to 700 lbs. would be quite an item. By correspondence we found a better market for this wax, if refined, much nearer home. As our time was not strictly valuable, we concluded to refine this wax ourselves. We applied to a manufacturer in town, to use steam from his boiler, but found his charge per hour would leave us little for our labor.

Not yet discouraged, we concluded to construct a boiler and do the work in our kitchen. This is how we did it:

We chanced to have on hand an iron pot that was once used to cook food for poultry. This pot holds about 12 quarts of water. The rim of it flared, funnel-shaped. We concluded to turn this pot into a boiler. We bored a $\frac{3}{16}$-inch hole about one inch from the top. We filed a bright surface all around the upper inside edge, and at a point opposite the hole. This work was done in about one hour. We next took it to our tinner, and had two pieces of $\frac{1}{4}$-inch steam-pipe cut: one piece (the one that goes into the pot) 2 feet long; and the other piece, to reach into the barrel, 30 inches long. The horizontal piece can be much longer, if you find it necessary. To make a solid job we concluded to let the horizontal pipe extend through the hole across to the opposite inside of the pot, hence we tinned the end of this pipe, and at a point to correspond with the hole. To let steam into the pipe we sawed two V-shaped openings in one side, near the inner end. It was now well soldered at the hole and at the end abutting the pot.

A heavy galvanized-iron cover was fitted to the top of the pot. Into this a hole was cut, and a $\frac{3}{4}$-inch coupling soldered. A plug closed the coupling. Now the cover was carefully soldered to the pot. An elbow on the screw end of the horizontal pipe, and a square nut soldered

to the upper end of the vertical length, to use as a handle to screw it on or off, completed the outfit.

The tinner's charge for material and labor was 68 cents, to which add two or three hours of our time and a 12-cent file, and we had a practical boiler. However, if you expect to use your boiler considerably, we advise that a ¾-in. steam-valve be soldered into the cover, with a short nipple at the upper end, in which to place a funnel.

After a time the lower end of the vertical pipe will be eaten off by the acid. The best way to construct this pipe is to make it in two parts, connecting the two with a coupling.

A good linseed-oil barrel should have one end removed, and the hoops carefully in place. With hot water and washing-powder, cleanse it well. Place this barrel near the cook-stove or range; fill the boiler or pot with rain water, and screw on the vertical pipe, with its lower end in the barrel. Put about 40 quarts of rain water into the barrel (hot water in both will save time); then add 1½ to 3 lbs. of sulphuric acid, depending on how dirty your wax is. Now fill the barrel to within 12 or 15 inches of the top with wax. You can put in about 150 lbs. If in a hurry, melt part of the wax in a pot on top of the stove, having added a little water to prevent the wax from getting too hot. If this is done, care must be taken that the pot does not stand in too hot a place, or the wax will boil over the stove and floor, causing fire risk, loss of wax, and a muss generally.

Over a good fire of hard wood or coal, your boiler will need replenishing with water every two or three hours. If you note carefully the weight of the empty boiler you can easily determine about how empty it is. Of course, as there are no valves to close there is no danger of explosion; but if empty, over a hot fire, the pot will probably be ruined or the solder melted off. If all the wax is melted in the barrel it will take some hours.

After the mass in the barrel is melted, if heat is still applied the mass will finally roll and seethe—in other words, boil rapidly. At this stage the mass will appear muddy, and rubbish will float on the surface. From this point the boiling must continue for two to five hours, depending upon the quantity of dirt in the wax at the beginning. At length, about all the rubbish will settle down. During this process of boiling, put a board, that fits partially inside the chime, on the barrel, over which place worthless bags, sacks, or garments, to retain the heat and steam. Useful articles will be spoiled if exposed to the vapors from the barrel.

Remove the boiler, and cover the barrel. In about two or three hours, dip off the clear wax, which must pass through thin factory or cheese cloth, and put it into suitable tin vessels to cool. We prefer to have a little hot water in these vessels, so that any impurities still in the wax may settle into it. When these cakes are cold, the sides of the vessels can be loosened with a putty or other suitable knife; and any impurity on the bottom is to be shaved off.

Pans to hold this hot wax are cheaply made of 20 x 28-inch roofing tin, by bending up the sides, letting them flare about five inches. Run a heavy wire around the top, and solder the corners. The tin at the corners should not be cut away, but bent over, and soldered fast, to strengthen the corners.

With care the wax can be dipped off till the layer in the barrel is not much over one inch thick. The residue should be left till nearly cold—say 16 to 24 hours. Underneath the solid wax will be found a cellular, waxy mass, that fails to harden. At first this seems to be a waste, for it surely contains wax; but under pressure the water is driven out, and the weight is trifling. To utilize this material would probably cost more than it is worth.

With good fuel, a six-hole range with water-reservoir, three barrels to boil wax in, and a boiler such as we describe, one man with an assistant should refine 1500 to 2000 lbs. of wax per week—a pretty good revenue, at 5 cents per lb. The acid will probably cost, for this amount of wax, $2.25; the fuel, hard coal at $5.00 per ton, about $1.25. The cloth strainers can be used only once. Throw out the rubbish, and put the waxy cloth into the next batch. We had a small quantity of cappings, and black old combs, that we pulverized finely during a cold day. This was put into one batch, and seemed to render perfectly. How easy in the future to render wax from old combs, as compared with former methods!

Manufacturers of foundation on a small scale will find such a boiler a great convenience, not only for refining wax, but also for melting and warming wax when dipping the sheets. Indeed, we think friend Root will at once prepare these boilers and offer them to his customers, for they must surely be in demand. At a slight additional expense a water-gauge can be set at one side of the pot, when a glance will indicate the time for refilling the pot.

Let us give a caution, so that others need not learn by experience that which cost us a little trouble. After dinner one day, while conversing pleasantly, we concluded the boiler was about empty, and the wax boiled sufficiently; hence we lifted the pot, replaced the stove-lid, and shoved the pot to the edge of the stove. After more talk and attention to minor duties, we unscrewed the vertical pipe and took the pot from the stove. We casually observed that the pot seemed very heavy, and, after going a few paces, wax began to run from the pipe. This continued, and we hastily procured a dipper, into which nearly a quart of wax escaped. Perplexed, we again lifted the pot, and for the first time realized that the pot was full of wax. How did it get there? A second, serious thought made it plain. The pot had been full of steam under pressure. The plug was in place. The pipe was in the barrel. Heat had been withdrawn; the steam condensed, and the wax passed in to fill the vacuum. We removed the plug, and allowed the wax to run out. After that our first care was to take out the plug.

We trust our friends will find this cheap boiler a source of pleasure and profit.

J. H. NELLIS.

Canajoharie, N. Y., March, 1893.

[Heretofore there has been no practical method by which bee-keepers not having access to regular steam-boilers could produce their own steam for the purposes of wax-rendering economically, and with the ordinary materials "around home," with perhaps the exception of one or two items. We are sure all our readers will feel indebted to friend Nellis for his very clear description. Having had experience years ago in a similar way, in making and testing iron-kettle boilers—not for the purpose of rendering wax, but for running steam-wheels and other mechanical toys—we can suggest a simpler wax-boiler than that of friend Nellis, simple as his is. Secure a large iron kettle. If you do not have one around home holding 12 or 15 quarts (the larger the better), you can get one at your hardware store for a trifling sum. From a sound two-inch pine plank, cut out a circular cover. A keyhole saw will cut it on a slight bevel, so that it will just drive into the kettle, after a little dressing with sandpaper, or, better, a wood-file. A better way, however,

would be to take a piece of plank to your nearest planing-mill and have it turned on a wood-lathe, so it will just make a good snug fit.

After the water is boiling in the kettle, the steam will make the cover steam-tight, because the wood will swell. Secure at your hardware store two ¾ or ½ inch gas-pipe elbows; a short piece of pipe, say two or three inches long, threaded at both ends; another piece of a length that will reach from your stove to the barrel, and still another piece that will reach from the top of the barrel to within six or eight inches of the bottom of the same. Bore a hole through the top of the wooden cover of the kettle, a little smaller than the size of the pipe. Screw in the first-mentioned piece of pipe; afterward, as tight as you can do it with your hands, one of the elbows; and so on extend the pipe on into the barrel. Next bore an inch hole to be stopped with a wooden plug, so that the kettle can be replenished from time to time. So far, at much less expense, you will have a boiler that is in every way as good as friend Nellis', without any solder, and without any boring through the sides of the kettle; and very few bee-keepers will have facilities for boring through cast-iron. With such a boiler it will not matter if the kettle does boil dry, for every housewife knows that an ordinary iron kettle will stand such treatment occasionally.

Now, to get rid of the fumes of the acid, and the slopping and sputtering of the wax that may occur, we would extend the pipe connection so as to reach from the stove out of the window, into a barrel just outside. This will allow all acid fumes to rise in the air, right where they will do no harm to the occupants of the house. Having done this you are ready to proceed as friend Nellis describes above.

To make sure that this plan would work, we had our "small brother" test the matter outdoors, and we find that every thing is all right. Now, we can furnish the kettle at a nominal sum; but of course it will be cheaper for the most of you to purchase your own at your own hardware store, if you do not already have one. It is possible that some of our readers who are not of a mechanical turn of mind would not care to make the wood cover, even if they could. To accommodate such we will furnish an iron kettle holding 15 quarts, wood cover fitted in tight, with the pipe connections and all complete, for $3.00. This will make it possible for every one to make his own steam. There is no satisfactory way of rendering wax by the acid without steam.]

STARTING NUCLEI.

FULL DIRECTIONS ON HOW TO DO IT, BY DR. C. C. MILLER.

A correspondent asks me to tell in GLEANINGS how I form nuclei, especially (if I understand him correctly) when full colonies are divided up after taking from one apiary to another. The principal difficulty in establishing a nucleus is to get the bees to stay put. It is a very simple thing to take two or more combs with adhering bees and put them into an empty hive; but the difficulty is, to get them to stay there. Except the youngest bees, nearly all are likely, under ordinary circumstances, to conclude that the old home was better, and accordingly to return to it. But by means of an out-apiary, that difficulty is entirely overcome. Or, two bee-keepers living two miles or more apart could exchange colonies, and each take advantage of the moving.

I might answer the question in very few words by saying that a colony can be taken to an out-apiary, and, without any ceremony whatever, the frames of brood can be taken out, each of them put in a separate empty hive, allowing an equal number of bees to each, and there you are. The bees can't desert and go back to their old home, for they can't find it.

But no doubt the question meant to include more particulars, which I gladly give. When practicing the plan under consideration, I generally, if not always, raised a queen in each nucleus, and then the nucleus was developed into a full colony. At the time bees began to think about swarming, I selected one or more colonies to be divided, and from the selected colony removed the queen. Possibly I added to it brood from other colonies, exchanging for this brood-combs containing no brood. If the removed queen was considered a proper one to breed from, the bees, upon her removal, would proceed to raise queen-cells, or such cells were obtained in some way. A day or two before there was any danger of the cells hatching, the combs were looked over; and the probability was that the cells were not very evenly distributed, some combs having several cells and some having none. Then I evened up matters and put a cell on each frame of brood which had none. This was done at least 12 hours before the colony was to be removed to the other apiary, so that the bees would have time to do any patching and mending that was needed. The hive was now filled with brood-combs, each of which contained brood and a queen-cell.

But this would allow only one comb of brood with its adhering bees for a nucleus, and such a nucleus would be too weak for the best work. So, about two days before the time of removal, another colony was made queenless, to be taken along to the out-apiary. Arrived at the out-apiary, eight hives were placed in proper places to receive the nuclei. In each of the hives a frame with adhering bees was put from the hive containing the queen-cells, and also from the other hive a frame with adhering bees. If I had them to spare, a frame or two of honey was given to each of the nuclei, but they would get along without this, for the honey harvest was now on, and in each nucleus there was a fair proportion of field-bees. Indeed, I don't know of any other way in which you can be so sure of having in each nucleus a full assortment of bees of all ages.

The nuclei were now formed, and in the majority of cases I could count on finding the young queen laying two weeks later. Of course, as in all cases, some of the queens would fail to materialize; but the proportion was no greater, if as great, as by other methods. Some years ago, by following the plan outlined, I increased 12 colonies to 81, and took from them 1200 lbs. of honey. But it was an exceptionally good year, a buckwheat year at that, and the honey was nearly all buckwheat extracted. But the 81 colonies were all strong and in good condition. They were in ten-frame hives, and only one, two, or three frames were taken from a hive to be extracted at a time, always leaving each hive well stocked for winter should the harvest close at any time.

I would lay stress on the importance of not making nuclei too weak. I don't believe there is any economy in weak nuclei. I don't think they raise so good queens. Besides, they are so slow building up, that, although you may at the start make a greater number of nuclei from a given number of colonies, you will gain by having a smaller number at the start, and then make new ones later in the season from those formed earlier. Another reason for this is, that, if you start by making your nuclei too weak, the season may close unexpectedly early, and all will be left in bad shape for winter; but

if you have a smaller number, and all strong, then the danger is less, especially if you follow the wise rule of determining that, the later in the season you start a nucleus, the stronger it must be.

I think it is a fact, although I am not sure that it is generally known, that queenless bees, perhaps more particularly those that are engaged in rearing queen-cells, are much more inclined to stay wherever they are put than bees taken from a colony having a laying queen.

Another fact that I think is not generally known, is, that, when part of the bees of a colony become sufficiently detached from the main body, and yet have free communication with it, such bees, in the busy season, are very likely to raise a young queen, independently of any thought of swarming. It doesn't seem to matter much how the separation be made, whether by having one or two brood-combs above, below, or to one side of the regular brood-nest, separated by a queen-excluder from it, or in some cases separated merely by sufficient distance. The bees seem to feel themselves practically queenless, in spite of the fact that they can easily go where they can find the old queen. Now, in such cases I have taken the frame or two of brood with adhering bees, a day or two before I thought it was time for the young queen to hatch, and have been very successful in getting them to stay wherever put.

Marengo, Ill. C. C. MILLER.

THE EVILS OF GLUCOSE ADULTERATIONS.

PROF. COOK DEFINES HIS TRUE POSITION.

Editor Gleanings:—It seems strange that, after one has fought and denounced honey adulteration for years, people should be ready to believe him its defender, upon the slightest suggestion. At our late Michigan convention, Mr. Heddon did defend the adulteration of honey with glucose. He argued that such glucose made it look better and taste better. I took the opposite of both these assertions. I am very certain that glucose adulteration, the only kind practiced, I think, is very harmful. I can tell such honey if only one-fourth is glucose, and it leaves such a metallic taste in my mouth, that, were I to use it for a little, I should have an aversion to honey. I not only held this as true at our own meeting, but at no small trouble I prepared specimens, using the best of honey. The judges, as I expected, had no trouble to select the adulterated specimens. Thus I say now, as I said then and have always said, such adulteration is most harmful; and if the product is sold as honey it is a rank fraud and most harmful imposture, and I think it should be severely punished by both fine and imprisonment; especially for a second offense. I said at our meeting, that, if it were true that glucose did improve honey—really makes it better—then I should never condemn it more—of course, I wouldn't. I should be a fool if I did. I would always praise, not condemn, an improvement. In this case I would condemn selling it for pure honey. But no one would; they would wish its own brand—the index of superiority—to help to sell it. But this is not to the purpose, as glucose injures honey, and will seriously interfere with the market if indulged in. Of this I have not a doubt.

I write this as I do not wish to be misrepresented, either at home or abroad. It is bad enough, right at home, where one is known; but it is harder to have the foreign papers so misinformed. It has been a great surprise to me that my position was so misunderstood. I said nothing to give such an impression. I argued with all the force I could exert to the exact contrary. I shall ever do so, unless I have reason to change my opinion as to such products which is not at all probable.

Ag'l College, Mich., April 19. A. J. COOK.

[We are very glad to receive this, inasmuch as we know that Prof. Cook has been in some quarters misunderstood; and we hope it will be the means of correcting any false impressions that may prevail, either at home or abroad. A brief convention report can not well give all that a speaker has said, and hence he may be misunderstood, as was Prof. Cook. We have had quite extensive correspondence with the professor of late, and know that, if there is any thing above another to which he is unflinchingly opposed, it is the mixing of glucose with honey. He is in a position to know, as well as ourselves, that there is no glucose on the market that will in any way add to the selling qualities of the honey, either in looks or taste. So small an amount as 25 per cent will ruin *any* honey; and there is nothing in the world that will set a going "the everlasting clack about adulteration" as quickly as will these glucose mixtures. People are suspicious, and have a right to be, when such goods are placed before them. The mixers *must* be ferreted out and exposed.]

HEADS OF GRAIN

FROM DIFFERENT FIELDS.

DADANT ON HONEY-DEW.

In a small article, on page 266, our friend Henry J. Alvis says that we told him that bees would winter on honey-dew. We can not explain how he understood what we may have said. If he will open our book, page 330, he will see that we consider honey-dew as worse than dark honey for wintering. Besides, in the instructions to beginners, contained in our circular, and which have been sent to him for years, he can read that honey-dew and fruit-juice are bad winter food, and should be extracted from the combs. CHAS. DADANT & SON.

Hamilton, Ill.

AN APPEAL TO INDIANA BEE-KEEPERS; WORLD'S COLUMBIAN EXPOSITION.

Indiana State Building, Jackson Park, Chicago, Ill., April 22.

Fifteen feet of show-case, 5x7 feet, has been purchased for the State honey exhibit at the World's Fair. Will you furnish from your apiary any portion of this exhibit? It now remains with the bee-keepers of this State to see to it that this space is well and appropriately filled; and we fully believe that your State pride, with our abundant resources, will prove you fully equal to the undertaking.

Mr. Sylvester Johnson, well known among the bee-keepers of this State, has kindly consented to look after the Indiana exhibit. He will be at the Fair Grounds throughout the time of the exhibit, and will do all in his power to see that exhibits are properly arranged.

We are depending entirely on this year's product, and consignments can be made in July. Plan your exhibit to occupy a space 2½ feet square and 5 feet high; pack carefully, and ship by freight to B. F. Havens, Dep't A, Agricultural Building, Jackson Park, Chicago, Ill. Freight must be prepaid, and at the close of the exposition the goods will be returned to your shipping-point free of charge. No cash

premiums will be paid from the State appropriation, but awards will be made by diploma.

I trust that you will make application for space at an early date, when more explicit directions will be sent you. Address me at Indiana State Building, Jackson Park, Chicago, Ill., giving me positive answer as to whether you will furnish an exhibit or not. I will send you full shipping directions upon notification that you will furnish an exhibit.

B. F. HAVENS,
Executive Commissioner.

THE DOVETAILED HIVE, WITH THE HOFFMAN FRAME,

is certainly *the* hive. As soon as the cover is improved I shall adopt it in my own yard. I would suggest that the cover be made as it is now, only that you use ½-inch lumber instead of ⅞, and have it in three pieces, matched. This will prevent warping and that chronic wind. Now, if it had another cover of $\frac{5}{16}$ stuff, projecting 1½ inches on all sides, and this covered with tin, I think it would be just the thing. This would leave an air-space which would turn the heat, and may be this same cover could be used for the winter case. As soon as this cover business is perfected we shall be obliged to lay aside our pet hives, even if it does go against the grain.

Indianapolis, Ind. WALTER S. POUDER.

[Our gable cover would answer your requirements.]

WHY BEES SOMETIMES CARRY EACH OTHER OFF.

In one of the back numbers of GLEANINGS I saw something about bees carrying one another off. That is not a rare thing in this section. It happens just at the close of chestnut bloom. The tag of the chestnut is covered with fuzz. As it turns brown it becomes sticky with wax. The bees will work on them late in the afternoon, and the fine fuzz will stick to their feet. It can be seen with the naked eye by watching when you have a chance. Look in front of the entrance in the morning, and see if it is filled up, and then examine it. GEO. SWEETING.

North Manlius, N. Y.

B. TAYLOR'S EARLY ADVOCACY OF THE SHALLOW BROOD-CHAMBER; HOUSE-APIARY COME TO STAY.

I have stood 30 years alone, most of the time, in advocacy of shallow double-hives, and see them at last winning recognition; and now I want to be put on record this early, as saying that house-apiaries have come to stay. When constructed and used aright, they offer advantages that will never be thrown away, when once understood. I have just completed a new one, 8x16 feet, in which I can work 46 colonies. Good colonies, in my imperfect house, wintered perfectly this unfavorable year.

Forestville, Minn., Apr. 6. B. TAYLOR.

OILY WASTE FOR FUEL, ETC.

I keep only a few bees for our own honey, and let the neighbors sample it too. I have 11 colonies; all wintered well so far. Have you ever tried oily waste for fuel in a smoker? I think it "takes the cake." I save it, and use nothing else. Do not stop your "Home talks" just because some can not enjoy them.

Bradford, Pa., March 25. W. H. PRATT.

DR. MILLER'S MANAGEMENT OF THE CAGED QUEEN AFTER THE ISSUE OF THE SWARM.

In "A Year Among the Bees," on page 69, Dr. Miller, in speaking of the management of swarming colonies, says, "After the queen is in the cage, the block is pushed in an inch or so, and the cage put where the bees can care for it, usually in the vacant part of the brood-chamber. Now, what I wish to know is, how long does he allow the queen to be caged? My experience last season was, when the queen was released she would come out of the hive and be found strolling across the yard with a few bees following her, sometimes trying to enter another hive, and in some instances the queens were killed. My queens were clipped.

Wyanet, Ill, April 8. JAS. C. HALL.

[Dr. Miller replies:]

In reply to the question of friend Hall, I think he will find all clear sailing if he will take the part he mentions as preliminary, and connected with all that follows on the rest of the page—in fact, with the next two or three pages. That is, the queen is caged and left in the hive for the bees to care for till I am ready to treat the colony, whichever mode of treatment is followed. If, for instance, the Doolittle plan is followed, as given on p. 69, then the queen is left caged ten days. If that plan is varied by putting the queen into a nucleus, then she was not caged longer than was necessary for my convenience. That might be three or four days, or I might be ready to put her into a nucleus right away, in which case it was not necessary for her to remain caged at all. Or if I "put up the queen," as given on page 70, then there was no need for her to remain caged, except long enough for me to be ready to take care of her, which might be right away or in three or four days. The point is here: If the queen were released in her old hive any time before all the cells were gone, then she would be very likely to come out again with a swarm. So if she were left caged in the old hive she would not be freed for ten days. If freed before that time, there still being queen-cells in the hive, I should expect her to act just as friend Hall describes; but if put into a nucleus, there would be no need of confining her at all, for all swarming would be given up. C. C. MILLER.

Marengo, Ill.

FASTENING STARTERS IN BROOD-FRAMES WITH GROOVES.

Mr. Editor:—The brood-frames which you made a few years ago had a groove cut on the under side, in which to put a thin strip of wood for a comb-guide. A lot of these frames was once received, and in some manner the comb-guides did not come with them. We wished to fasten inch strips of foundation in them for starters, but were puzzled how to do so. We had before used the usual method of mashing the foundation on with a chisel-shaped instrument. We could not put starters in these frames in this way without getting them to one side of the center of the top-bar, because the groove was in the center. So we pushed the edge of the starter down into the groove entirely, and fastened it there by crushing the edges of the groove. That did tolerably well until a better way was found out. The idea occurred to us that the groove would be just the thing in which to fasten the starters with flour paste. It proved quite satisfactory. We proceeded as follows:

Provide a receptacle a little longer than the frames, fit to hold the starch paste. The paste should be quite thick. The proper consistency can soon be found by trial. The starters should not be less than an inch or more in width, unless of heavy brood foundation. When narrow strips of thin foundation were used, the bees, in nearly every instance, cut it down to the wood. A starter long enough for an L. frame is taken up, and one edge dipped into the starch paste. This edge is pressed down in the groove,

which is about ⅛x⅛. Then the frame is set away, starter side up, till the starch dries.

We liked this way so well that we used it in putting starters in several hundred frames since. Any one who has put starters into a large number of frames by mashing the foundation on, can appreciate a quicker and easier way. We intend to use it until we find something better yet. C. G. LOOFT.

Cochranton, O., April 1.

NO WINTER LOSSES.

I was astonished when I read the report in GLEANINGS, of your winter losses of bees. I have just been examining my bees in the indoor repository, where I put 50 of my weakest colonies on the 19th of November last, and I found them all living, and, I think, in very good condition. I have 55 packed outdoors, and they are all alive and in good order. What I want to say is, that I put 105 colonies into winter quarters, and they are all alive to-day.

I did not know any thing about bees until I read your A B C book three years ago this winter. I can't understand how you old bee-keepers lose so many in the winter. I have lost only two during these three winters. One starved, and the other smothered in a packing-box outside, in January, 1892. They melted four combs, and there was about a pint of bees alive when I found them in that state. Perhaps when I feel inclined I will tell how I use my pets in winter. R. A. MARRISON.

Inverary, Ont., Can., March 28.

[You just wait. When you get to be an old veteran you will find there will come along times, say once in ten years, when you will lose heavily. We have had no losses worth mentioning, since the winter of 1880–81, till last winter, and we do not *expect* to have any great losses again for another decade. There was something in the winter, or in the locality, that made all bees wintered outside, in our vicinity, winter about alike; at least, our neighbors for miles around report about the same percentage of loss that we have had.]

WINTERING IN MICHIGAN; A GOOD WORD FOR GOLDEN ITALIANS.

I went into winter quarters with four colonies. One died with at least 35 lbs. of sealed stores; two reduced to three frames; the other is fully as strong as it was last August. They are occupying the whole of the eight frames; brood in four frames the 8th. They were all in the same kind of hive—four-inch wall of chaff, sides and bottom. Tops of frames were covered with eight-inch cushions made of burlap filled with wheat chaff. Three had a single thickness of burlap placed directly on the top of the frames, and a cushion on the top of the burlap. The other and the heavy one had two thicknesses of burlap (of a finer texture) over frames and cushion on the top of the burlap.

The one that died was a hybrid; the other two, leather-colored. The strong ones are yellow bees, or golden-colored, queen small and dark; bees large, gentle, and nicely colored. So, now, I admire the golden bees. The frames are 17¼ x12, outside measure. One queen was from Texas, three from Kentucky—the hybrid, the best one, and the darkest leather-colored. One of our bee-men lost all of his—two dozen or more stocks. Another with 56 lost all but 5. They do not take GLEANINGS, nor read the A B C either. I might say I had not read the A B C enough when winter set in, or I might have done better. I searched around in it for some knowledge as best to winter. I thought I had just struck the thing. Perhaps it was as good as any way for this extremely cold winter. Ought not the A B C to give at the close, for instance, of wintering, a recapitulation, for outdoor and indoor—in just as few words as possible? If you issue one in that way, I want it. Let it be the same as we used to have in our school text-books.

Northville, Mich., Mar. 16. CHAS. BIERY.

[A recapitulation in a few words would be unsatisfactory and misleading. The subject is somewhat complicated, and therefore can not well be abbreviated.]

FIXED DISTANCES, AND THE PRACTICABILITY OF HOFFMAN FRAMES.

In view of what has been written about fixed distances, closed-end frames, etc., and with my limited experience, I have become convinced that it is a convenience in handling, and a good help to get combs built straight, to hold the frames firmly in place. In order to do so I've placed blocks, 4 in. long, ⅜x⅜, on one side of the end-bars, by which means I can press the frames or combs together, and they will hang 1⅜ inches from center to center, as Manum advises; but Mr. Manum said, "Nail the frames to the brood-box with 10-penny nails, and then they would be fixed; try it." I wish you would scold at Mr. Manum for writing any such thing to me, for, if I were to nail my frames down I would use only a wire nail, not more than one inch long. It seems to me those blocks will keep the frames from being jostled together or getting too far apart; will enable the apiarist to hold the frames firmly in place while moving without nailing with either 10-penny or one-inch nails; will serve somewhat the purpose of closed ends; will hold the frames at suitable distances apart, and not prevent the spreading of frames further apart for winter; will not interfere with putting foundation into frames; in fine, will be a good thing, and I believe you summed up, at the close of the discussion, that *fixed* distances were necessary. I've also prepared one hive for holding about 24 frames, *a la* Doolittle, where he says he had one hive with brood in 32 frames, from which swarm, he says in *American Farmer*, he obtained 566 lbs. of extracted honey in one season, on the spreading-of-brood plan. I've also prepared one hive with ⅞-inch top-bars. With the thin top-bars, $\frac{5}{16}$, the bees attach the surplus boxes to the top-bars, with brace-combs, etc. Two years ago I obtained nearly 96 one-pound boxes of honey from one swarm, to which I gave two empty frames of comb twice in the middle of the brood-nest, at intervals of two weeks. I think they did not swarm; but they, being three miles away, I did not know nor care. I will call that long hive my "pallus."

Ludlow, Vt. A. P. FLETCHER.

CHAMPION ROBBERS; POLLEN-PICKING; THE WAY BEES USE UP MICE.

I have some bees—black, hybrid, and Italian, that are the champion robbers. Not only will they rob a hive with "neatness and despatch," if they get a chance, but will try to rob their sisters of pollen. I fed them some meal a few days ago, which they took eagerly. Noticing some bees that seemed to be fighting, I looked closely and saw that a good many bees were alighting on the backs of those which had secured loads of pollen, and were biting or trying to bite off pieces of the load.

Winter loss in this section of Connecticut is light. I have lost but 6 per cent so far.

While working with my bees last week I saw a mouse run from a hive, covered with

bees. It went perhaps a rod, then stopped, kicked a little, and died. There were over 50 stings in it. F. W. HUMPHREY.

Oronoque, Ct., Mar. 28.

CATFISH WANTED, ETC.

Can you give me any information as to where I could get catfish to stock a fish-pond? What kind would be most advisable to get? We had carp in our pond, and last winter they were all killed, the water being too low. We like carp well, but one great objection to them is the many small bones they have. I have been thinking of trying catfish, and should like to learn all about them I can.

My bees wintered well, losing 2 out of 84, and a few others were queenless.

LEVI A. RESSLER.

Nappanee, Ind., April 14.

[Can any of our readers answer friend R.?]

TOTAL DEPRAVITY.

A few days ago I was in the office of the Clemons-Mason Com. Co. After a pleasant greeting, Mr. Clemons remarked that he had something to show me; and, stooping down, took from under his table a stone weighing in the neighborhood of 12 lbs., which was one of two taken out of beeswax, the two weighing 21 lbs. He exonerated the bee-keeper of whom he received it by saying that, upon tracing up the matter, he found that he had bought it of a man traveling in a wagon; so the identity of the guilty party is lost. We have heard of individuals whose souls were as small as a lady's thimble; but whoever did this, I am afraid, had even smaller souls. However, while some one would suffer financially the weight of the stone, I think I would rather buy it with a stone in it than tallow. Being ignorant of this latter kind of adulteration, we melted and dipped into sheets a hundred pounds of wax, and tried to make it into foundation, only to fail, after weary hours of hard work. Every soul tempted to adulterate or cheat in any avenue of business ought to read and ponder Ezekiel 18: 30, 31. MRS. MILTON CONE.

Kansas City, Mo., Apr. 10.

[We thank you for your kind closing words, my good friend; and as it will save our readers a good deal of trouble in hunting up their Bibles, we give here the passage you refer to.]

Therefore I will judge you, O house of Israel, every one according to his ways saith the Lord God. Repent, and turn yourselves from all your transgressions; so iniquity shall not be your ruin. Cast away from you all your transgressions, whereby ye have transgressed; and make you a new heart and a new spirit; for why will ye die, O house of Israel?

PHŒNIX, ARIZ.; A GOOD WORD FOR THE COWAN EXTRACTOR.

I am more than pleased with the Cowan extractor. Mr. A. J. King examined it, and he pronounced it *very good*, and he, as you know, is competent to judge. By the way, I am living at present in his house—the same where you visited him last winter. We came to this sunny clime one year ago last December, through the instrumentality of that letter written by Mr. A. J. King (and published in GLEANINGS), in search of health, more especially on my daughter's account, who had been greatly troubled with rheumatism for over six years, being at times so bad that she had to use crutches for six months at a time; and I wish to add that she is much improved, and we entertain fond hopes that, through the agency of this genial climate, she may be restored to permanent health. MRS. M. N. STANLEY.

Phœnix, Ariz., Apr. 12.

YELLOW CLEOME AS A HONEY-PLANT IN ARIZONA.

I herewith inclose some seeds of the yellow cleome, which proves to be so valuable a honey-plant in this vicinity. It is extremely hardy, and grows without irrigation, in which respect it is like the mesquite, and, in fact, next to the mesquite, is my best source of honey. There is, however, nearly or quite a thousand acres of alfalfa within my range; but as it is grown for hay it is cut as soon as the bloom appears, and the bees get in very little work on alfalfa. This plant grows very similar to the mustard, 6 to 12 ft. high, and stalks one to two inches through. Stock will not eat the plant while in bloom, but do eat the seed-pods when ripe, or after frost time. It blooms from the 1st of June till frost, and the bees work on it freely night and morning. The purple variety, or Rocky Mountain plant, is not so hardy, and will not thrive well without irrigation, or in a springy place (*ciruega* land, we call it).

I am anxious for you to test the growth of this plant in your State. If it grows as well there as here, it will be a boon to bee-keepers if sown on waste land. F. E. JORDAN.

Camp Verde, Arizona, April 2.

WHEN EDISON WAS YOUNG.

The following is an extract from *Practical Electricity:*

"I was an operator in the Memphis office when Thomas A. Edison applied to the manager for a position," said A. G. Rockfeller, a member of the Reminiscence Club, St. Louis. "He came walking into the office one morning looking like a veritable hayseed. He wore a hickory shirt, a pair of butternut pants tucked into the tops of boots a size too large and guiltless of blacking. 'Where's the boss?' was his query as he glanced around the office. No one replied at once, and he repeated the question. The manager asked him what he could do for him, and the future-great proceeded to strike him for a job. Business was rushing, and the office was two men short; so almost any kind of a lightning-slinger was welcome. He was assigned to a desk, and a fusilade of winks went the rounds of the office, for the 'jay' was put on the St. Louis wire, the hardest in the office.

"At this end of the line was an operator who was chain lightning, and knew it. Edison had hardly got seated before St. Louis called. The new comer responded, and St. Louis started in on a long report, and he pumped it in like a house afire. Edison threw his leg over the arm of his chair, leisurely transferred a wad of spruce gum from his pocket to his mouth, picked up a pen, examined it critically, and started in, about 200 words behind. He didn't stay there long, though. St. Louis let out another link of speed, and still another, and the instrument on Edison's table hummed like an old-style Singer sewing-machine.

"Every man in the office left his desk and gathered around the 'jay' to see what he was doing with that electric cyclone. Well, sir, he was right on the word, and was putting it down in the prettiest copperplate hand you ever saw, even crossing his t's, dotting his i's, and punctuating with as much care as a man editing telegraph for 'rat' printers. St. Louis got tired by and by, and began to slow down. Edison opened the key and said, 'Here, here! this is no primer class! Get a hustle on you!' Well, sir, that broke St. Louis all up. He had been 'rawhiding' Memphis for a long time, and we were terribly sore; and to have a man in our office that could walk all over him made us feel like a man whose horse had won the Derby. I saw the 'wizard' not long ago. He doesn't wear a hickory shirt, nor put his pants in his boots, but he is very far from being a dude yet."

There are several things in the above account that please me. Edison depended on his *ability*, and not on starched collars nor good clothes. Where one has not the ability, however, it may be well to make up for it in some other way. Another thing: When he saw that they proposed to *crowd* him a little, he did not begin feeling for some tobacco, but simply put

an innocent wad of "spruce gum" in his mouth. What a satisfaction it must be to be able to show to the world we are *not* found wanting when weighed in the balance of public companionship and scrutiny, as was the boy Edison! We should infer from the above that Edison did not use tobacco when a boy, and I sincerely *hope* he does not now.

There is not more than a tenth of the bees alive in this section, and there were a good many kept among the farmers.

Bad Axe, Mich., Mar. 28. H. J. NELSON.

THE HUMMING OF THE BEES.

Inclosed please find a single dollar bill,
For I am bound to be one of GLEANINGS' readers still;
And when I read its columns through, like echoes on the breeze
It reminds me of nectar sweet, and the humming of the bees.

The yellow-jacket builds its nest where scarlet berries grow,
And the white-faced hornet's dome is hidden 'neath the snow;
And as the cold wind chilly blows, among the tall balm-trees,
I often stop to listen for the humming of the bees.

But the summer's coming on, and the asters pink and blue
Will spring up luxuriantly where once the forest grew;
And when I see the bumble-bee swing out upon the breeze,
I think how happy I should be with just one hive of bees.

But they say it is too cold, and the summers are too wet,
And the bees that have been brought here have not succeeded yet;
And when the summer comes to us, and the tall linden-trees
Sow the odor of their blossoms broadcast upon the breeze—

When the alsike and white clover display their creamy bloom,
And the queen of the meadow spreads its blossoms like a broom;
When by the fence the goldenrod is nodding in the breeze,
And beckoning and beckoning for the humming of the bees;

When softly sweep the breezes o'er yon forest-covered hills,
And the trout is swimming gaily in the clear and sparkling rills;
Then I know I shall be lonesome out among the tall balm-trees
When I stop and listen vainly for the humming of the bees.

I love to hear the bluebird in the leafy month of June,
And the robin and the graybird, each with a happy tune;
I love to hear the merry waves as they run before the breeze;
But sweeter music far to me is the humming of the bees.

If you want to hear sweet music, as if an angel's wings
Had softly touched a golden harp, trimmed with a million strings,
Then wander in the forest when the ground is frozen stiff,
And the wind comes rolling gently down from yonder rocky cliff;
And the music you will hear as it strikes the old elm-trees
Is just about as pleasant as the humming of the bees.

Richards Landing, Ont. ARCH. DUNCAN.

HUMBUGS AND SWINDLES.

MUSHROOM-GROWING — LOOK OUT FOR SWINDLERS.

Just as soon as some new industry begins to be developed, especially something pertaining to rural life and rural pursuits, just so soon does a certain class of swindlers begin to dip into it—artificial honey, for instance. Well, the people have already got to work in the mushroom business. A subscriber sends us some circulars headed as follows:

MUSHROOM CULTURE.

With continuous crop, all the year round, from chemically prepared beds, with pulsion and aspiration.

The most profitable investment for people that can devote a few hours daily to this culture.

Originated by
THE FRENCH PROPAGATING CO, New York.
Civil Engineers. *Specialists.*

The words "pulsion" and "aspiration" first caught my attention. Look out for any thing of that sort in the advertisement of something that might be a little suspicious. These people claim to have originated something new. Chemical fertilizers are to take the place of stable manure. Of course, they want some money to start you in the new enterprise. One of the principal points made is, "full instructions with drawings, $8.00." This reminds one vividly of Mrs. Cotton. Next we have "one propagator, $6.00;" next "chemicals, $2.00." Of course, we do not know what the chemicals are; but the price seems to be reasonable compared with the drawings and "propagator." Then follows a great amount of particulars in regard to the large sums of money that can be made by growing mushrooms. Any dark cellar, any unused room, any out-of-the-way cubby-hole will do. Well, this latter part may be true. I feel quite well satisfied that mushrooms can be raised in all sorts of vacant cellars, or even attics; but I do not believe any one will succeed with it unless he has a real love for the business. They talk about $2.50 per lb. for the crop. In our locality, 40 to 50 cts. per lb. is about what we get. But may not these people be straight and honest, after all? Yes, they *may* be; but neither Dun nor Bradstreet knows any thing about such a firm at 215 Chrystie St., New York, nor anywhere else. Another thing, in their private (?) letter they say:

We have selected you, because your letter was the first out of 22 from your county. For $4.00 we will send you full instructions, drawing of your place, directions for shipping mushrooms and spawn, and chemicals for five square yards of bed, thus giving you a chance to convince yourself that this is the most profitable business you ever handled.

They give, as a reason for starting only one person in the county, that overproduction would bring the price "way down." And, by the way, this private letter is a *printed* one, after all. It is a little singular that they should have *exactly 22* applications, and no more, from every county where these printed letters happen to go. I hardly think any of our readers will be taken in with any thing of this sort. There is one thing that puzzles me a little; and that is, their circulars contain some very fine drawings of mushroom-beds, mushroom-cellars, and mushroom-caves—in fact, the very same drawings that we see in the new books recently published on mushroom culture. I do not mean to discourage any one from going into this business. I think it is destined to be a great industry; but please do not think it necessary to send $8.00 for instructions and drawings. We will send a circular, free of charge, such

as we send out with each package of mushroom spawn, to any one who wants it; and if you want the fullest particulars known in regard to mushroom culture, we can furnish the latest books at from 75 cts. to $1.50.

ANOTHER VISIT TO T. B. TERRY'S.

SOMETHING ABOUT DIGGING DITCHES BY STEAM POWER.

In our book on tile drainage, you may remember that friend Chamberlain says he does not know of any machine that has proved to be a decided success in digging ditches for laying tile. In other words, all things considered, an expert man like Chamberlain himself, with the proper hand tools, will dig the ditches cheaper than it could be done, at the time his book was written, by machine power. Of course, circumstances alter cases, and this was the general advice given. Since the book was put out, however, there have been several cases mentioned where tiling was successfully done by means of a steam-power ditcher. One of these is right in our own county—in fact, at our county infirmary—and I have been invited to go down and see it work. We expect to have an appendix to the tile book now very soon, discussing this matter a little further, but where ditches are dug of a depth and width suitable for irrigating and draining the land so that they might be called small canals, instead of ditches, the case is very different. In the desert wastes of Arizona they are all the time making great irrigating canals by means of steam machinery; and right in the same neighborhood where friends Chamberlain and Terry both live, there has been a piece of work going on during the past winter that I propose to tell you something about. I first saw a notice of it in one of Terry's articles in the *Practical Farmer*. The more I thought of it, the more I thought I must break away from business and go and see the machine at work.

Part of friend Terry's farm has been, for the past fifty years, almost if not quite useless because of standing water that could not be got rid of without making a ditch five or six miles in length in order to get the requisite fall. Years ago an attempt was made to do this by hand work and horse power; but it was not a success. During the past winter one of our Ohio manufacturing establishments (Marion Steam Shovel Co., Marion, O.) sent some men out in the depth of winter to put up a machine right in the swamp. They first dug a pit, or pond-hole, which was, of course, speedily filled with water. On this body of water they constructed a sort of boat, or scow, almost 100 feet long, and perhaps 20 feet wide. When the boat was finished, machinery was set up on it, to dig a canal for the machine to sail on. If one were not posted in regard to modern improvements he might take it to be one of the extinct reptiles of former ages—a great big rhinoceros or sea-horse, for instance. Then imagine the thing to have a snout, or rooter, twenty or thirty feet long, with a tremendous backbone to enable it to root in the mud and swamp, and you have it. This great rooter drops into the water with a splash and bang that might almost frighten one. Then it moves forward far enough down into the mud to go under the stumps, trees, and bushes, and finally makes a scoop, hoisting its load high up in the air, swinging it far enough over the banks of the ditch to be sure the semi-liquid mud does not run back again and thus make it necessary to scoop it out a second time, and then you can form some idea of the way the machine does its work. Three or four men operate the huge animal, and a surveyor goes along with the proper instruments to see just when it has rooted deep enough and wide enough; and the water runs into the canal as fast as they dig it, so that the whole thing is floated down stream in a river or a canal of its own making.

A part of the equipment is a dynamo, and electric lamp so disposed that the work, when required, may go on day and night. All that is needed is coal, and this is dumped from the bridge over the canal on the nearest wagon road, right into a flat boat that floats it down to the great "ichthyosaurus" of modern times. While operating this ponderous machinery, some braces, or stays, are run out and anchored securely into the bank of the ditch on either side. One can easily imagine that these stays are the animal's fore feet as it claws them into the mud in order to get a safe foothold while he pushes forward his gigantic rooter. The machine has been at work all through the latter part of the winter, and the canal is now over a mile in length. The machine is off by itself in the swamp, with nothing to betray its presence except the volumes of black smoke that roll forth, and the snort of its nostrils as it gets under an unusually heavy stump or tree, or while it lifts the same aloft in the air, preparatory to dropping it on the bank. The mud and bushes and small trees are not deposited on the bank in a regular furrow, or winrow, for that would not let the water get in readily from the adjoining swamp; therefore this stuff is dropped in heaps, something like little mountains, with valleys or canyons between.

May be you wonder why I go into details in regard to this latter part. Well, the truth is, during the day these aforesaid "canyons," brought some sad experiences. There had just been a tremendous heavy rain in the neighborhood a day or two before our visit. Friend Terry concluded the easiest way to get out into the swamp where the machine was working was to work along this bank of debris. Ordinarily it dries off on top so as to be very fair walking; but at the time we were there it was not *quite* equal to a sawed-stone pavement—that is, not all the way. When we had got almost a mile out into the "wilderness," by much pains and hard work in getting over the aforesaid canyons (carrying rails, bits of board, etc.), we reluctantly decided that it would not be prudent to go any further; and Huber, who had been so animated by the prospect of the visit that he could neither eat nor sleep, was fast losing his enthusiasm; and I myself really feared we should all go down up to our necks, and stick there like so many cabbages. We could not call anybody who lived in the vicinity, and the people on the great rooting-machine, which was yet hardly in sight, could not be made to hear any way. We stopped on one of the dryest of the mounds, and held a short council. Friend Terry said he must take Huber on his back and make a beeline, to the best of his knowledge, for dry ground. It just now occurs to me right here, that I promised not to tell what happened. There is one thing that concerned myself alone, however, that I think I may mention. In our explorations we had found it necessary to carry a couple of sticks, not only to feel our way, but to help us to stand upright in the sinking mud. Well, once I happened to put all my weight on my stick; it treacherously broke in two in the middle, and down I sprawled in the mud and water. I suppose Huber ought to have looked sober while his papa lay wallowing in the mire, but when, in *spite* of all my efforts, I went clear down, it was too much to expect of a boy nine years old.

Pretty soon friend Terry shouted that he

could see a horse eating grass on dry ground. I tell you, I just *loved* that horse. It was "love at first sight" on *my* part; yes, "I loved the very ground *he* walked on." It was *hard* ground —see? We told Mrs. Terry that we should probably be around to dinner by one o'clock; but it must have been about that time when we first got sight of that horse so comfortably located. It did not make *me* sick, because, you see, my "second wind" came in in just the nick of time. Another thing, I did not have to carry Huber. In fact, had Huber and I been alone, I should have had to go somewhere for help. I asked friend Terry a few days ago if it did not make him sick with the hard work he did in carrying Huber through the swamp. Here is the reply he gave me, at the bottom of his postal card:

Sick? Not much! I enjoyed "playing horse" with Huber. T. B. T.

I wonder if you remember of my speaking some time ago about some Sterling strawberries I ate one evening when I got in late at friend Terry's home. Well, if you have forgotten the circumstance, I haven't. I am a great lover of fine fruit; but as memory goes back I can not say that I ever enjoyed any fruit more than I did those strawberries on that particular night. Well, after we got in from our raid in the swamp, sure enough there were some Sterling strawberries—some that Mrs. Terry had canned herself; and they had the Sterling look and the inimitable Sterling flavor of those I tasted before, right from the vines. Perhaps several things conduced to make these berries so *very* luscious. In the first place, we were all three tired (just a little) and hungry. Huber was not at all backward in owning up that *he* was *very* hungry, when interrogated. These strawberries are the best tart berry, in my opinion, in the world. They were grown on *clover sod* (of course), and they were canned so as to lose little if any of their color or flavor. After I had eaten one large saucerful I was asked to have some more. When I said I guessed I had had a plenty, friend Terry insisted, and volunteered himself to fill up my dish, and then he poured in a lot of that ruby-colored juice. Said he:

"Friend Root, I never drank any wine: in fact, I am not sure that I know how wine tastes; but if there is any wine in the world that can compare either in looks or taste with this juice from these canned berries, then it *must* be something delicious indeed."

As I sipped spoonful after spoonful, I too concluded that the world might have the wine, so far as *I* was concerned, and I would take my chances with the juice from the canned Sterlings. After dinner we looked over the farm. Oh yes! we did take a little exercise first in getting off the mud; and I was agreeably surprised to find that the sort of mud they have out there does not stick like *Medina* mud; and Robert (Terry's only son) took Huber in hand and polished him up from head to foot, so that even his own mother would hardly know he had been through "the Slough of Despond" that morning. Then the Misses Terry gave us some piano music that I could understand and enjoy every note of, almost as easily as I did those Sterling strawberries but a short time before. Dear me! there was so much that was pleasant *inside* of that Terry house, we shall really have to wait until next issue before we look around *outside*.

I received a sample copy of GLEANINGS. If it is a fair sample of all the numbers, it certainly is immense. I caught several new ideas from the one number. I will send in my subscription as soon as I can. A. C. MITCHELL.

Enfield, Ill., Mar. 27.

HIGH-PRESSURE GARDENING.

BY A. I. ROOT.

CHEMICAL FERTILIZERS; THE SUBJECT REVIEWED BY CHAS. DADANT.

Friend Root: — In reading, in GLEANINGS of April 1, your article against chemical fertilizers, I was greatly amazed; for I remembered the experiment that you made a few years ago with phosphate of lime scattered on rye, and the wonderful results that you obtained.

I have never been able to use these fertilizers; yet I have studied the experiment made by Geo. Ville at Versailles, France, chemistry having enabled the scientists to determine the chemical elements which compose plants, of which elements four are organic and ten mineral; and experiments having demonstrated that but one of the organic, the nitrogen (or azote), can be exhausted, and that but three of the minerals—phosphorus, calcium (lime), and potassium, are indispensable, the natural consequence was that, as every crop takes from the soil most of the elements of which its plants are composed, the fertility of the ground decreases unless these elements are restored to it—a restoration which is difficult, if not impossible, by manure alone, as a large part of it is wasted, and because the grains raised on the farms are sold out, and the animals are killed far from the soil which has furnished them the material of which their flesh, skins, and bones, are made.

To help the farmers out of this difficulty, about 35 years ago the French government intrusted Geo. Ville with the care of experimenting on chemical fertilizers. This scientist began by sowing some kernels of wheat in chinaware pots, filled with burnt sand, to which he mixed one or more of the chemical elements named above; then he continued for several years on a variety of soils, and with several kinds of plants; and the result was the creation of the business of chemical fertilizers, which spread over both continents.

The experiments of Geo. Ville demonstrated that, if some of the necessary elements are used alone, in a soil which does not contain a sufficient quantity of the others, the result is very little more than if no fertilizer had been used; while, on the other hand, if the other elements are present in the ground, in sufficient quantity, the results are marvelous. Such was the case when you scattered phosphate on your rye.

As the air contains about 79 per cent of azote (nitrogen), the leaves of plants absorb more or less of it. The quantity taken up by the leguminosæ (pulse family) even exceeds their needs, and the surplus is stored in the ground by their roots. Everybody knows that, if an exhausted land is sown with clover, it will recuperate some of its lost fecundity. But the mineral elements, taken away by successive crops of corn or wheat, can not be restored by the sowing of clover, or other plants of the same family, since these elements stay in the earth and not in the atmosphere.

As it would be too costly, if not about impossible, to return these mineral elements to the ground in a pure state, i. e., without being combined with some other substances, it is indispensable that the combinations be made with substances which increase the fecundity of the soil instead of remaining inefficient, or noxious, by decreasing the results anticipated.

For instance, nitrogen can be given to the land combined with sulphur (sulphate of ammonia), or with sodium (nitrate of soda), or with potassium (nitrate of potash). The nitrate of soda is far from being as good as the nitrate of potash; for sodium does not exist in as large

a quantity, in plants, as potassium; and plants find, in every soil, more of it than is necessary.

I notice that Ville recommends nitrate of soda together with nitrate of potash for beets, carrots, etc., while for about all the other plants he prefers nitrate of potash. Besides, he advises farmers not to use one of the fertilizers alone, unless they are satisfied that the other indispensable elements exist in their land in sufficient quantities.

I will add, that Mr. Ville is not opposed to barn manure. On the contrary, he advises its use, together with chemical fertilizers as complement, the one helping the other.

As to your failure with nitrate of soda on onions, perhaps it can be explained by what I wrote above on this compound, or by the absence of other indispensable elements. I have studied the matter, and found that onions, garlic, and other plants of the same family, contain sulphuric and phosphoric acids, and phosphate of lime. Perhaps these acids and salts do not exist in sufficient quantities in your soil. Please try sulphate and phosphate of lime, mixed together and separately; or, if you think that your soil needs nitrogen, use sulphate of ammonia, instead of nitrate of sodium, and give us the results. CHAS. DADANT.

Hamilton, Ill.

[Friend D., it is true I succeeded with chemical fertilizers with rye, and, to some extent, with wheat; and I generally mean to make these an exception when I speak of fertilizers. These experiments were also made before my ground had been repeatedly enriched with stable manure. The point that troubled me was, that fertilizers seem to be of no use on my heavily manured soils and plant-beds. Your suggestion that only four elements become exhausted is new to me; but I now remember that the analysis printed on the sacks of phosphate always mention nitrogen, phosphoric acid, potash, etc., but seldom any thing else. Very likely your explanation is correct. I know this: that guano shows a marked result on our heavily manured plant-beds. The result is more pronounced where it is used in connection with lime. With lime alone, however, we notice but little if any difference, although lime alone is a preventive of the flea-beetle, and also kills the angleworms in the soil when enough of it is used. I have never been able to discover that it has any injurious effect on *vegetation*, however. I will try to make the experiments you suggest.]

POTATO ONIONS IN SOUTHERN ILLINOIS.

We raise but few of any kind of onions except the potato onion here in Southern Illinois. They should be set late in the fall, and covered with manure, straw, or cornstalks, to prevent from being frozen out. If planted too early, so the tops start to grow in the fall, they will do very little good. When planted in the spring they seem to ripen prematurely, and do not keep well. When planted on rich ground they grow to enormous size, but they are a rather coarse onion, and not very good keepers.

De Soto, Ill., March 14. WM. E. YOUNG.

RAISING ONION-SETS — HOW THEY DO IT IN JERSEY.

You folks out in Medina are "slow" on raising onion-sets. Here is the Jersey plan. In the first place, you want a patch of ground that is well drained; or, better, a patch where the roots of trees are plentiful, such as the south side of a row of apple-trees. The roots draw the moisture out of the ground toward fall, at about the right time for the sets to ripen up nicely. Don't have the ground rich, or they will be stalky. We use, in sowing, Planet Jr. seed-drill, and open No. 5 hole. This will sow them quite thick at a good fair walk.

To keep them over winter, put them on a floor made of shingle laths nailed ¾ inch apart. I have such a floor in my wagon-shed, which I find just the thing for onions in the fall. To cure them, cut some straw about an inch long, and mix this with the sets, or wheat chaff will do. Also, as cold weather approaches, cover them with straw mats. This is the way I had mine this season, and they are fine. The idea, that Landreth sells onion *seed* for raising sets! I think he is trying to impose on the public.

HERMAN HILLMAN.

Dundee Lake, N. J., March 21.

[Many thanks, friend H. Since you speak of it, I do believe that you have suggested a good plan for utilizing ground that is too poor for any thing else on account of the roots of trees. The only time we have succeeded in raising many nice sets was on some very poor ground, before I had manured it up to its present state. Don't be too hard on the Landreths. It seems to me quite likely some kinds of seeds may be better adapted to ripening up early into mature little bulbs than others; and you know the Landreths have been for years raising onion seed and sets, not only by the carload, but I am told they even load a *train* of cars, sometimes, with onion-sets and nothing else.]

SAND AS A FERTILIZER.

Perhaps some of the veterans may smile when I talk about high-pressure gardening where the soil is fertilized with sand—and sand right from the shores of the lake, at that. Years ago a brother of mine was living on the eastern coast of Lake Michigan. It was not long before he had a piece of land. The Roots always must have some land sooner or later. They would not be *Roots* if they did not love ground, you know. Well, his land was *all* sand; and in order to raise stuff, they went off somewhere and got clay, and drew it in to put on the garden; and they discovered that a little clay would leaven quite a piece of ground. I suppose all this is nothing new to people who live in sandy regions; but those of our readers who have clay soil almost without exception, as in this part of Ohio, will think it funny that one should ever think of going after clay. Well, I have for years been experimenting with sand mixed with our clay soil. I do not like the sand that washes up along our neighboring Rocky River, because it is full of weed seeds. The wash in the river, that changes almost every season in many neglected places, grows rank weeds of tremendous dimensions. If I use the river sand on my plant-beds, it is too much like manure from livery stables. Some little time ago our station agent told me there was a part of a carload of sand that nobody wanted, and that I might have it at almost my own price. I put it on my plant-beds, with marked benefit. In order to keep the surface soil from baking and crusting, I used a mulch of fine sand. This covered up the coarse manure (the surface was sifted, of course, so the manure was in a moderately fine state of subdivision), so as to make the surface of the bed as smooth as a sawed-stone flagging, and so white it made a very pretty background for the plants. Well, half an inch of sand, or a little less, seemed to act beneficially on almost all of our plants. Little plants from seeds can get up through it without hindrance. I would not have more than half an inch, because it dries out. This half-inch of mulching, I think, is just as good as mulch made by raking over the surface of our clay after a rain; and the sand

makes the ground work very much easier. Weeds come out very much better than they do out of the clay. Radishes and other root crops are benefited in many ways. Well, this spring we are trying to push strawberry-plants so as to get runners at the very earliest moment. In fact, we have applied rich old compost all around the plants, and fine manure is almost heaped over the plants to make them boom. Now, imagine my surprise to find, a few days ago, that one of the beds that had a pretty good mulch of pure lake sand was growing with more vigor and luxuriance than any of those in the black manure. I was pointing it out to one of my men, who has a greenhouse and raises roses, and he told me the following:

He had about a hundred three or four inch pots of choice roses that he was trying to push along by giving them the very best of compost he could fix up; but they seemed to lag. Thinking that, perhaps, they needed more dampness, he put about two inches of lake sand on the bench, and set the pots a little way into the sand. After a little, here and there the plants commenced to start with wonderful vigor; then another and another. Finally this unlooked-for sudden start attracted his attention —so much so that he attempted to lift up one of the pots. It was stuck fast! and then he found that the roots of the roses had gone through the hole in the bottom of the pot, and some of them had actually spread out through this moist sand to the length of a foot or more. He was obliged to break the pots open to utilize all the roots belonging to the plant. I asked him if the pots were not so full of roots they were obliged to go through the bottom to get more room: but he said not. They seemed to have a particular fancy for that especial kind of sand. In fact, when they got out of this choice fertilizer into the sand, they began to thrive like pigs in clover. Now, this lake sand contains almost no weed seeds of any sort. It has been washed by the waves so repeatedly that one would think there was no vitality left in it. Can it be that the moisture it held, and the mechanical state permitting the roots to grow at liberty, were the cause of it?

A soil or material that is just right for one vegetable, sometimes does not answer nearly as well for another. For instance, we put too many ashes on a long bed. It stunted and almost killed the seeds of lettuce, cabbage, and cucumbers, while the beet seed all germinated nicely, and the plants grew with unusual thriftiness and vigor. And this reminds me that some one spoke of putting his paper of beet seed on a heap of ashes while he prepared his ground. The wind blew the package over, and some of the seeds went down in the ashes and could not be found. Well, the beets that grew in the ash-heap were not only away ahead of those in his nicely prepared ground, but they were perfectly smooth, while the others were more or less misshapen and scraggly. You see, my experiment corroborates his, that beets will stand almost any amount of ashes.

Now, to get the best results we want an evenly balanced soil. It reminds me of what stock-raisers say about an evenly balanced ration. A few days ago I was feeling bad to find one of my beds so hard and clayey at one end, while the other was a very soft, dark, mellow soil that I thought would be greatly superior for the onion seed I wanted to sow on the bed. I should have had the soil changed, and one end mingled with that of the other, had it not been that the boys had already sown the seeds on the clayey end before I noticed it. I was thinking that, where the rich soil was, containing so much old rotten manure, we should get the earliest onion-plants. Imagine my surprise to find the onions up and growing in the poor end, before they got through the ground on the other. Another thing, when they did come up on the rich end of the bed, there were vacant spaces in the rows. I was showing it to a friend of mine, and he poked his finger into what I called the good soil, and remarked, "Why, there is not enough clay in this to hold the moisture — it dries out too quickly. If you will give this end of the bed a thorough wetting, and give it a little *more* water than the other, you will see it will all come up yet." I did so, and it is just as he said. Now, had we depended on the rain, the soil containing the largest proportion of clay would certainly have given the onions the best start. Of course, we do not want so much clay as to have the ground baked, and form a crust so hard that the seeds can not get through. And this brings out the point that clay land will stand large quantities of stable manure better than sandy soil or muck lands. At one time I was greatly in love with the black peaty muck from our swamp garden; but I have found out that, unless we have frequent rains, this same beautiful muck is liable to dry out so that it is impossible to get it wet again unless we have long-continued wet spells. The beds in that new greenhouse, made up of a pretty hard clay, with stable manure right from the horses, without any straw or litter in it, is giving about the best results, especially for plants where *foliage* is what we want. The house was planted at first almost entirely to lettuce. Every pound of lettuce has brought 30 cts.; and as fast as the lettuce gets out of the way, cabbage-plants, tomato-plants, onion-plants, and almost every sort of plant we have tried, do just wonderfully. This 24th day of April we have green peas ready to pick, where the seed was sown last December. We have just had two cold waves, and cold cloudy weather for a week or ten days. Every thing outside came almost to a standstill, unless there was bottom heat under the beds; but every thing in the greenhouse just moved right along; for with the bottom heat, and a temperature of 60 or 70 degrees overhead, there was not any standing still. After we had decided that all cabbage-plants in the future could be grown outside, we were obliged, in order to fill orders, to clear away a bed in the greenhouse, and transplant the cabbages inside. Like every thing else they just took hold and moved right along; while plants from the same bed, transplanted outdoors, did just about nothing. The weather was not cold enough to kill them, it is true; but they did not go ahead any. They were covered with sash; but what good could sash do when we did not have any sunshine?

HOW TO HOLD A BAG OPEN, ETC.

Our new price lists, as you may have noticed, are now printed on electrotype plates—not on type kept standing until it is old and worn out, as heretofore. The boys have been advocating electrotypes for some time; but I feared it would stand in the way of making frequent changes in prices, and that the electrotypes might be behind, and prevent price lists from going by the first mail, etc. Well, it all went on swimmingly until a few days ago, when the electrotypes did not come (they were made in Cleveland). We sent telegrams, but they did not answer. Mr. Calvert said their fashion was to send the goods instead of answering telegrams, and that the electrotypes would be sure to be on hand by the next train. Sure enough, they came, but we had the usual hitches. The girls could not have the price

lists to stitch and fold, for the pressman did not want to turn them over while they were "green" — that is, before the ink was dry. Then in the morning, when they were turned and printed, we had a cold wave and a snow-storm, even though it was April 15; and the girls did not get around, and I began to crowd things. I told them to have wrappers addressed and stamped, for applications most urgent, so as to go right on the price lists the minute two or three hundred were ready. As soon as the stamp was on, we bundled them into a light soft bag made of stout cloth. This bag is one I use on my wheel. If it is not too full I can shake the mail-matter toward the ends, and squeeze it up in the middle, like a small waist, you know. Small waists are all right for bags, even if they are not for women-folks. All right. Then we just slipped that small waist down into the lamp-holder on the wheel, and it makes a very simple and expeditious package-carrier. There, I have just got ready now to tell my story. You see, this story is one with a long preface and a short moral; but the moral is to come. When one of the small girls was asked to hold the bag so the price lists could be put in quickly, I was going to help her. Did you ever undertake to hold a bag, and find that you needed just one more hand than the orthodox number that God has given us? It takes two hands to hold a bag, and then it will not stay open. I was going to hold the bag open myself, so we could get in the price lists quickly; but Faith (that is the name of the small girl) dextrously slipped one *elbow* inside of the bag; then when she held it open with her two hands there was a three-cornered opening just right to shovel in merchandise. She said she learned it of Miss Cole. Miss Cole bosses the paper-room; and she (Miss Cole) said her father taught her how to do it when she held bags for him to shovel in corn, etc. Now, if our farmer readers knew this before, it may not be any new invention; but I am 53 years old, and have been watching all my life for short cuts in all sorts of farm work; but I never got hold of this little kink before; and I felt ashamed of myself when a little girl taught me something so common-senselike and simple.

OURSELVES AND OUR NEIGHBORS.

Hell and destruction are before the Lord; how much more then the hearts of the children of men? —PROV. 15:11.

A few days ago a newspaper was laid upon my table. As usual I glanced over it hastily to see what passage had been marked for me to consider. While glancing over it my eye accidentally struck upon the following, which was given simply as a piece of news. In the neighboring town of Fostoria, Seneca Co., in our own State of Ohio, a lady teacher belonging to one of the Fostoria schools happened to be off a little by herself on her way home. She noticed a man following her; and, being somewhat alarmed, she hastened her footsteps. He also increased his pace; and she finally, in much fright, started to run. He ran too; overtook her, knocked her down, and robbed her of her pocketbook containing some $20.00. At the time the statement was made she was in a critical state from nervous prostration caused by fright and the blow. Nothing was said about hunting up the perpetrator of this foul deed, and I did not learn that the community rose up, as I think it ought to have done, to demand that this man be hunted up and punished, even if it cost thousands of dollars to find him. In repeating the circumstance I have been told again and again, "Why, Mr. Root, that is nothing particularly remarkable. Such outrages are mentioned in the newspapers every day, and they belong to no particular locality, and no particular locality seems to be entirely free from such terrible events."

May be this is true; but in our own town of Medina no such thing ever happened, to my recollection. We frequently hear of men being knocked down, and robbed of their money. This occurs mostly, however, in our large cities; and, so far as my knowledge extends, such acts of highway robbery are mostly confined to individuals who have thoughtlessly exhibited money where prowlers and thieves might get a glimpse of it. At other times it has been caused by people who persist in carrying considerable sums of money on their person, or keeping it in their houses. For years I have been in the habit of giving our people severe lectures about both of these things; and to set a good example I never carry more than five or ten dollars in money in my pocket at any time. In my recent travels I very rarely carried as much as fifty dollars in money. Most of the time I carried checks in my pocket, of $25.00 each. When one of these checks was exhausted I got another one cashed at the nearest bank. Until within a few weeks ago we were in the habit of paying our help every Saturday afternoon here in the factory. The messenger boy who went to the bank was then obliged to carry through the streets from $500 to $1000. I have scolded about it for a good while. Once or twice during dinner-time I have found the pay money left without being put into the safe. We now cut off all temptation in this line by giving our help a check on the bank, so no money is handled here on payday at all.

I recently saw an account that a member of the famous Dalton gang, with one other man as an assistant, robbed a certain paymaster of two or three thousand dollars, and got away clear. A great crowd of men had been working hard all the week. They had earned the money by the sweat of their face. They were justly entitled to it if ever anybody is ever justly entitled to any thing; and yet this fiend in human form, who had not worked nor sweat at all, could coolly, and without scruple or twinge of conscience, take all their earnings, and use it for the selfish gratification of some low passion. We have been told by scientists and theologians that there is at least a *spark* of something Godlike in the breast of *every* human being. There is no need, however, for any scientist, theologian, nor anybody else, to tell us that there is also something devilish in the hearts of a great part of humanity. Let us now get back to our first illustration:

If there is any class of people in this world who are entitled to the respect, reverence, and careful treatment of the whole human family, it is the lady teachers of our schools. To them are intrusted, next to the mothers of our land, the task of training the children. A great part of this work seems to be falling into the hands of good women, and it is right that it should. Some of the noblest specimens of humanity that I have ever met in the world are among these women teachers. I feel proud to number them among my friends. I feel it an honor that it has been my privilege to assist them somewhat, and to give them my aid and encouragement. God bless the schoolma'ams of our land, as we used to call them. I do not know of any other class of people in this whole wide world who need our prayers, our encouragement, our respect, and our help, as do our lady teachers. The man who would covet their faithful earn-

ings must certainly be down to the very lowest depths of depravity.

I do not know any thing about this woman who suffered this indignity and wrong; but, judging from our own teachers here, and the teachers of my acquaintance, she was most likely a good, pure, high-minded woman—most likely a faithful and devoted servant of humanity. She and the class she represents should have the very best treatment this world can give. When it is needful for them to go out among the world it should be our delight to honor them. If they wish to find health and exercise out in the open air or country, it should be the business of every man and every boy to watch over and protect them—yes, to watch over and protect them as we would watch over a mother, a sister, or a daughter. Many of them, as I happen to know, are looking about and seeking illustrations from nature and art in order that they may interest and teach their pupils understandingly. It should be our delight to help them. "As the twig is bent, the tree's inclined." They should not be poorly paid.

I was rejoiced to find that, in the Pacific States, women teachers are paid much better than we pay them here in the East. When you get a really good, competent, faithful teacher for your children, or for your neighbor's children, do, for God's sake, be liberal toward this teacher. If you scrimp and dicker on every thing else, don't dicker about the wages of your teachers. Pay them liberally—that is, where they are faithful and competent. Have the best, no matter what it costs. Sometimes we say it is better to invest liberally in proper food and clothing than to pay doctors' bills. If this be true, it is a thousand times wiser to invest liberally in means for properly educating your children than to pay the consequences of letting them grow up in ignorance and vice; and this leads in the direction of the man who brutally struck down that woman that he might get hold of her earnings. A big stout man—no, no!—not *man*—God forbid—a big stout brutish fiend in human shape, because he had strength to run *faster* than a poor, weak, helpless, unprotected woman, knocks her down, and robs her of her scanty earnings. Why! ever since I read that paragraph, and while it has been running through my mind again and again, I have fairly boiled over with a desire to try my feeble strength on such a one as he. It seems to me as if God would *lend* me strength, or something *better* than strength, to teach such a one at least some sort of lesson. If energy and fierce indignation in a righteous cause ever lent any man strength, I think it would come to me then.

But yet that is not the thing, after all. It is the same old story. Some temperance lecturer said, that, if every saloon-keeper in our land should die to-night, somebody else right behind him would be ready to step into his shoes; and if all the saloons were not open and running the next day, they would be the day after. If some policeman could be near at hand to shoot down this man in the very act, it would, perhaps, frighten some others behind him, who have the same low purpose in their hearts; but I fear it would not change very much the state of the heart of such people.

There is no use to say these things do not happen often, and that there are so many newspapers nowadays that everybody knows of every thing that is happening. The moral stands out sharp and clear. "Hell and destruction" *are* abroad in our land. Shall we build more prisons, and hang more people? God forbid!

I looked narrowly to see if any thing was said in the paper as to whether this man was intoxicated. There was nothing said about it. If he was, it would explain the whole affair very clearly. In such a case it was *whisky*, and not the man who did the act. The saloon-keeper who sold him his drink, and those who insist that the liquor-traffic is a commendable industry, are *particeps criminis* to the crime. As there is nothing said about his being intoxicated, I think we may take it for granted, at least for this time, that he was not intoxicated—at least, not with alcoholic liquors. Through a fault in education in bringing up, or from unrestrained vice on his part, he was just that low and brutish, and this case only illustrates the fact that there *are* such in our land, right among us, in our land of liberty. For self-evident reasons, those with such depraved natures keep their inmost thoughts from the light of day; but it crops out here and there too unmistakably to permit us to say there is not much of it in the world. What shall we do? Does God know? And if so, why does he permit such terrible exhibitions of wickedness and sin? We can not answer all these questions; but our text tells us plainly that God does know; and the Bible tells us, too, again and again, where we are to look for the remedy. These exhibitions of evil speak plainer than words, to the effect that even we who profess to be Christians are not working and praying as we ought to do. "God, help," should be the prayer of every Christian in our land, as he sees these things as they come up before him. Then he should be up and doing.

I do not know whether this Home talk of mine will be read in Fostoria or not; but even though I do not live there, I live in the State of Ohio; and every true knight-errant of the cross ought to be ready to spring forth to the rescue of that schoolteacher. I am a good deal in debt, and I have not much money to spare; but I am just now burning for the privilege of putting my hand into my pocket to start a reward, or to help in a reward that may be started already, for the apprehension of the man who did this. I beg pardon again—I did not mean to say "man." Let us get hold of the *wretch* who did this, even though it cost the State a pile of money. Let us convince him that there *is* a God in Israel, and that there *are* Christian people in the State of Ohio. Let every father and mother help. It is a disgrace to our *State* that such a thing happened within its borders. Let us rest not until we follow the thing out to its uttermost limits. Let us have the *history* of this man. Where was he brought up? Can he read or write? Has he ever been to church or Sunday-school? Does he know of the existence of such an organization as the Y. M. C. A.?

By the way, here is a case in hand that it seems to me the Christian young men ought to take up. Several times our Y. M. C. A. has been called "effeminate." Boys, let us show these fellows whether we are effeminate or not. May be they think Christians think it is *wrong* to fight, even in defense of a schoolma'am. I do not know how much my life is worth; but it seems to me I never before felt so much like sacrificing it, if there is *need* of such sacrifice, to redress such wrongs as these. I have heard women reformers sometimes, when they got up into their high flights, say, "Oh! *shame* on the men!" And now *I* say, "Shame on the men," myself included in the lot, if they let this pass and do nothing. I want the W. C. T. U. to help us; and the Endeavor society; and the Sunday-schools; and the ministers of the gospel. Why, if somebody were setting your houses on fire, you would pull off your coats, and fight, the whole of you. But this is *worse* than setting our houses on fire. During this present summer, men and women, and especially teachers and those whose occupation keeps them indoors, are

planning to go outdoors more than they ever did before. They are going to ride *wheels* outdoors. The Columbia people, in one of their advertisements, said the woman who has learned to ride a wheel can go *four* miles or *forty* miles if she chooses, without asking odds of anybody. And what they say is true. Our fifteen-year-old daughter can, I think, ride forty miles without any trouble, on a fair road; but how can she *dare* to go out of sight of her home while brutes in human form are abroad, ready to knock her down if she happens to be out of sight? Our teachers will be afraid to take wholesome exercise if this state of affairs is permitted to go on.

And that reminds me: Suppose, dear friends, that this schoolteacher were *your* daughter. Why, it almost calls forth a groan to think of it. But she is *somebody's* child. She is a child of humanity. She is a child of the *State of Ohio;* and if this should meet her eye, I want to say, "Be of good cheer, daughter. Even though this thing did happen here in our beautiful State, and even though there are among us such as he who did this act, there are also thousands of brothers and fathers who are not only *strong* but *brave.* What you have suffered may have been needed to bring us to our senses. So, be not cast down and afraid. There *is* a God above who knows these things; and in his name we promise you this thing shall not be passed by unnoticed. Look up; go on with your work, and may God speed you."

Dear friends, this is springtime, and a glorious springtime too; but let us not be so busily occupied with our crops and our work at home that we can forget the responsibility that God has laid upon us. Our nation has been more than once redeemed from the hand of the spoiler. More than once have America's sons and daughters laid down the implements of peace and showed the great wide world that we can *fight* as well as pray. A few months ago, a brute under the influence of strong drink presumed to lay violent hands on a little child. I need not tell you the end of this terrible tale. Every man, woman, and child for miles around made it a common business to avenge the little one. The man was *burned at the stake* before the outraged populace had hardly time to say whether it was right or wrong. Good people held up their hands in horror. I do not now mean to say all that was done there was right; but I am glad that, when patience *ceases* to be a virtue, our people can rise up in a body and teach all mankind, at least in one direction, a wholesome lesson. I do not recommend that this man who struck down the teacher should be burned at the stake; but he should be hunted up, if money can find him. It is true, he did not strike a *child;* but he *did* strike an appointed guardian of little children; and he and all else like him should either be converted from the error of their ways, or be shut up where they can not harm and rob the protectors and teachers of America's children.

Please don't stop GLEANINGS, as we all like it very much. My wife says, put in plenty Home Talks and sermons, as she enjoys reading them. Long may you live. W. D. SOPER.

Jackson, Mich., Apr. 5.

L. A. Dosch, in the last issue of GLEANINGS, voiced our sentiments very nearly, only that we want you to keep right on with your "silly religious talks," as long as you honestly believe what you say. We should miss them greatly, for, no matter what other papers we have on hand, or what else there is in GLEANINGS, we read and enjoy those "silly religious talks" first. Your ideas in reference to labor questions and capital we usually indorse, and by no means consider them narrow.

Conneaut, O., Mar. 20. D. CUMMINS.

Thou hast loved righteousness and hated iniquity.—HEB. 1:9.

APICULTURAL journalism was never on a higher plane than now, both in quality and quantity.

BRO. YORK, of the *American Bee Journal,* if we mistake not, has just added a new face of handsome type to his paper.

EVERY time the *Review* comes to our table, we make a dive for it among other matter. The last number was an excellent one *as usual.*

THE honor of having the largest house-apiary in the world is claimed by an enterprising Canadian. It is round, having a circumference of 128 feet, and is two stories high. Further particulars will be given later.

THERE seems to be a demand in some quarters for an uncapping-machine. Some time ago we illustrated one, but it was impracticable. Now that electricity is so useful a servant in wire-imbedding, perhaps we can employ it for uncapping. The Rambler and John S. Reese have both suggested an idea that possibly may lead to success. Full particulars will be given in our next issue.

A HINT TO ADVERTISERS.

CATCHWORDS in advertising are half the battle. It is better to use something attractive, odd, or startling in a headline in a small advertisement than an ordinary unattractive card occupying two or three times the space. Take, for instance, "You press the button, we do the rest." It has come to be almost a byword; and yet the happy combination of these words was worth thousands of dollars to the manufacturers of the Kodak camera. As another example we would call attention to the advertisement of S. F. & I. Trego, on page 324. They say, "We are on the lookout," then show a picture of a sailor on top of a mast. We admire the pluck and energy of any firm who are on the lookout for customers—not of the half-hearted sort, but a sort of enterprise that fairly *jumps at opportunities.* As another example of this kind we would call attention to the "ad" on the last cover page of this issue. The catchwords are, "A New Hive." While the W. T. Falconer Co. have not got up exactly "a new hive," there is something so attractive in this headline that people are forced to look at it. If there is any thing that arrests the attention of a bee-keeper, it is a new hive—particularly if it is backed by a reputable firm. There are a good many others of our advertisers who employ skillfully worded lines; but the ones mentioned above are conspicuous examples; and our reason for referring to the matter here is, that our advertisers may thus help materially to increase their net profits. It should be remembered that space costs just so much, no matter what use you make of it. Effective display and appropriate "catchwords" or "catchlines" mean dollars of profit.

MR. HARBISON.

WE are glad to present to our readers, from the pen of our special correspondent, Rambler, a very interesting account of Mr. Harbison, of California fame—his early history, his hive, etc.

You have often heard of the Harbison hive, but few have any accurate idea of its origin, size, and general appearance.

REPORTS, so far as we have gathered them from all over the country, seem to show that bees have wintered fairly well, though not so well as last winter. In some quarters the losses were hardly worth mentioning. It seems to be a singular fact—one for which we can assign no reason—that there has been the greatest mortality in the region of Northern Ohio. We might assign as the cause, our proximity to Lake Erie; but why are there no very great losses in Michigan, Pennsylvania, and New York, that border in a similar way on the great lakes?

WE have just received a new edition of the work, "Bee-keeping for Profit," by Dr. G. L. Tinker, of New Philadelphia, O. This little treatise gives in detail Dr. Tinker's new system of management; the size and shape of his hive, and general information regarding the uses of perforated zinc, of which the doctor makes a specialty. As nearly as we can judge from a hasty glancing over its pages, nearly all the old matter has been retained, with here and there some additions in regard to perforated zinc. A chapter from "Bees and Honey," on the subject of "Pasturage a Necessity," has been added to the book. It is published by G. W. York & Co., Chicago, Ill., of whom it may be obtained.

IT will be remembered that we stated editorially in our last issue, that if R. L. Taylor and the other fellows did not keep still we should be "on their side of the fence." Mr. Taylor, instead of keeping still, has gone and sent in a well-considered article on the hiver and its cost —see page 343. We do not remember whether we were *on* the fence or not; at any rate, we now feel as if we were pretty nearly pushed over on Mr. Taylor's side, and yet—and yet—we can not quite give up the idea that we should *like* to be on the other side. The Pratt hiver worked economically for us last year; and the queens were reared after the swarms were cast. If the new swarm in its new quarters be removed in four or five days, the parent colony will probably rear a queen.

SINCE we shut down on the sugar-honey question in our columns, we have been asked by adherents on both sides to renew the discussion, more particularly as some of the other journals were keeping it alive in their columns. We do not wish to indicate any policy for another paper, but we hardly think it wise for *us* to open the discussion *for the present*. If the production of sugar honey is unwise, as we firmly believe it is, the best way to kill it is to say nothing about it. To vigorously oppose it is, in a certain sense, to keep it alive. The thing that we have to regret is, that it should have been discussed as much as it has in our columns, particularly as more extensive experiments should have been made and a better knowledge of the product secured; for even Prof. Cook, in a card just received, says, "*I am not sure* that sugar honey is what I think it is; that, of course, is to be settled." How much better to have "settled it" before saying any thing about it, and so incurring great risk as to the consequences!

CYCLONES.

BY a letter just received from M. H. Hunt, of Bell Branch, Mich., a manufacturer of and dealer in supplies, we learn that he came very near losing all his buildings by a cyclone that passed by his place on the 12th of last month. A neighbor who lives near him on the east lost all of his buildings and his orchard, amounting in all to something like $5000, with no insurance. Among his losses was an apiary. Not a scrap of the hives could be found, nor even a bee. The track of the cyclone was thirty rods wide, and we are glad to know that friend Hunt was not "in it." On the 8th of April, 1890, a destructive cyclone passed within two miles of our buildings. Houses, barns, orchards, and fences were almost annihilated. Since that time we have carried cyclone insurance. It is terribly hard on a man who has been working the best part of his life in acquiring a property, to have it *all* literally swept away in a moment, with no insurance to look to.

MAKING YOUR IDEAS "GETATABLE."

SOMETIMES our correspondents are a little careless in making themselves understood; and this is true of those who write regularly as well as of those who contribute only "semi-occasionally." In order to get the meaning we have been obliged to read the paragraphs over a number of times, to see what the writer was "driving at;" and even after having dug out the idea, we hesitate to supply a word here and there, to make it plainer, for fear we may make him say just what he did not want to say. Those who are guilty of this sort of carelessness are just the very ones who could do better. We look at it this way: If *we* have to re-read paragraphs, our subscribers, instead of digging out the meaning, will just skip them, and hence just that much valuable space is wasted. A diagram or a rude sketch will help wonderfully many times; and we hope our friends will feel free to add such features to their descriptions, and where practicable we will have them engraved. It should also be borne in mind, that *you* can understand perfectly what you are trying to tell about. After you have finished your description, submit it to some friend; and if *he* catches the idea readily, it is presumable that others will. We do not mean to make this a sort of scold; but ideas should be so worded that the reader will have little or no difficulty in catching the full meaning at once.

But you say an editor is supposed to re-write, re-word, and re-arrange, so that every thing will be plain; but, dear, dear! if the poor *editor* does not know what you are trying to tell, how is he going to do it? He will probably consign what is an otherwise valuable article to the everlasting waste-basket, and turn his attention to something that gives ideas more easily "getatable."

ROOT'S EXHIBIT AT THE WORLD'S FAIR.

WE suppose most of our readers expect to visit the World's Fair at Chicago. We take it for granted that they will, of course, hunt up the exhibit from the Home of the Honey-bees. It is not so extensive as we had originally planned or hoped. We were, in the first place, limited to about 4 x 8 feet, but we complained that it was no use making an exhibit in such a space as that. It was then enlarged to 8 x 14 feet; and even then we felt that we were being cramped, as we desired to send a carload of goods of our own manufacture. But the secretary of the Department of Agriculture informed us that, by reason of the great number of applicants for space, he would *have* to limit us to that space or nothing. We prepared an exhibit, and have recently sent it to Dr. Miller, who is to set it up in a few days after a photograph we supplied him, and incase the whole thing in a showcase, or, rather, a sort of glass house. The exhibit comprises nearly every article we manufacture, and *all* distinctly relating to apiculture. A conspicuous feature of the

exhibit will be a large water-color painting, 25 x 40 inches, giving a birdseye view of our manufacturing plant. The picture has been pronounced, by all who have seen it, to be exceedingly accurate: and those who visit the World's Fair will have not only a chance to see the external appearance of the Home of the Honeybees as it is, covering as it does so large an area, but a sample of all the goods manufactured therein. The painting has just been completed, and is made with the special object of exhibiting the same at the World's Fair. We shall doubtless give our readers a half-tone reduced engraving of it. But a reduced copy in one color does not begin to express its lifelike proportions. The artist, we are proud to say, is a Medina County man, and is a relative of two of our employes.

The location of the exhibit is in the Agricultural Building, in the gallery of the second floor, in section 33, H. It is shown along with exhibits of a similar character, and we think there will be no difficulty in finding it.

SEALED COVERS; THE FINAL STATEMENT OF THE CASE.

In response to our request in a couple of issues back, we have received scores of reports giving comparative tests between colonies under sealed covers packed in chaff, and colonies similarly packed with absorbing cushions or upward ventilation. We have given a few of the reports as they happened to come in elsewhere, as average samples. The results, as reported, show that bees have been wintered successfully both ways; but the evidence taken as a whole seems to indicate that the absorbing cushions, or upward ventilation, gives the better result. In some quite marked instances there is quite a decided difference in favor of absorbing cushions. We notice that the reported mortality, in some instances at least, under sealed covers, is due to the fact that the moisture, not being able to escape upward, runs down on the inside of the hive, on the bottom-board, to the entrance. There, coming in contact with the cold air, it freezes, and seals hermetically the only opening to a supply of fresh air. The result has been, that such colonies die, as a matter of course; and as warm weather comes on, the entrance thaws out before the apiarist gets around to ascertain the cause. Upward ventilation, on the contrary, will, of course, save such colonies; but absorbing cushions often become wet and soggy; and if they are left on the hives without being dried out during winter they are worse than nothing. It becomes evident, then, that, in order to have the best results with the absorbing cushions, there should be a free circulation of air over the top, through ventilators sufficiently ample. It is never the thing to do, to place a telescopic cover (without ventilators) over the absorbing cushion so tight that there is no escape for moisture. Such cushions invariably become practically water-soaked; and the colonies under them will be quite likely to die.

Now, although we have said a good deal in favor of the sealed cover, in the last year or so back, what we did say was more to stimulate experiment along the line that we thought might develop something valuable; but the scores of letters show that the old absorbing cushion, with its upward ventilation, is the more reliable plan for outdoor wintering yet.

So far, in our A B C of Bee Culture we have not given one hint that there was any such idea extant as the sealed cover. Indeed, the directions through all this time have been to use absorbing cushions. We go on the principle that it is better not to recommend a new plan to beginners, and, in a general way, text-books, until we have ample evidence that it is superior to the old. So far as beginners are concerned, and those who look to their elders for instruction, no harm has been done.

A PANORAMA OF THE NOTABLE OBJECTS OF INTEREST IN THE WORLD.

We have just received from the publishers, Mast, Crowell & Kirkpatrick, of Springfield, O., a wonderful book. It contains over 500 photographic views, 11½x14 inches; and these views, by the way, are of the highest order of art that photography has ever yet aspired to. A large portion of them are from the Old World; yet quite a number of them are lifelike, familiar scenes from our own land. Mrs. Root and I went over some glimpses from California, until it seemed as if we were back on the old familiar spot. We showed the children the hotels where we had stopped, the mountain-peaks covered with snow, the waterfalls we had visited, etc. The glimpses from the Holy Land are especially valuable. From all pictures of the pyramids I had previously seen, I supposed they were made of hewn stone throughout, something like the steps to the public buildings in our great cities. The camera, however, with its unerring fidelity, reveals the fact that the great pyramid is now, after a lapse of about 40 centuries, what we should call a great stone-pile.* Of course, they were once blocks, each block reaching up to a man's arms; but the action of the elements, after so long a time, has done its work, as with thousands of other things. Wood-cut engravings have many times given us erroneous conceptions: but the faithful camera tells the truth. The photograph tells no lies. The subjects are written up by Gen. Lew Wallace, Edward Everett Hale, Washington Gladden, and others. Many of the pictures are reproductions of paintings that are valued away up into the thousands. I was especially interested in a couple of companion pictures representing Abraham and Sarah turning away Hagar and Ishmael. It is a nice book to look over on Sunday afternoon, while you tell the children Bible stories. I do not know what the book costs. I have been told that it is sold only by agents.

* SOMETHING MORE ABOUT THE PYRAMIDS.

Since the above was written, our stenographer, W. P. Root, furnishes the following:

The outside of the pyramid of Cheops is not the same now that it was when finished. What now look like steps of stairs on each side were at first filled in with three-cornered stones, commencing, of course, at the top, and working downward, thus leaving the pyramid as smooth on the outside as any surface of stone could possibly be made. This will be made plain by the figure above, where the zigzag mark represents the present surface, and the straight line the outside as the builders left it. At a comparatively recent date the Arabs pried these stones from their places and used them for building palaces, etc., in Cairo, within sight of the pyramids toward the east. As Egypt has neither rain nor frost, the elements have made no marked change in the general appearance of this greatest of all human works. The beauty of the pyramid, so far as its masonry is concerned, is all on the inside, in the wonderful galleries, where the immense blocks of syenite are cemented together in the strongest manner with a layer of mortar scarcely thicker than a coat of paint. A thoughtful person can not help thinking that, if man has emerged from a state of animalism, it is strange that this great monument, which appears at the dawn of human history, is a model that man to-day can not surpass, and probably can not even imitate in any particular. It is built on geometrical principles that offer no room for improvement. It contains 85,000,000 cubic feet of stone — enough to pave a road 17 feet wide and a foot thick a distance of 947 miles.

TRADE NOTES.

TAYLOR'S COMB-LEVELER; A MISCONCEPTION CORRECTED.

Since our article under this heading, in our last issue, we have received the following from Mr. Taylor, which will explain itself:

Friend Root:—In speaking of the use of the handy comb-leveler, in April 15th GLEANINGS, you say:

Although we have never tried it, we presume it is a fact that the bees will build out these combs, reduced to foundation again, as rapidly and perfectly as they build from regular foundation; and probably no one could detect, after the combs were finished and capped over, those that were built from leveled-down combs, and those from foundation.

This leaves the impression that all that is gained by the use of the leveler is the saving of the foun dation originally used in them. Now, I confess to being greatly surprised at this explanation. Why, there is no more reason for reducing the combs to foundation again in sections than there would be to reduce extracting combs to the original foundation after each extracting. Already I have received inquiries as to whether the cells could not "be left deeper." Mr. Root, these sections of empty combs, if used rightly, are nearly equal in value to sealed combs of dark honey, at least; and I believe sections of dark honey can be extracted, and the honey sold as extracted, or used for feeding; and the empty leveled combs kept over to be quickly filled again with white honey with greater profit. Oft-times bee-keepers have many sections filled with honey-dew that is not fit for table use. Extract the honey from them and use it for spring feeding, and you can have the empty combs filled with clover or bassswood honey, even in a short honey-flow; and in half the time that the same work would be done on new foundation.

Last year I used about 2000 such combs. They were in 24 section cases; 12 empty combs, and 12 sections filled with new foundation. The honey-flow, both clover and basswood, was short and meager; yet the combs were nearly all filled and sealed, while there was not a single section of foundation finished fit for market, right in the same cases. Most of them were nearly filled with comb and honey, but not sealed. I extracted them and sold the honey for 12½ cts. per lb. I now have the empty leveled combs ready for the white-honey flow of 1893, and I know I have in them property of great value.

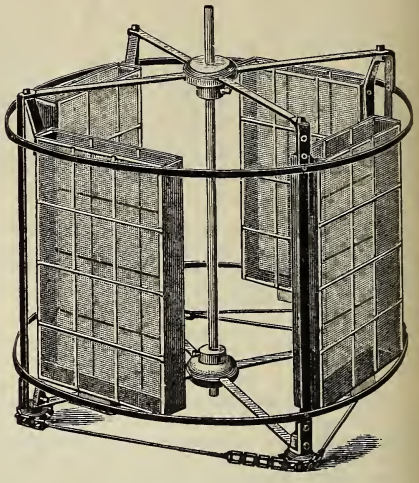
Now, I should like the readers of GLEANINGS to hear this explanation, as I see by two letters received to day that bee-keepers are being misled by the idea that the combs are reduced to the original foundation, whereas they should be left as nearly full depth as possible, and have the surfaces level and of equal depth. B. TAYLOR.

Forestville, Minn., April 24.

We are very glad to be corrected. In our hurry we failed to catch on to the real purpose of the comb-leveler, and we trust the above will make it all plain now. Yes, indeed, the instrument would have a much more valuable use in reducing cells to as deep a level as possible than reducing them to the depth of ordinary foundation.

FOUR AND SIX FRAME COWAN EXTRACTORS.

Our four and six frame Cowans, while similar in principle to the two-frame machine, differ in having a center-shaft and in having each basket geared with a chain, so that the reversal of one basket reverses them all simultaneously. Indeed, it is not even necessary to stop the extractor. All that is required is, to slow up the motion a little, so that the hand can catch one of the baskets, and retard its outer edge while the reel revolves. The inner edge of the basket being thrown past the center, the centrifugal force will carry it the rest of the way, and the reversal of all the baskets is accomplished much more expeditiously and easily than with the so-called automatic reversing machines. The baskets are thoroughly braced, and there is not the slightest danger of heavy combs bulging them, and they are hinged in such a way as not to interfere with each other, nor to fly off the hinges entirely, as is the case with some reversibles. There are no chains — no hitching nor catching of any kind, for the reversal of motion is positive.



INSIDE VIEW ONLY.

The cross-arms of the reel are made of wrought iron, cast into a solid hub, and there is no possibility whatever of their getting loose. Of all things that are annoying, it is to have extractors break down or give out, right in the height of the honey season.

Besides all the other features of the Cowan, the crank can always be run one way. Another feature is, they do not throw honey over the sides.

SPECIAL NOTICES.

WHOLESALE PRICES TO DEALERS.

We have sent out, during the past week, wholesale price lists to dealers who advertise and sell anything that we manufacture or job. If any who are entitled to these lists have been missed in the distribution, we should be pleased to hear from them.

MAY EDITION OF OUR CATALOGUE.

We have finally completed the resetting and electrotyping of our catalogue, and are now printing it entirely from plates, and mailing it as rapidly as possible to our old customers and those who apply. We have made it of especial value to beginners by incorporating directions, and answering questions most frequently asked.

We have made a slight reduction in the prices of 24 and 48 lb. shipping-cases. The 24-lb. single or double tier are $10.00 per 100 in the flat; and the 48-lb., $12.00 per 100; in lots of 10, 2c each extra. The 12-lb. 3-row case is 80c for 10, though printed in error 40c.

SAFETY BICYCLES.

A month ago we called attention to the Lovell Diamond Safety bicycle, agreeing to send catalogue with special price on application. We were daily expecting our supply of catalogues then, and we regret to say our expectations have not yet been realized. The manufacturers claim to have sent us a supply, and we shall, no doubt, receive them shortly. As soon as they come we will break the spell with those who are patiently waiting, and any others who have not yet applied, but are interested enough to do so.

If any prefer the Victor or Columbia, the two leading wheels, at $150, we can supply either, but