Gleanings in Bee Culture

VOL. XL APRIL 1, 1912 NO. 7

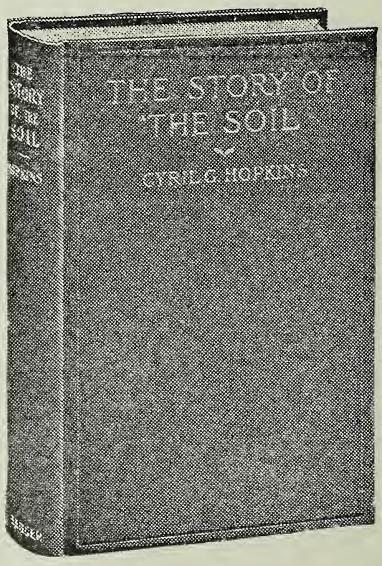
Have You Robbed Your Farm?

A True Story With a Moral

Some years ago a young man bought a farm on the edge of an old peat bog in Illinois. The soil was evidently very rich, and the first year yielded a big crop of corn—85 bushels per acre. The young man was happy, took unto himself a wife, built a little home on a little knoll on the farm and settled down. The next year he had another bumper crop on the farm and a pair of twin boys in the home, and he was happier than ever.

Well, he continued to live and farm this place for twenty years, and worked hard and faithfully, but in that whole time never raised another good crop, and he couldn't understand it, especially since the first crops were so fine.

One day a soil specialist came along, examined the soil and found it lacking in phosphorus. The first two crops had used up all there was, and more phosphorus had to be added before another crop could be harvested from this soil.



When the specialist told this to the farmer, and that for a small sum per acre he could have added the phosphorous and raised a bumper crop every year, he just broke down and cried. He said: "Just think! I have lived here all these years, a very poor man, and raised my family in poverty and ignorance, all the time working hard, without success, and if I had only known what you tell me I would be rich and my children could have had an education and social advantages which have been denied then."

Every farmer should know the kind of soil he is farming; should learn how to avoid robbing it; should learn how to feed it; so that instead of getting poorer every year his soil will be getting continually better.

You can do it, Mr. Farmer, by reading such books as "The Story of the Soil."

Cyril G. Hopkins, the Author of "The Story of the Soil," is acknowledged authority on Soil Culture of the University of Illinois, author of "Soil Fertility and Permanent Agriculture," etc.

Every scientific farmer and every student of the soil, and everybody who wants to know how to make things grow to perfection should read Mr. Hopkins' Masterpiece, a new book, entitled "The Story of the Soil," a handsome volume, elegantly bound in cloth, containing 350 pages, size 5x7½ inches, illustrated—sells for $1.50.

GLEANINGS specially desires that every one of its subscribers read this book, and become familiar with the knowledge of the soil and suggestions of this great man.

We have arranged with the publishers to get this book for you at factory cost, and will send it to you by mail, postpaid, and a year's subscription to GLEANINGS both for $1.50. Address

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Gleanings in Bee Culture

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Editorial

CHEAP HONEY FOR MANUFACTURING PURPOSES.

An intimation has come to us that the bakers have discovered a new recipe by which they can use a cheaper substitute for extracted honey in their manufactured products. Honey gives, as is well known, in cooking, a lasting quality to the cakes, because it makes them keep almost indefinitely. Hitherto, it is said, no artificial substitute has been found to take its place; but we can not believe that there is any thing that can be made by man that will take the place of honey. Some of the bakers, perhaps, may put up a bluff that they have discovered something better and cheaper than honey for the purpose of getting honey for less money. We await results.

DR. WILEY RESIGNS.

It is with much regret that we note that Dr. Wiley has resigned from his position as Chief of the Bureau of Chemistry—a position that he has filled so faithfully for 29 years. According to the newspaper account, the action was entirely voluntary on his part. He was completely exonerated from all guilt in connection with the charges that were brought against him; but he felt that his sphere of usefulness was limited, since the same parties might accuse him unjustly again, and so hamper him that he would be unable to give his undivided attention to his work.

We understand that he does not intend to withdraw entirely from this kind of work; in fact, we believe he expects to do more of it than ever before, except that he will be established with an office in Washington, but not in the employ of the government. We certainly wish him success, for it is to the interest of the American people that he succeed.

We believe the United States Government has lost one of its most efficient workers—one who believed in going ahead when he thought he was right, even though the stand he took might bring trouble to himself. Would that there were more fearless officials.

MUCH INTEREST IN OUR AUTOMOBILE NUMBER.

We have almost enough material on hand to get out another special number on automobiles if we chose to do so. Some very fine illustrations (over a dozen of them from as many different beekeepers), came in too late. There is, apparently, far more interest shown in the subject than we had anticipated. But when we stop to think about it, it is not at all strange; for there is no class of producers to whom the motor vehicle is more an absolute necessity than beekeepers.

Possibly another year it would be well for us to issue another special number on this subject; but at present we have such a wealth of good material along other lines for special numbers to come, as well as for our regular numbers, that we feel that we can not devote very much more space to this question, interesting as it is.

ANOTHER SWEET-CLOVER PAMPHLET.

The Bokhara Seed Company, Falmouth, Ky., has just issued a sweet-clover pamphlet, entitled "Sweet Clover and How to Grow It," by E. E. Barton, a member of the American Breeders' Association. A description of the plant is given, including the white sweet clover, the biennial yellow sweet clover, and several other varieties less common. This description is given in such plain simple language that anybody can understand it. For instance, the nature of the plant is explained in that, with red clover, alfalfa, beans, peas, and numerous other kindred species, it belongs to the family of plants called legumes; "a group whose importance to agriculture is beginning to be recognized the world over, and which furnishes in a large measure the food supply of both man and beast, as well as constituting the main stay of the soil's fertility."

The uses of sweet clover are mentioned, and the great value it has in supplying the two things most needed by the greater number of farms—nitrogen and humus. Its value for pasturing and for hay is also brought out. "While alfalfa hay is rather active on the kidneys and bowels of horses, sweet clover has a slight corrective influence

in that regard; and for this reason it is desirable to mix sweet clover with alfalfa meadows, resulting in a more satisfactory hay, as well as assisting the inoculation of the soil where alfalfa is getting a start. On account of the frequent mowings of the alfalfa, the sweet clover will not be able to reseed, and will disappear from the alfalfa at the end of the second year."

The value of this plant for honey was not overlooked, and the different varieties were compared as to their value to beekeepers. Then follow full particulars in regard to the seed and methods of sowing; the best time of year for sowing, the amount of seed, the nurse crop, etc.

All this goes to show that farmers everywhere are waking up to the value of this once despised *weed*, and are calling for the seed to such an extent that the seed companies are getting out these special pamphlets. For further particulars regarding the special pamphlet mentioned above, address The Bokhara Seed Company, Falmouth, Ky.

HOW THE BEES HAVE WINTERED.

As in former years, we find it difficult to give a comprehensive report of the prospects of the season; for, although we have hundreds of reports, there are not enough in any one State to give conclusive evidence. On account of the influence of local conditions, these reports from localities, often only a few miles apart, are more or less conflicting. It is still too early for any thing definite from Canada. We will take up the States that we have heard from, one by one.

CALIFORNIA.

The early reports were any thing but hopeful. During the fore part of March there were good rains; but while most of the beekeepers feel somewhat better over the outlook it is doubtful whether a bumper crop will be produced in any part of the State, owing to the rains having come so late.

CONNECTICUT.

Few reports. Very few days when bees could fly, but apparently most colonies have come through in very good condidion.

FLORIDA.

There is every indication now that there will be a fine crop of honey throughout Florida. While the winter was a little backward, the cold did no damage, and the copious rains have put every thing on the boom. In the vicinity of Bradentown, the orange blossoms opened up March 18.

GEORGIA.

The outlook has changed but very little from that given in our last issue.

ILLINOIS.

Reports are rather unfavorable. Colonies in cellars appear to be all right; but those wintered out of doors have suffered losses all the way up to 75 per cent. One apiary of 58 colonies, all dead.

INDIANA.

Most colonies, wintered outside without protection, dead. Colonies in cellars and those well protected, and in good shape in the fall, are all right. Losses average about the same as in Illinois.

IOWA.

Heavy loss in most parts of the State, ranging from 40 to 60 per cent, and, in some instances, worse yet. Considerable honey dew gathered last fall.

KANSAS.

Loss of colonies in single-walled hives close to 25 per cent.

KENTUCKY.

Few reports. Loss of colonies in single-walled hives, possibly 50 per cent.

MAINE.

The few reports are all favorable.

MARYLAND AND MASSACHUSETTS.

Losses apparently not severe.

MICHIGAN.

Reports quite favorable, with the exception of one loss of 39 per cent. In another apiary, all colonies in fairly good shape with the exception of the golden Italians, which are nearly all dead.

MINNESOTA.

Half of the reports show favorable wintering, the others indicating a loss approaching seventy-five per cent.

MISSISSIPPI.

Excellent prospects for good crop.

MISSOURI.

Colonies in good shape in fall, all right. Those without protection wintered very poorly.

MONTANA.

The few reports received are very favorable.

NEBRASKA.

Heaviest loss in years.

NEW HAMPSHIRE.

Losses very light, as a rule.

NEW YORK.

Large number of reports show that losses are apparently light. Colonies in cellars in good shape.

OHIO.

Many reports, most of which are favorable. In one or two localities loss approaches 60 per cent.

OKLAHOMA.

Few reports. Loss possibly 33 per cent.

PENNSYLVANIA.

About half of the reports indicate serious loss. Causes—starvation, insufficient packing, long-continued cold, etc.

RHODE ISLAND.

Few reports. No serious losses as yet.

SOUTH DAKOTA.

Few reports. Outdoors, 30 to 75 per cent loss. Cellar, 10 to 25 per cent.

TENNESSEE.

In some parts, owing to poor quality of stores and no packing, loss is quite heavy. Other reports more favorable.

TEXAS.

Good season expected.

VERMONT.

Few reports indicate close to 50 per cent loss.

VIRGINIA.

Few reports. No serious losses.

WASHINGTON.

Apparently little loss.

WEST VIRGINIA.

Most reports indicate a loss of about one-third.

WISCONSIN.

All reports agree on quite heavy loss out of doors; and, in some instances, in cellars also.

In looking over these reports, the reader must remember that much depends upon the weather from this time on. Just now (March 25) there is nearly ten inches of snow on the ground in this locality, the result of a March blizzard. If the weather turns very warm suddenly, and then gets colder again after a couple of weeks, the brood that will have been started may chill. In two weeks the conditions may have taken a decided turn one way or another.

Look out for spring dwindling. This spring we expect to hear of an unusual amount of trouble from this source for the weak colonies will not stand very much.

THE VALUE OF HONEY BECOMING BETTER KNOWN.

THERE have been so many sensational stories published in the press regarding bees and honey that have been misleading and untruthful that it is quite refreshing to find occasionally an item that is true as well as interesting. The following, from *The Christian Herald*, indicates that the original writer knew what he was talking about, in this instance at least:

HONEY BREAD.

In Europe, where the food value of honey seems to be much better understood than in the United States, enormous quantities are used. Of late years we seem to be waking to a realization of the value of honey as a wholesome and delicious article of food, and also as to its preservative qualities. Cakes and sweetbreads made with sugar soon become dry and crumbly, and to get the good of them must be eaten when fresh; but when made up with honey they seem to retain their freshness indefinitely. In France honey bread a year or eighteen months old is preferred to that just made. They say, "It has ripened." It is the preservative, or, rather, the unchanging quality of honey that makes it so popular with the best confectioners.

As pointed out in the introduction to our new booklet, "The Use of Honey in Cooking," cakes and cookies made with honey retain their moisture and freshness almost indefinitely—a fact which is not appreciated by the general public. It is a question, however, whether the average housewife, on reading this clipping, would put very much faith in it, since she has been fooled so often. At the same time, we are glad to see items appearing in which honey is given its just dues. Let the good work go on.

WHAT MAKE OF AUTOMOBILE TO BUY.

THE various articles in this special number show conclusively, we think, that automobiles are cheaper than horses when the saving of time is taken into consideration. In fact, each user of a machine is so enthusiastic and so sure that his own is the best make to buy that a prospective customer is likely to be confused and unable to decide which way to turn. For the benefit of such we may say that there is no longer any great risk in buying a machine made by a well-established firm that has been in the business long enough to know what is required of a motor vehicle in the hands of an experienced driver and running on all kinds of roads. There is quite an advantage, however, in purchasing from a local dealer if possible, for he will not only see that his customer is taught to run the car but will take an interest, in most cases at least, in seeing that it is satisfactory in every respect. Many dealers handle more than one car, and usually the various makes they sell are quite different. It may be well, therefore, to consider briefly some of the different types; for after all a great deal depends on personal preference. A car that would exactly suit one person might not be satisfactory to the next one, even though the work required were the same.

AIR-COOLED VERSUS WATER-COOLED CYLINDERS.

Some gasoline-engines are air-cooled and others are water-cooled, and we are asked repeatedly which method of cooling is the better. For small cylinders, air-cooling is quite satisfactory. There is no radiator to leak, and no pump to get out of order. On the other hand, the air-cooled automobile engine is not as quiet as the water-cooled, and it requires a somewhat greater quantity and better quality of lubricating oil. If of the four-cycle type, the exhaust valves are also a little more likely to warp with the heat, and give trouble about leaking, than if the cylinders and valve chambers are cooled by a water-jacket. And there is not as much trouble from leaks in water-cooling systems as there used to be, for the manufacturers have abandoned the use of steel in the radiators, pipes, and tanks; and the rubber hose, if used at all, is of good quality, so that it is strong and durable. It is true that air-cooled cylinders will never freeze in cold weather; but there is now no excuse for allowing water-cooled cylinders to freeze, for it is very easy to make an anti-freeze solution with either wood alcohol or glycerine mixed with water.

TWO-CYCLE VS. FOUR-CYCLE AUTOMOBILE ENGINES.

There has been a vast amount of discussion between automobile designers regarding the two-cycle engine—that is, one in which there are two strokes of the piston in the complete cycle, as against the one in which there are four strokes in the complete cycle like the average automobile engine. The four-cycle engine has an inlet and exhaust valve for each cylinder. The operation is something like this: The gasoline vapor is fired by the electric spark, and the force of this charge drives the piston down or away from the cylinder head, and the momentum of the flywheel carries it back again, when the exhaust valve opens and the burnt gases escape. As the piston starts down again, still carried by the momentum of the flywheel, the inlet valve opens, and a fresh charge of gas is drawn into the cylinder. When the piston returns, this charge is compressed, ready to be fired once more, thus completing the cycle. Thus, there are four strokes of the piston in the complete cycle. In the two-cycle engine the piston acts as its own valve, allowing the burnt gases to escape through a port in the cylinder, which is uncovered when the piston reaches nearly the limit of its stroke; and when it moves back again toward the cylinder head a fresh charge which was drawn in is being compressed ready to be fired, so that there are only two strokes of the piston completing the cycle.

Four-cycle engines are much more complicated, but they are more efficient; that is, they will develop a certain horse-power on a smaller amount of gasoline than would be used by a two-cycle engine of the same horse-power. For this reason, perhaps, and

also because the average four-cycle engine is somewhat more easily controlled, and steadier in running, a very large proportion of the manufacturers use this type.

Among the advantages that may be mentioned of the two-cycle engine are the simplicity, the ease of lubrication (for the oil may be mixed with the gasoline), and the fact that the two-cycle engine of a given horse-power is lighter than a four-cycle engine developing the same power. In the past, quite a number of cars having two-cycle engines that were poorly designed turned out to be failures, and this has caused considerable prejudice against this type of engine, which is not well founded, in view of the fact that there are some manufacturers who for years have built good reliable automobiles in which this engine is used.

THE TRANSMISSION QUESTION.

The weakest point in most cars is the transmission, which changes the ratio of drive between the engine and the wheels. It would be impossible to go into even a brief discussion of the merits of the different types of transmission used; but we will say that all forms of transmission have their faults and their limitations. For instance, the planetary transmission which is simple to operate is limited to two speeds forward only. It is difficult to learn to operate properly the sliding-gear transmission that is used on the majority of cars manufactured, and the gears are short-lived unless equipped with the very best bearings. The friction transmission which is the easiest to operate of all is expensive to build, and slightly less efficient than either of the other two drives; and this loss, though so small that it can not be detected in the running of the car nor in the amount of gasoline used, has caused considerable prejudice. This point is more fully discussed elsewhere in this issue.

SOLID VS. PNEUMATIC TIRES.

We are asked quite often as to the merits of solid tires as compared with pneumatic ones. The solid tires are perfectly satisfactory for motor trucks, wagons, etc., where the speed is not over fifteen miles per hour. They are lower in first cost, the expense of upkeep is less, and they never give serious trouble on the road. Pneumatic tires, however, are much to be preferred for pleasure cars, as they ride easier, and they are much easier on the mechanism of the car, since the machinery is subject to much less vibration when they are used.

THREE RELIABLE TRUCKS.

After the foregoing, it may seem like an impossibility to recommend any special car; but owing to the fact that so many have asked for advice, we desire to mention here three trucks — the Reo, the International Harvester, and the Chase. These are built especially for business, and we can give them our unqualified endorsement. The designs of these three machines are quite different from each other; but we have no hesitancy in recommending any one of them. There are undoubtedly other motor wagons or trucks that are perfectly satisfactory; but these particular machines are to be seen in service every day on the streets of most of our larger cities as well as on country roads, saving time for busy farmers, and we believe them to be particularly adapted for bee-keepers.

We have had personal experience with the Reo. For instance, the one shown in our cover picture of this issue was purchased in 1906. For four years it was used as a pleasure car, being fitted with a folding rear seat. The last two years it has been used as a general truck, the body shown being built here. It would be impossible to say how many miles this machine has traveled, but 15,000 would not be far out of the way. The original price was only $650, so it can be seen that the investment for this distance traveled has not been great. The repairs have been rather below normal if any thing; and, although the machine needs a general overhauling now, it is still capable of considerably more hard work. The 1912 model truck is shown on page 196.

The International auto wagon made by the International Harvester Company of America, Chicago, Ill., is used by the thousands by farmers and business men of all classes. It is equipped with a 20 h. p. two-cylinder opposed, air-cooled engine, which has had to be altered very little in design during the past few years, showing that it has proved very satisfactory in the hands of the users. The high wheels and solid tires make it possible to drive in mud or sand. In this connection, notice what Mr. Polhemus has to say, pages 204–206.

The Chase motor truck is sold in perhaps larger quantities for commercial purposes than any other one make. Mr. Peterson's report of his success with this truck on page 200 is not an unqualified endorsement, but it must be remembered that the one which he has is a very old model. Those turned out by the Chase Motor Truck Company, Syracuse, N. Y., at the present time are being bought in large numbers by such large corporations as the Bell Telephone Company, etc. This car has one of the simplest engines that we have ever seen. For instance, 167 parts found in the ordinary four-cylinder, four-cycle, water-cooled engine are eliminated in this three-cylinder, two-cycle, air-cooled motor, and it is a motor that "delivers the goods" too.

Occasionally, bargains may be picked up in second-hand cars; but as a rule they prove to be a big expense for a year or two; and then have to be sold for almost nothing. Then there is always the danger that the former owner, through abuse, may have weakened some vital part, such as the steering knuckles, or axles, which may give out at any time without warning. The owner who drives the machine himself knows just how he has driven it, and, therefore, knows what to expect. As a rule, we believe that new cars prove to be more satisfactory in the end.

Stray Straws

Dr. C. C. Miller, Marengo, Ill.

J. E. Crane, that paragraph of yours, p. 153, about the beauty of flowers, thrilled me. Shake, old fellow, shake!

Of all the appropriate things said about Prof. Cook in last Gleanings, none is more appropriate than the one which calls him *lovable.*

Miss Mathilde Candler had much experience with carbolic cloths as super-clearers before the advent of the Porter escape. They do the work quickly and efficiently, but sometimes kill brood. Have our British friends ever observed this?—*American Bee Journal*, 73.

A. C. Miller thinks bees leave supers for brood-nest cold nights to warm their feet; J. E. Crane thinks it's to warm the brood. If I may risk butting in, I think both are right. The Creator sends them down to warm the brood and they think they're doing it to warm their toes.

Geo. M. Steele wants me to retract that statement, p. 126, "We do not believe there are a dozen colonies showing *all* five banders in all the United States." He thinks he can produce the goods. But, friend Steele, I didn't say that. It was the editor. Go for him. I have troubles of my own.

Mr. Editor, I see you have "honeybee," p. 154. The dictionary says "honey-bee." But the dictionary has only been waiting for you to make the lead, and will be glad to make the change. Two words used as one word should be joined by a hyphen; then when the word has passed its novitiate the hyphen should be thrown away, leaving the word all in one. A number of bee-terms should be thus shortened, as topbar, queen-cell, beekeeper, etc.

After all, the frantic efforts to clear the four murderers, mentioned on page 119, only succeeded in postponing the hanging a few days. They were hanged Feb. 16. Whether death or imprisonment be the punishment for murder in any given State, the great thing needed is promptness, both in conviction and execution of sentence. While I believe in capital punishment, I believe a man would hesitate more about committing murder if he were sure he would be securely imprisoned for life within a month of the murder, with no chance of a subsequent pardon, than he would if death were the penalty with nine chances in ten that he would get off scot free.

A study of those census figures, page 68, brings some surprises. One would hardly guess that West Virginia would head the list as the State having most bees to the square mile rather than one of those we call great honey States, such as Texas and California. As a matter of fact these come 24th and 26th on the list. Let us place the bees of each State in apiaries of 100 colonies each, and then distribute them evenly over the State. Then make a list, giving each State its number in the list, and the number of miles apart its 100-colony apiaries will be. Here are some of those at each end of the list:

1. West Virginia, 4.7; 2. Kentucky, 5.1; 3. North Carolina, 5.2; 4. Tennessee, 5.3; 5. New York, 5.6; 6. Delaware, 5.7; 7. Missouri, 5.8; 46. Nebraska, 36.5; 47. Wyoming, 46.2; 48. Montana, 48.0; 49. North Dakota, 119.6.

Doesn't look as if North Dakota beekeepers would be very sociable at a distance of nearly 120 miles apart, does it?

Take it another way. In these same States establish apiaries 3½ miles apart all over the State, and then divide the bees of the State equally among these apiaries. Here's the number of colonies that will be in each apiary of each State:

West Virginia, 44.66; Kentucky, 37.87; North Carolina, 36.17; Tennessee, 34.36; New York, 31.80; Delaware, 31.27; Missouri, 29.28; Nebraska, .76; Wyoming, .47; Montana, .43; North Dakota, .07.

Pity those statistics are not full and entirely reliable.

Brother Doolittle has made a good job of showing up the importance of having many bees rather than many colonies, page 102. No one who has given the matter much thought will dispute that it takes a larger *proportion* of the bees of a weak colony to stay at home and keep the brood warm than of a strong colony. I feel a good bit like going a step further and saying that at least in some cases the absolute number required to stay at home in the strong colony is less than in the weak. Take a colony of 20,000 bees, and there may be a day warm enough to work on the flowers, but so cool that 10,000 of those 20,000 bees must stay at home or the brood will be chilled. Close by it is a colony of 80,000 bees, with brood in proportion. On that same day only 5000 bees will be needed to stay home for the purpose of keeping the brood warm. (Just now we're not considering at all the number required to stay home to feed the youngsters.) Please bear in mind that sealed brood is a producer of heat, and when a big lot of it is massed together very few mature bees are needed to keep the brood warm enough. Put it another way. Fill a hive with combs entirely filled with sealed brood, but not a bee in the hive outside the cells. Let the weather be warm enough so that none of that brood will chill, but cool enough so that, if it were any cooler, the brood would chill. Now in another hive at the same time let there be a single frame of sealed brood, and that frame will certainly be chilled. It's hard to hammer too much on the importance of having colonies *strong.*

Beekeeping Among the Rockies

WESLEY FOSTER, Boulder, Colo.

In an apiary of 105 colonies, half of which are being wintered in double-story eight and ten frame hives, and half in single-story eight and ten frame hives, four colonies up to date, February 15, have died. These four colonies were all in single-story hives.

SPRING MEETING OF THE COLORADO STATE BEEKEEPERS' ASSOCIATION.

With the idea of uniting the interests of beekeepers on the western slope and Eastern Colorado, a spring meeting will be held in Montrose, probably early in May. The date will be announced a little later. The Montrose County Beekeepers' Association is to be our host, and they have promised us a good time. There will be a picnic and various other entertaining features. Every beekeeper on the eastern side of the Rockies should make it a point to attend this meeting. There will be special rates on the railroads, and this will be an excellent time to see the western-slope country. Montrose County is as good a section of Colorado as one will find in riding over a good many hundred miles of Colorado rails. The county is young yet, and has hardly begun to grow.

The orchards are mostly on the mesas, which rise a hundred feet or more above the valley. The freezes are said to slide down hill; but they so often come in the night that they can not find the edge of the mesa, and so camp out in the orchards unless the ever watchful orchardist smokes them out, when they slip downhill and nip the alfalfa bloom of the diversified farmer in the valley. The farmer who is content to raise alfalfa, wheat, onions, and spuds, and does not go in for the $500 per acre (?) profits in orcharding, is supposed to have lost caste in this country; but upon inquiry I found that the reason for their losing caste is principally because these diversified farmers are holding most of the mortgages on the fruit ranches, and also sitting in the bank directors' chairs! Montrose County is worth seeing. I can't tell it all. Go yourself and see where weeds grow like trees, and the pumpkin-patch is used by small boys to play hide and seek in. Why, I saw a pumpkin that weighed 147 lbs., and it wasn't fed milk either. It just had all the Gunnison water and black soil and Colorado sunshine it wanted.

PARCELS POST NOW AN ISSUE.

In taking up this question of parcels post, there are two things that should be thoroughly understood: First, every express company is operating in violation of the law. Second, the law has been violated so long that nearly everybody has forgotten about it. Here is a part of it: "And declares it to be unlawful for any person or persons to establish any private express or expresses for the conveyance, or in any manner cause to be conveyed, or to provide for the conveyance or transportation by regular trips, or at stated periods or intervals, from one city, town, or other place, to any other city, town, or other places in the United States between and from and to which cities, towns, and other places the United States mail is regularly transported under the authority of the Postoffice Department, of any letter or *packages*, or packages of letters, or other properly transmittable matter in the United States mail, except newspapers, pamphlets, magazines, and periodicals. A penalty of $150 is inflicted by the act for its violation."

The parcels-post limit now is four pounds, and the rate 16 cents a pound; but the rate for beans, peas, seeds, etc., for planting is 8 cents a pound. If for human consumption, the charge is 16 cents a pound; the charge is twice as much if the beans are to be eaten as if they are to be planted. Talk about the high cost of living!

Now, suppose the express companies receive an 11-pound package from Great Britain's parcels post. They will deliver it anywhere in the United States for 24 cents; while if we want to send it by post our Postoffice Department charges us 16 cents a pound, and we have to divide it up into four-pound packages.

The postoffice in Boulder will charge me 64 cents on a four-pound package to New York; but if I send it to Berlin (through New York), the charge is only 48 cents.

There is no limit to the size of package carried by parcels post in Switzerland, and the rate is one cent a pound. In Belgium the limit is 132 pounds, and the rate about 1½ cents a pound. Germany will carry by post up to 110 lbs. at a rate of about 1¼ cents a pound. Austria will do the same. France will carry up to 22 lbs. at 1½ cents a pound. But we here in the United States have to pay 16 cents a pound, and can send but 4 lbs. Mexico, which owns 51 per cent of the express companies' stock, will carry parcels at half the rates charged here.

The average rural-delivery carrier's load is 25 lbs. It should be nearly a thousand pounds, and would be, under an intelligent parcels post. The rates could be put down, and it would not be long before we could have rates almost as reasonable as those in Europe. And, in addition, we can, from the additional profits, soon have the penny letter postage.

The express companies have been paying dividends of 38 per cent, and this is made through a violation of the law. What are you going to do about it? I would suggest that you write your Senators and Congressmen at once, urging them to support a progressive parcels-post measure. It will mean several dollars a year to you, as you will readily appreciate as soon as this betterment is in operation.

NOTES FROM CANADA

J. L. Byer, Mt. Joy, Ont.

I am glad to note, Mr. Editor, that you have reached the point where you do not say that a sealed cover is *absolutely* the best thing for our colder climate, and I confidently expect to see in the near future that you will be quite *sure* they are not at all desirable, and that a dry *porous* material next to the bees is altogether to be preferred for outdoor wintering.

These notes are written March 11, and this month so far seems likely to keep up the record for cold weather that has been established by the two months preceding. While every day in March has been fine and clear—bright sunshine prevailing about all the time, with no storms whatever—yet for all that, on eight mornings out of the eleven the thermometer has registered from zero to five below.

P. C. Chadwick says, page 101, Feb. 15, that the average mortality of bees in California is ten per cent per annum. If that is correct, a lot of the talk about the wintering problem in the North is exaggerated, comparatively speaking, for many beekeepers in the colder climates do not lose more than that annually. In fact, I have good reason to believe that some of those who pay close attention to requeening, etc., do not have as high a rate of mortality as that.

By the way, the Feb. 15th issue is quite a "chicken special," and, judging from the different articles given, many beekeepers are "chickenkeepers" as well. One of our most successful men in Ontario combines chickens, bees, and fruit, and he certainly makes good in all three branches. Just a question whether a combination like that is not better for many than "keeping more bees." No doubt all will depend on the makeup of the man who is most concerned in the matter.

In reference to G. H. Bedford's plan of finding queens, p. 720, Dec. 1, the plan certainly looks easy. However, if they drive up as easily as he intimates, I would prefer to allow bees, queens, and all to go right up, with no excluder to hinder their progress. Then I would invert the prepared crate with the wire-cloth sides, and drive the bees down through an excluder into the hives again. In that way it seems to me that the queen would be sure to be found. If I relied on finding her trying to get up through the zinc I am afraid she would be overlooked too often.

Every year about this time, or earlier, reports appear from different sections further south, to the effect that the bees have been shut in five or six weeks without having a flight, and the fear is expressed that loss will result from this cause. What has always puzzled me is, why a few *weeks* should work disaster, when we in the North often go from four to five *months* without having a day that the bees can take a cleansing flight. This present season our bees have not had a flight for three months, and during all that time we have had more zero weather than many of us have ever experienced before. Yet for all that, the bees appear to be wintering all right outdoors; and if we should have a good day in the near future, I do not look for very heavy losses. The exception in my own apiaries will be almost altogether confined to the 20 hives I mentioned in the February 1st issue as being wintered with no packing, the hives being constructed with double boarding with heavy paper between the two.

Regarding protection of apiaries in the matter of windbreaks, I must disagree most emphatically with friend Holtermann when he sanctions high board fences for that purpose. While I would sooner have a high board fence than *nothing*, still it would be my last resort. My favorite location, when it can be secured, is a site some distance south of a row of evergreens, with the bees in an orchard if possible. One of my apiaries has evergreens on the north, east, and west sides, and is right in an apple orchard. The protection is about as near ideal as possible. Another yard is also in an orchard, and has a row of evergreens on the north side. Still another yard is in an orchard; but instead of evergreens the farm buildings are on the north side about ten rods away, and this breaks the north winds. In all three yards the bees winter well as a rule. At the home yard there is a high board fence, and I certainly do not compare it with the evergreens so far as giving shelter to the apiary.

About the middle of February we had a day that was *almost* warm enough for the bees to take a flight; but the wind was blowing cold from the north, although the sun was shining brightly. In spite of anything we could do to prevent it, a number of colonies got stirred up, and a few bees came out of the hives. Wherever the bees fell on the snow where the sun would strike them, they got up and flew again; but if they fell in the shade they were done for. Toward evening I happened to take a look on the north side of the board fence, and there was a distinct line made by the dead bees that fell within the space nearest the fence that the sun did not strike. Scarcely a bee was on the snow beyond that line, but for eight or ten feet all along the fence there were hundreds of bees. With a protection higher than the fence, and further away from the yard, the conditions that caused the loss of so many bees are done away with.

Conversations with Doolittle

At Borodino, New York

TRANSFERRING BEES.

"In some frames which I have bought the combs run from one frame to another to such an extent that I can not get any of them out without tearing them or the combs, or both. Please give something in GLEANINGS regarding such a state of affairs."

As I frequently receive letters of a similar nature, it may be well to devote a little time to this subject, even though it is a matter which has often been written about, and one found in practical books on bee culture. Our questioner puts the matter of crooked combs very strongly, for I have yet to see that colony of bees whose combs are so very crooked, or which run across the frames so badly that they can not be utilized in transferring to other frames, and the frames they were in at first remain fairly good after the combs are cut from them, so that they can receive the combs from the second colony worked upon.

The first thing necessary is to decide on the time to do this work. My time has always been during the blossoming of the apple trees, for at this season there is little honey in the way, and the combs are not very full of brood unless there is an earlier yield of nectar. With the first flow of nectar to a sufficient extent to attract the bees into the fields in large numbers, and to enable them to secrete wax enough to fasten the combs together, and to the frames, is the right time. Drive the bees away from the sides of the hive to which the combs are attached, and with a long knife or chisel cut these attachments so that nothing holds to the hive save where the ends of the frames rest. Next blow smoke enough over the tops of the frames to drive the bees off. Turn the hive bottom side up at once on an old blanket. By this time the bees will have become demoralized and quite well filled with honey. Place a box over the bottom of the hive, and give a few strokes either with the fists or with some sticks. The bees will at once proceed to run up into the box, and in a few minutes all will cluster there.

This box of bees can then be set on the old stand, the old hive lifted off the whole mass of combs and frames, and the work of cutting out the combs to the best advantage and fitting all the worker comb into frames can be started. When all are nicely fitted into the new frames, and these frames put in the old hive (if that is good enough to use, or if not, in a new one), this hive containing those combs which are judged useful should be set on the old stand, and the bees from the box hived into it, the same as is done in hiving a natural swarm. If there is not sufficient comb to fill all the frames the hive will hold, a division board is placed next to the last comb put in (a bee space from it), and the colony kept thus until a time comes when they will work foundation, when frames of foundation are inserted in the vacant space. Or if one happens to have empty combs in frames of the same size, this vacant space can be filled with these at the time of transferring. This is similar to the way our fathers transferred, and the plan used at the great field-day meeting in June, 1906, near Philadelphia, by Prof. Surface who demonstrated before the thousands gathered there at that time.

But there is another way which I consider fully as good, if not better, for modern beekeeping. This latter plan allows the beekeeper to wait till nectar is coming in quite abundantly, or till about the time the bees swarm naturally, when a new hive with a full set of frames filled with comb foundation is prepared the same as if hiving a natural swarm on frames filled in this way. This new hive is set on the stand of the colony which is to be transferred, and most of the bees and the queen are driven into a box as before, only the hive and combs are not disturbed by cutting or otherwise. After the queen and about two-thirds of the bees are in the box, the old hive is removed to a new stand, and the bees are hived from the box into this new hive as before. They will at once draw out the foundation in the frames, and the hive will soon be completely filled with the very best worker combs possible, and a good colony for securing surplus honey. In 21 days in the old hive with crooked combs will be a young queen about to begin to lay, or already doing so. The worker brood will have emerged from their cells, and every thing will be in shape for another transfer. The process is the same as the first, except that now *all* the bees are driven off their combs and hived in another new hive, prepared as was the first. We now have these old crooked combs where we can do what we please with them, while the bees are all on (or will be as soon as the foundation is drawn) the very best all straight worker combs, such as make the eyes of any apiarist sparkle with delight.

Now, what shall be done with these old crooked combs? Some say dump the whole thing into the solar wax extractor, and let the sun separate the combs from the frames and the wax from the honey, as all can then be used to better advantage than in any other way. Without question, this is the easiest way out; but some way the heart of the one who commenced his beekeeping life between 30 and 50 years ago, before the advent of comb foundation, when every inch of worker comb was considered very valuable, still considers such comb of more worth than the wax it contains, therefore he generally fits all of the best of it into frames for use again.

General Correspondence

INTERNATIONAL AUTO WAGON SAVES EXPENSE OF HIRED MAN

BY N. L. HENTHORNE

In this section of Colorado, thirty-five miles north of Denver, in the Platte Valley, bee range is rather limited, thus making the maintenance of large apiaries in one location not conducive to the best results. The only alternative is to place from fifty to seventy-five colonies in different places throughout the district. I have between 500 and 600 colonies within a radius of twelve miles from my home, and this necessitates traveling from 100 to 150 miles every week during the swarming season. In order to get the work done I was obliged to keep a man to assist me; and my experience with hired help during the swarming season has been far from satisfactory at the best. The long drives I was compelled to make every day during the summer were very fatiguing, for considerable time was spent on the road alone; and in order to keep the horses in shape I could not overwork them; and the cost of maintaining a driving outfit in this country amounts to about thirty dollars a month.

A very important advantage of a motor vehicle is in getting to a yard and away again with a load of honey. With horses it is always risky if not dangerous.

In view of the objections to horses as given, I became convinced that the automobile is the only means of transportation in the bee business, and I decided to buy one. Upon investigation I learned that I could buy second-hand machines in Denver at prices ranging from $100 to $600; but I knew nothing at all about automobiles, and I believe investments in second-hand machinery to be inadvisable at best. Therefore I bought a new truck, manufactured by the International Harvester Company, the solid tires and the air-cooled cylinders being strong points in its favor, in my estimation. The car is ostensibly built for service; but by adding a rear seat it can be turned into a pleasure car, as it rides quite comfortably.

I held the wheel of my machine for the first time at four o'clock on the afternoon of July 11, 1911. The morning of the 12th I loaded on 72 empty eight-frame comb-honey supers, and ran out 7½ miles into the country, did the necessary work there, and reached home in time for the midday lunch. In the afternoon I went nine miles in another direction, arriving home at 5:30.

Aside from the usual minor troubles of the inexperienced driver, I have had no trouble whatever with the machine; and in the 4000 miles of travel which I have covered with it I have not paid out a cent for repairs aside from one slight accident to the engine. During the summer I can make the distance of 100 miles with a load on eight gallons of gasoline and one gallon of oil—the former at 14 cents per gallon, and the latter at 43, making a total running expense of $1.55 per hundred miles. This machine can carry 1500 pounds twelve to fifteen miles per hour, and I have run into Denver with a load of honey, and out with supplies, in one afternoon—a distance of 70 miles, round trip. Mr. Rauchfuss, of the Colorado Honey-producers' Association, will verify my statement that my honey arrived at the association in better condition than any other he received. I now expect to do all my own work this summer with the use of the truck. I can haul from 55 to 65 cases at a trip.

Naturally there will be the expense of new tires in the future. The cost of tires is nine dollars each, put on; but I can say that I have never been delayed a minute because of tire trouble. I have made several trips into the mountains with my truck, and it works well on the mountain roads. I can hardly wait until fishing time comes for a run into the hills. I have used the machine in mud and sand with good success. Like all machinery it requires good care in order to do good work.

Platteville, Colo.

REO DRIVEN TEN THOUSAND MILES WITHOUT REPAIRS.

BY C. A. KINSEY.

Since April, 1911, I have been driving a 1910 25–30 h.p. five-passenger Reo, and have covered between eight and ten thousand miles. I have had no repairs made on the car so far, outside of tires, except to grind down two exhaust valves. The tire expense is something that depends a great deal on the quality of the tire, kind of roads, and, most of all, on the carefulness of the driver.

With this Reo it is possible to start out at 7 o'clock in the morning, with six grown people, two children, nine and ten years of age, lunch-baskets, fishing-tackles, etc., and go 45 miles up a rocky canyon into the heart of the Rocky Mountains, making a rise of nearly 3000 feet, spend a good part of the day fishing and berrying, and get home again at 7 P.M. This car ordinarily will travel 15 miles on one gallon of gasolene. In this Gallatin Valley, surrounded by mountains, there is always an up grade, either going or coming, from 30 to 50 feet per mile. There is one particular road that rises some 1700 feet in a little less than four miles. The Mitchell and the Reo, with favorable conditions, will take this grade on "the high."

I know from personal experience that an auto is a boon to beekeepers. There is no danger from stings and resulting runaways as with horses.

Belgrade, Mont.

REO USED FOR DELIVERING HONEY IN THE WINTER

BY JOHN C. BULL

I use my automobile mostly for delivering honey, as I work the house-to-house trade in the winter. My machine is a Reo two-cylinder five-passenger touring car, with detachable tonneau. I take the tonneau off and put on a box for delivery work. I bought my car second hand after it had been used for about 16 months. I have had it 19 months, and have driven from 5000 to 6000 miles. The territory that I cover selling honey is 30 miles across; and to cover that ground with a horse and wagon would take twice the time. With the auto I can leave headquarters in the morning, drive 10 or 12 miles, then deliver $75.00 to $90.00 worth of honey, and be back for supper, while to drive that distance with the average horse would take nearly all the day on the road, considering the loads that I carry, which sometimes amount to 725 lbs. at a trip.

As to cost of upkeep, if the auto is used every day, and the horse the same, I think the cost would be nearly equal, although the auto would cover two or three times as much territory as the horse. The horse requires attention three times a day, while the auto, when not in use, costs nothing; and the time required to keep a car in shape is far less than taking care of a horse. The auto can be looked over and kept in shape at odd times or stormy days, so the time is not missed.

As to reliability, almost any of the standard makes of car have passed out of the experimental stage. In the last two winters I have delivered some 26,000 lbs. of honey with my car, and have never been obliged to find another way to finish up a day's delivering. I use it all winter, through cold, snow, and all kinds of roads. I find I can go almost anywhere a horse-drawn vehicle can. If a man has a car that can be used for pleasure or business both, he will find the pleasure ride is something that can not be measured in dollars and cents.

Any one who has several out-apiaries and lots of traveling to do on the road will find a good automobile the best and most paying investment he can make.

Hammond, Ind.

WHY WE INVESTED IN A MOTOR BICYCLE

BY C. CALVERT

To explain matters, a friend and myself run about two hundred colonies of bees of our own, and we also have the oversight of about sixty colonies belonging to a friend who at present is abroad.

Our own bees are located in various apiaries containing from thirty to fifty colonies each. These apiaries are situated ten, eleven, twenty-two, and forty miles away from this town, so we have found it a weary and exhausting task to make the rounds of all of them on the ordinary bicycle. For example, to cycle nine or more miles up to the Cotswold Hills, do a heavy day's work, and then to return home on the cycle, perhaps when it is windy, or when the temperature is 90, in the shade is somewhat like hard labor. So we determined to have a motor bicyle with a side car. The seat of the latter is detachable, and an oblong-shaped box with sides a few inches high, and large enough to carry a couple of hives of bees, can be screwed on in place of the seat. This box is also convenient for the conveyance of syrup to the apiaries, and for bringing tins of honey home for bottling. It will, we hope, save a carrier's bill—a serious item to the beeman who does not keep horses. Driven bees, too (a commodity you probably do not know the meaning of in America, where I suppose straw skeps are not used), may be obtained at long distances, and conveyed easily on a motor cycle. It is estimated in this country that such a machine may be run a year at an expense of less than one penny a mile. This is, of course, taking into account petroleum, new tires, breakages, license—in fact, every thing, and it is well-spent money, seeing that it saves, first, the wear and tear of bicycles for two men; and, second, a carrier's bill for conveyance of bee produce, feeding syrup, and appliances, and that it provides a quicker mode of transit to one's work, at which the beeman arrives perfectly cool and fresh, besides getting in two or more extra hours' work a day which otherwise are spent crawling on the ordinary bicycle.

Cheltenham, England.

HAULING HONEY FROM OUTYARDS IN AN E. M. F.

BY ROY TAIT

In the spring, and during the first part of the season, we make the rounds to the outyards once a week in the auto. We leave home about 6 A.M. with extra hives filled with combs or full sheets of foundation, and at about 7:25 I reach our mountain yard, 20 miles away. Our first machine was a Maxwell; but now we have an E. M. F. 30 h. p. model. My next machine will be built to order. It will have an E. M. F. 30 h. p. engine, the Cartercar friction transmission, and the Midland full-floating rear axle—that is, if I can have it built that way. I believe the E. M. F. car as built to-day, with removable tonneau, is the best car on the market for the money—$1100 at the factory. Its simplicity and durability will at once appeal to the mechanic as well as to the man who knows nothing about machinery.

The greatest nuisance in motoring is the pneumatic tire; but the trouble can be overcome to a certain extent by using inner linings, which prolong the life of the outer casing about one-half.

I would not think of keeping bees in outyards without an automobile. When I read of a man going to dozens of yards with a horse, I wonder.

Grand Junction, Colo.

Wesley Foster and the Brush Runabout, purchased by the State of Colorado for use in bee inspection.

AN AMATEUR AUTOIST

Some Knowledge Gained by Experience with a Brush Runabout

BY WESLEY FOSTER

Automobiles are taking such an important place in the beekeeping world that possibly my first month's experience with one may be interesting and valuable to the owner who is already or soon will be in the same fix that I am. December 1, 1911, I knew almost nothing about autos except that they have been honking at me at every crossing, and throwing dirt and burnt gasoline into my lungs ever since Bryan ran for president. Previous to December I had enjoyed perhaps three rides in automobiles. I had also run my uncle's gasoline-engine to operate a buzz-saw for making some bee supplies. The extent of my knowledge had been in reading advertisements and watching the changing models from year to year. I knew that, to be right up to the times, one must have a new auto about every six months, but I did not know the use of a carbureter, spark plug, magneto, nor the various levers.

On Dec. 1 the State purchased a Brush runabout for my use in bee inspection, and since that time I have been getting acquainted with nuts, burrs, grease of three kinds and oil of two, well scattered over my anatomy and clothes. I have washers and burrs in every pocket, and nuts and screws in my pocketbook.

December 2 I went to Denver to bring the runabout to Boulder. The Overland Auto Co., from whom the auto was purchased, sent a young man along to show me how to run it. We left Denver about 3:30 P.M. for the 32-mile drive to Boulder. The mechanic ran the machine to the outskirts of Denver and slowed up to let me take the steering wheel. A sudden crack, and our plate-glass windshield curled right over the engine shield! The nuts of both braces of the windshield were gone and the bolts were lost. We had not seen that everything was tight before starting.

We took off the windshield, and my companion carried it in his hands the rest of the way. I got along well running the auto on the straight road; but when it came to passing a hay-rack I nearly always forgot for an instant just what to do, and would put on the brake, thus throwing the engine out of gear, so that it would get to "going like sixty," buzzing and singing like a drone. After having passed the team I would release the brake and let the engine back into gear so suddenly as to give it an awful wrench, sending the car ahead with a mighty jerk. Now I have learned how to pass teams with little difficulty and no jerking.

Well, I ran the auto all the way home without the mechanic taking hold of any thing, though he gave me "pointers" and advice several times. The most valuable point for me right at the start was my bicycle experience in holding the handle-bars

The Reo 1500-lb. truck which is equipped with a single-cylinder 12 h. p. motor, planetary transmission, and a 44x72 inch body.

firm, and also A. I. Root's suggestions and caution some time ago about guiding or steering too much.

It was dark when we reached Boulder at 6:15 P.M., and the last twelve miles were driven by using the acetylene-gas lights; but I took the mechanic to the train for his return trip and drove the auto home alone. I did not attempt to run it into the barn by its own power, but pushed it in by hand. I turned out the water by opening the faucet on the engine and radiator so it would not freeze, as we had no anti-freeze mixture in the radiator.

The next morning in reading the instruction book I found that the oil on the dash-oiler should have been turned off. I hurried out to follow out this injunction, but the oil had been running all night, and there must have been nearly a quart in the engine. We had a hard time getting the engine started. We put hot water in the radiator, gasoline in the cylinder, washed the spark plug in gasoline, and primed the carbureter by pulling the little wire provided for this, but the engine would not start until we had worked with it for an hour or more. Then how smoky was the exhaust caused by the burning engine oil! I had three large blisters from cranking the engine, and was tired out when it started.

The next day we could not get the engine to run at all, and called in an auto-repair man. He found that the batteries tested only ten instead of twenty-five. After he put in new batteries all was well. This is a point to remember: Batteries weaken from becoming old. The batteries in this car were new when they came from the factory, but they had become worthless from standing in the store room. Be sure to have the batteries tested before buying.

The barn in which we keep the auto is so cold that we have been letting the water out from the radiator every night. The faucet is hard to get at, and has a nail hole in which to insert a nail to turn the faucet. To save trouble we thought it would be a good idea to leave the ten-penny nail in there, but soon learned by sad experience to remove it. Three holes had been punched in the sheet-steel dust-guard under the engine.

A five-gallon can of gasoline which we kept at first in the auto back of the seat knocked off several square inches of varnish, so now we are wrapping cloths or sacks around every thing we put in behind. The other day we got tired of emptying out the water every day, so we got a gallon of wood alcohol for $1.00 and made an anti-freeze mixture of 40 per cent wood alcohol and 60 of water. Since then we have been leaving this in the radiator. Some auto men say that this often will not work, so I have been keeping the radiator well protected besides. The Brush has a single-cylinder 10 h. p. engine, and is hard to start when the engine is cold. I have had to jack up one of the rear wheels when starting, as the transmission sticks a little, the car being new. This lets the wheel turn, and the engine will go on the second or third trial. I often have to ad-

vance the spark and pour some gasoline in the cylinder before the engine will start if the day is cold.

The book of instructions says, "Never advance the spark before getting the engine started, as there is danger of a back kick." But as the Brush engine runs opposite to most motors, the result of a back kick would be to throw the hand out of the way, and no damage would be done unless one's knees were in the way. I keep my feet out of the way and have not had a back kick yet.

Most of my trouble has come from not oiling enough. The engine has stopped several times for this reason. On one occasion, when only three blocks from home I looked into the gasoline-tank to find it as dry as a bone; but I managed to run the machine within a block of home on the gas in the tube and carbureter before it stopped. I had to take the gasoline out of our stove to finish the trip, then rush up town and get back with a new supply in time to save the baking which my wife was doing at that time.

One of the beauties of the Brush runabout is that it is so light it can be lifted around by hand. I do not need a jack to lift a wheel. It will run 25 miles on a gallon of gasoline, which costs 12½ cts. at the refinery two miles from our house. On Colorado roads it will run from 15 to 18 miles an hour; and for short spurts, perhaps 25 or 30 miles.

Our Colorado mud has so much alkali that it will dull the varnish; and some small specks that I left on for several days took the varnish off entirely. It will pay every auto owner to remember this. The varnish was taken off from the steel parts, not on wood. Letting out the hot water from the radiator on the varnished steel turned it from black to a bluish color. Oh! one learns fast, I can tell you.

We inspect the auto often, and keep bolts and nuts tight. One of the gasoline-tubes leading to the carbureter began to leak, and we unscrewed this and put some white lead in the threads, screwed it back into place, and it has not leaked since. An auto-repair man told me this.

My father-in-law has helped me grease, oil, and crank and generally fool with the auto. He is also very much interested in chickens. The other day he made a contract to furnish 500 baby chicks, and is planning to buy an incubator. Well, we found that the radiator was not quite full; and so, as the per cent of wood alcohol in the radiator was a little below the 40 per cent average, he took a pint and a half down to pour in; but he was thinking about that incubator, and poured that wood alcohol into the *gasoline-tank!* Well, we asked our all-knowing repair man whether harm would come from such a mixture. He said we had better draw it off and put in new gasoline. It took us an hour to draw it off through the faucet on the under side of the carbureter. We found that the gasoline came to the top, so we poured the top off and threw the wood alcohol away, and are using the gasoline in our stove in the house.

Fully equipped, the Brush costs $450 in Denver ($400 at the factory), and the makers say that it can be maintained for three to five dollars a month—a claim that I can well believe. At any rate, it is cheaper by far than a horse, when gasoline and oil are worth 12½ and 50 cts. a gallon respectively. It is a time-saver also, and its ways are as easily learned as the nature of a horse. The Brush has room for an extra seat behind for a few bee supplies. As it is, twenty supers may be carried, but by making an extension box, forty or fifty could be hauled very easily.

Boulder, Colo.

[You will very likely find that you have already had nearly all the trouble that you will have for some time. A beginner with an automobile, as with any thing else, makes a good many blunders at first; but after he becomes accustomed to the car and its eccentricities it will run along very steadily and give practically no trouble—that is, if it is a well-designed machine.

The wood-alcohol solution for an anti-freeze mixture in the radiator does very well if you are careful to test the density of the

J. R. Heaton's Cadillac, which he purchased because of having a very severe attack of automobile fever.

Cadillac owned by R. L. Watkins, Selma, Cal.; bought primarily for a pleasure car, but used constantly in a 600-colony business.

liquid with a hydrometer each time you come in from a run, and add more alcohol if necessary. The point is that the alcohol boils or evaporates much more quickly than the water; and, even in a run of a few miles, enough of the alcohol may evaporate to make the mixture unsafe if the temperature should fall considerably while the car stands for a few hours.

On this account a safer mixture is one made up of equal parts of glycerine and water. This costs more at first but the glycerine does not evaporate, and the mixture may be saved from year to year, kept over summer in jugs, and used again and again. This solution has no bad effect on the metal parts of the cylinders or radiator; and, while some claim that it attacks the rubber-hose connection to a certain extent, this objection does not seem to be a very serious one, for we examined the rubber connections in a car that had been in use three winters and found that the glycerine had not hurt them a particle.—Ed.]

THE CADILLAC, USED BY A CALIFORNIA BEE-KEEPER HAVING 600 COLONIES OF BEES

BY R. L. WATKINS

My car is a 1912 model five-passenger Cadillac. I selected this particular make because it seems to be the best car, and the one that has the best equipment of any at a reasonable price. It has electric lights, an electric self-starter, and every manipulation is made from the seat. I have driven it 1400 miles, and have never had a crank on it, and have never had to make an adjustment of any kind—have not even had a puncture. It is equipped with oversized tires, 4 x 37, with staggered tread on the rear wheels. A four-cylinder Kellogg air-pump inflates the tires.

I bought the car more for pleasure than any thing else; but I believe it will pay for its upkeep in my business. I have 600 colonies of bees located in ten different yards from four to fifteen miles from home, and I do all the work myself; and with my car it is almost like having them all at home. As the roads are good, it takes only a few minutes to drive fifteen miles. If necessary, I can visit every yard in one day, and have time for considerable work.

Selma, Cal.

AN AUTOMOBILE FOR ALL THE FAMILY

BY J. R. HEATON

In the spring of 1911 my wife and I each had a very severe attack of fever. In fact, all the children had a touch of it too. (There were only five of the children at home at that time, the other four being away.) We lingered along quite a while, but did not seem to get any better. One day our family doctor came by in his auto, and stopped in front of the house where I was mowing the lawn. I went out to have a friendly talk with him, and, in the course of our conversation, the automobile question came up. I told him that we were all about sick; and when he asked about the symptoms I told him I believed we had the automobile fever. That day we decided to cure ourselves of it, or at least to take a dose of medicine for it.

The first thing that we had to decide, after we concluded to buy a machine was what size and what make we would get. I have a large family; and as we wanted a car for pleasure-riding more than any thing else, we decided we would get a five-passenger touring car so that we could take as many as seven persons at a time if some of them were children. We knew that we would have to have plenty of room, so we began to look for a machine having a long wheel-base and one with a roomy body. We knew such a car would cost us between $1600 and $2000—a lot of money to put into a thing just to ride in; but we had the fever pretty bad, and we wanted to cure it, even if it did take $2000.

I had a son in Indianapolis who had gone to the Indiana Automobile College, and who was driving a machine in the city at that time. I thought his judgment would be worth considering, so I went to see him to look for a car that would suit us, and also to get his advice as to what make was the best and cheapest for the money. Indianapolis is a great distributing center for automobiles. One can find any thing in this line from $350 to $6000. (I thought one costing less than $6000 would do for us.) At first we looked at some second-hand cars, as I thought we might find one that would suit us that we could buy cheap, and that would be good enough for a poor man and his family. I found that we were mistaken in this, however, so we turned our attention to the new machines. It would take too much time to tell all the kinds and makes we looked at. I will only say that when we investigated the Cadillac we thought we had found just the car we had been looking for—one that was built right, was strong and very roomy—one that I would not be ashamed to drive any place in any city. I finally bought the machine, and the agent drove it home for me, as I had never had hold of a steering-wheel in my life.

The distance from Indianapolis to my home is 71 miles, and we made the trip in three hours and five minutes. That was not very fast, to be sure; but it was fast enough. I don't like fast driving. It is dangerous, and one can not see the country. The Cadillac weighs, when empty, 3100 lbs.; but for comfort and easy riding, a rather heavy car, and one having a long wheel base, is the best, for it will not bounce along and bump like a western bronco, which a short machine often does. Of course the real reason why I bought a Cadillac was because I liked it best. It just suited me so far as size was concerned, and I think it is the best car that is made and sold at the price—better, in fact, than many that sell for several hundred dollars more.

The Cadillac has three forward speeds, and I have never yet found a hill that I could not pull on the intermediate or second speed, even with a full load of five passengers. Besides, there are a great many other good features that I will merely mention. For instance, the metal trimmings are all nickel instead of brass. The nickel looks much

Chase motor truck, used by James Peterson, of Corning, Cal., for hauling bees.

Albert Snell, of Clayton, N. Y., in his five-passenger Ford.

better, and it is much easier to keep it looking nice. I have never had to polish the nickel, and the car now looks as good as new.

There are two complete and independent systems of ignition with separate spark plugs for each.

The oiling system seems to be about perfect. The oil is supplied to the crank case of the engine by a force pump which can be regulated so as to keep just the right amount in the case, and not so much as to cause smoking at the exhaust. One never sees the Cadillac going down the road smoking like a fire-engine. I can run one hundred miles with one pint of lubricating oil, and there is not a gear on the machine that does not run in grease or oil. The four wheels that carry the car will run 1000 miles with one greasing. It does not seem as though there could be much wear on any part of the Cadillac with such perfect lubrication.

Some cars use more gasoline than others. I do not know how the Cadillac compares with other machines; but I drove to Indianapolis and back, a distance of 166 miles, and used only nine gallons of gasoline, making about 18½ miles on a gallon. I think this is very good for a heavy machine with a load of five passengers, such as I had.

EXPENSE OF UPKEEP

I have run my car 3082 miles, and it has not cost me a cent for repairs. My tires are in good shape, and I think they are good for 2000 miles more of travel.

The cooling system has never occasioned any worry. The water is forced through the radiator and around the copper water-jackets by a centrifugal pump, and the air is sucked through the radiator by a fan. The water never boils, but does what it is intended to do—keeps the cylinders cool.

Does an automobile pay from a business standpoint? I think it does. An automobile costing $2000 will travel further than $2000 worth of horses and carriages, and the upkeep will be less. Besides, much less time is taken, and the traveling is much more comfortable.

This article may sound like an advertisement for the Cadillac; but I have merely given my reason for buying the particular car that I did, and my experience with it.

Rosedale, Ind.

CHASE MOTOR TRUCK USED BY A CALIFORNIA BEEKEEPER

BY JAMES PETERSON

I am sending you a photograph of my automobile, with the last load of bees from an out-apiary. The machine is a Chase delivery wagon equipped with a three-cylinder two-cycle engine which will carry all I can pile in the body, at 15 miles per hour. I have had eight grown persons in it at one time.

This machine is one I bought last fall in Sacramento, paying $300 for it second-hand. I do not know much about automobiles; but if I had it to do again I believe I would have a car with a four-cycle engine. This machine was not altogether satisfactory until I had a machinist rebuild the timer, since which time I have had no trouble.

The automobile is sting-proof, and saves a great deal of time in going to and from my out-apiary. The cart shown on top of the load is what I use to take the bees over the soft ground to the auto.

Corning, Cal.

[The two-cycle engine—that is, those similar to the motors used in boats—has not

been entirely satisfactory for automobile use in the past; but we understand that the present truck, built by the Chase Motor Truck Co., is giving complete satisfaction. It is still equipped with a three-cylinder air-cooled two-cycle motor, the smaller-sized trucks being fitted with a planetary transmission, and the larger sizes with sliding gear. This is a machine that has passed the experimental stage.—ED.]

TWENTY MILES TO A GALLON IN A FORD

BY J. H. THOMSON

Though I am a beginner I have sixty colonies, and I like beekeeping. It is a profitable business as well as good for pleasure. From one colony last season I sold $25.00 worth of comb honey.

I have a five-passenger Ford touring car. I bought a Ford because I believe it to be the best car on the market for the money, and because the expense of upkeep is not so great as on other cars. I average about 20 miles per gallon of gasoline.

I bought the machine for a pleasure car, but find it useful for business too. In the five months I have owned it I have driven it 2550 miles, and three of the tires have not yet been punctured. The longer I have it the better I like it. It has proven so satisfactory in every respect that I don't see how I could get along without it.

Fowler, Col.

CARRYING HONEY, BUTTER, AND EGGS TO MARKET IN A FORD

BY ALBERT SNELL

In April, 1911, I purchased a four-cylinder 20 h. p. Ford touring car. I bought it for pleasure and for taking honey, butter, eggs, and other farm produce to market. It has proven very satisfactory. It will take the steepest grades "on the high" with five persons in, when other cars have failed. I ran it 2000 miles last season; and although our roads are stony and rough I have paid out nothing for repairs. The tires are good for another season. One gallon of gasoline will run it 20 miles, so it is cheaper than a horse.

I am a veteran of the civil war, 67 years of age, and never ran a car before this one.

Clayton, N. Y.

THE AUTOMOBILE FOR OUT-APIARY USE

BY J. A. GREEN

That the automobile may be made one of the greatest of time and money savers is becoming daily more apparent. To no one does this apply with more force than to the beekeeper who keeps bees away from home. The ways in which it may be helpful to him have been mentioned so often that it is hardly necessary to go over them again; but, briefly, the most important are these:

J. H. Thomson and family in their Ford, which they drove 2550 miles, and had only one puncture.

J. A. Green and his two-cylinder Reo carrying a load of forty supers.

The great saving in the time of travel. The man who has out-apiaries five, ten, or more miles from home must spend many hours on the road. This time, which may be called non-productive labor, may be shortened to approximately one third by the use of an automobile. The time of a man who is caring for a large number of colonies is very valuable during the busy season, and it is just at this season that the most traveling has to be done. At any season it is very wasteful to spend nearly half of your time in getting to and from your work.

A further great saving of time, labor, and worry is made because of the possibility of entering and leaving an apiary safely at any time of day, and of being able to drive up close to the hives to load or unload. It is wasteful of both time and labor to be obliged to stop your wagon some distance away from the bees, and carry all the supplies from there to the hives, and all the honey from the hives to the wagon, even if a wheelbarrow can be used, which is not always the case. Then there is the never-ending worry lest the horses should be stung in spite of all precautions, resulting, perhaps, in an expensive runaway and breakdown, to say nothing of the risk to life and limb. Many a time I have had to wait until dark before I could safely leave an apiary with my load, not getting home until nine or ten o'clock at night, which is neither pleasant nor profitable. A very successful beekeeper once said to me, in talking on this point, "I am twenty years older than I was ten years ago." We owe it to ourselves and those dependent on us not to waste our energies by unnecessary work and nervous strain.

I have been using an automobile in out-apiary work for two seasons. My car is a second-hand Reo two cylinder five-passenger touring car which cost me in Denver $400—somewhat less than a third of the price of the car similarly equipped when new. It had seen some hard service; but, being somewhat of a mechanic, I trusted to be able to keep it in running order. This has taken more time than I have liked, though otherwise the results have been fairly satisfactory. There have been occasions, to be sure, when things did not work quite smoothly, and sometimes these seemed to come at the most inopportune times. For instance, one night when I was coming home with a heavy load of honey the chain broke, twisting up the sprocket somewhat. I repaired the chain a couple of times, getting only a little further each time; and when darkness overtook me I had to telephone home for a team to come and haul me in. Next day Dr. Phillips and Wesley Foster were to be in our town, and I had expected to take them for a ride through our valley. I worked on that car until the last possible minute, and then had to give it up and admit that the thing couldn't be made to run reliably until a new part had been secured. Then

there was Prof. Blinn, the expert on cantaloupes, sugar beets, and alfalfa, whom I was to take on his way of spreading information throughout our farmers' institutes and rural schools. The car had been running beautifully the evening before; but in the morning it wouldn't go, and it continued not to go until I had spent a couple of days of strenuous toil on it. But such things are painful to remember, and I will refrain.

I have been unfortunate in my experiences with having work done in the garages, which I have found both expensive and unsatisfactory. Doubtless this would not be true in all cases. Of course not all have either the training or the equipment needed to do much automobile repairing; but every car-owner should learn as soon as possible to make at least all minor repairs and adjustments himself. A new car should give little or no trouble for a year or two, by which time the owner should be familiar enough with its mechanism to keep it in order with very little assistance.

This model Reo was so made that the tonneau, or back, was readily removed. To do this easily I have two small "safety lifts," or pulleys, with clutch, hanging from the ceiling overhead. These hold the load automatically at any height. One of these on each side is fastened to the ceiling over the car, the hooks engaging in wire loops slipped over the supports of the folded top. With these one man can easily raise the tonneau up out of the way. To put in place of the tonneau I have two backs, one of which transforms the touring car into a neat runabout; the other into an express or delivery wagon. Without any help I have taken off the touring body and replaced it with the express body in nine minutes.

In getting a car which one expects to use in a commercial way the tonneau should be made so as to be easily removed. With many cars this can not be done. With some, the whole body could be removed, though this would require a much more expensive wagonbox to replace it. In some cars the removal of the body is not practicable. Unless there is some kind of box that will carry at least a small load, one of the most important advantages of the automobile will be missed, as out-apiaries demand a constant stream of supplies, and the greater part of the honey can be hauled back on the return trips, making special trips for that purpose unnecessary. If the automobile is wanted only for transportation, a motor cycle is much cheaper and even more speedy. Of course the motor car can be used also for the transportation of the family.

Get a new car if you can afford it. If you buy a second-hand one, be sure what you are getting. Many second-hand cars are better bargains, so far as actual use and value are concerned, than new ones; but usually they sell for about what they are worth, and there is always some risk in buying an old car. If it were not for this it might be advisable to get an old car for the first season, disposing of it after you had become familiar with motoring.

D. C. Polhemus' new building for a workshop, extracting-house, etc., and his two International auto wagons which he uses to carry the combs to and from the apiaries.

The illustration shows my business wagon with a load of forty supers on. There are generally one or two more grown persons in the touring car, and I have taken as many as thirteen in it, though such overloading is rather hard on tires and the machine in general.

The engine of this car is nominally of twenty horse-power, though figured by the rule generally used it is only eighteen, and at this altitude only fifteen, which is hardly enough for heavy loads on some of our hills unless the engine is working perfectly.

Some details on the construction of the express body may not be amiss. The foundation is made of 2×4's bolted down by the bolts or thumbscrews used to fasten the tonneau, with another pair set near the front end to overcome any tendency to tip down behind. Lugs into which to screw these bolts must be fastened to the frame of the car.

On this foundation is built the box 40½ wide and 56½ long inside, which is just right for eight hives or supers of the eight-frame size, provided there are no cleats nailed above handholes, which are a nuisance whenever hauling is to be done.

The front end of the box must be high enough, and sit back far enough to keep the load from sliding against the backs of the seat in front. The sides, which may be of any convenient height, are braced outside by L-shaped braces, which at the top are formed into hooks turned outward. One of these comes opposite the middle of each row of supers. A waterproof canvas over the top of the load is a protection against dust or rain, and helps hold the load together. A light rope, hooked back and forth through the side hooks, and tied in a single knot, holds all securely, yet may be removed in a few seconds. While an automobile may bounce considerably, it is not so hard on a load, and especially does not shake it from side to side as badly as the ordinary vehicle.

Being an orchardist as well as a beekeeper I am obliged to keep horses. An electric railroad also runs close to my home and to my out-apiaries. I do not use either of these ways of traveling much in summer, but I consider the automobile practially indispensable.

Grand Junction, Colo.

AUTOMOBILES USED BY A 2000-COLONY BEEKEEPER

Combs Hauled to a Central Extracting House in International Auto Wagons

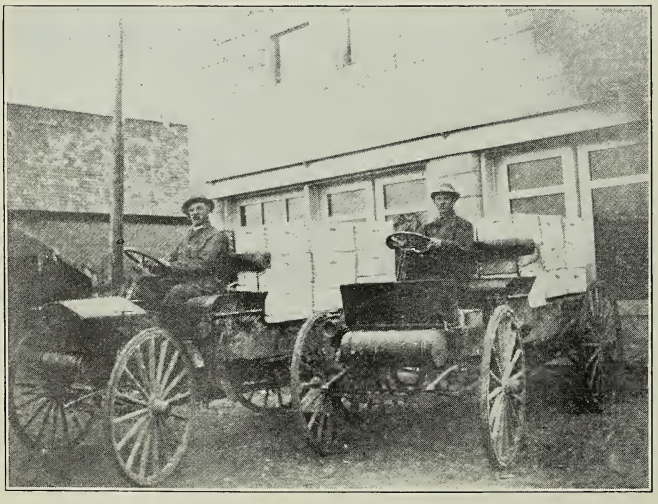
BY D. C. POLHEMUS

The accompanying picture shows our auto wagons, one of which has been used three years and the other two. They are "Internationals," and they have been in use constantly from April to November each year, in going to and from our fourteen bee yards scattered over the county at a distance of from three to twenty miles from home. We have headquarters here in Lamar, where we do all the work such as putting in foundation, repairing supers and hives, and other work that is not necessary to be done at the yards. On our daily trips this ready-to-use material is taken to the apiaries.

Of course we do not make very long runs. This style of machine is not intended for fast running, like a pleasure car; but we make an average of twelve miles an hour on our trips to and from the yards, and carry from fourteen to eighteen full-depth extracting supers of honey. We have hauled at one time as many as 36 supers of empty combs.

Before getting a machine I felt that it would give us considerable trouble, especially as some of our yards are in irrigated fields, and some on sandy knolls. The roads are sandy some of the way, for we located the yards before we had the autos, and we picked out all kinds of out-of-the-way places. We are more careful now where we locate an apiary, for it does not pay to locate where we know we shall have hills, sand, and frequently mud to bother us every week of the season whether we use an auto or team and wagon.

We have had very little trouble with these machines. We go almost anywhere that one can with a horse



Ready for a quick run through mud or sand.

Interior of the extracting room, showing eight-frame extractor driven by electric motor.

and wagon, for, being of the high-wheeled type, and having solid tires, mud does not stop us unless it is very deep. We have not put on any new tires yet; but the three-year-old machine must have new tires on the rear wheels before we begin another season's work. A local blacksmith has bought a machine for putting on tires, and offers to put on two rear tires for $35.00.

It costs about two cents a mile for gasoline and oil. We think the expense of keeping a machine is no more than keeping up a team, wagon, and harness, to say nothing of the satisfaction one gets out of the machine in the yard, and the time saved on the road. We would not try to get along without an auto for our work.

One of the main features of planning our work is to get the most out of the boys' time during vacation, and get as nearly finished up in the fall by time school commences as possible. We have thought of a heavier machine—one that would carry more honey—but have finally concluded that, as we have more or less sandy roads, and occasionally mud to go through, a medium-weight machine is better.

The International machine costs $800, so we can use two machines and have no more money invested than if we had one of the larger style of motor wagons or trucks. We are not prejudiced in favor of the International, but have looked over other makes, and think that, for our work, it is the best we have seen. There are a good many days in the year when we have very little if any load to carry, and this is something to consider; for, instead of having to run a lot of extra machinery over the country, we have a speedy and economical way of traveling.

We kept two teams before we got a machine, and still keep one, as we have some heavy hauling to do at times. Each of the machines will carry a thousand pounds; and as we go to some yard every day we get our honey in as fast as one man can extract it.

For several years our extracting was done at the outyards, and the honey run into five-gallon cans and hauled home every day. This plan has some advantages; but the cost in time and labor of keeping up a house at each yard, and moving the extracting outfit about twice a week, and seeing that the wants of a force of men are supplied, induced us to try a different plan.

The last four seasons we have been hauling all the honey home, where we have an eight-frame extractor run by an electric motor, which we think is the best power for running an extractor. Some may think this entails too much hauling of honey and supers; but we find we can take care of more bees with the same help, and do not need so many supers, as we keep extracting every day, which gives us a supply to take out to the yards each morning during the extracting season.

I might say a little in regard to our apiary work. We use both the eight and the ten frame hives; and while I have some prefer-

One of D C. Polhemus' out-apiaries near Lamar, Colorado.

ence for the ten-frame I don't think there is any difference so far as results are concerned. We can give as much room in an eight-frame hive as any colony needs by piling up supers, and the eight-frame is lighter to handle.

We winter most of our eight-frame colonies in two stories. Of course this means such colonies as we run for extracted honey. The comb-honey colonies are wintered in one-story hives.

All our bees except one yard are run for extracted honey. This may be a mistake considering the demand for comb honey this year; but we have thought for some time we would quit the production of comb honey altogether. I like the comb-honey work myself, but it is difficult to get help that is satisfactory.

Our bees are all wintered out of doors, packed to protect them from bad weather. Some winters the packing is not necessary; but this winter, when we had a month of zero weather, the packing saved many colonies from freezing.

We unpack about the middle of April, and examine each colony to know about their stores, but disturb the bees as little as possible till the weather warms up good about the first of May. In this climate the nights are very cool till late in the season, and it is a disadvantage to try to work them too early. When the strongest colonies have their hives about full of brood we equalize, giving each of the weaker ones a frame of sealed brood.

We used to tier up the hives, and not extract much till the end of the season; but with our present method our hives never get more than three stories high, and many of them only two.

Lamar, Colo.

THE "CADILLAC THIRTY" FOR BUSINESS AND PLEASURE

BY LOUIS C. KOEHLER

In June, 1910, I bought a "Cadillac Thirty" motor car. It is a four-passenger car with removable tonneau. I made a box with a roof which is put in place of the tonneau when I go to market. It has a door in the back, and will hold 500 pounds of honey besides sundry other articles.

My two main honey markets, Manitowoc and Two Rivers, are twenty and fifteen miles respectively from the apiary. Formerly it took me two days to go to Manitowoc, sell the honey, and return, wasting eight hours on the road. Now I can go to Manitowoc in one hour, sell the honey, and return before dark. I find the automobile very convenient in delivering honey. I do not have to bother with tying the horses, having them shy at other automobiles, and I have no bother and waste of time in feeding at noon.

In fifteen minutes I can replace the tonneau and then have a pleasure car. Besides using the car for the honey market and pleasure, I find it a great convenience during the busy season if I must go to some distant place rapidly.

My expenses for repairs have thus far amounted to ten cents, for welding the brake-connecting rod. I still have my original set of tires.

Mishicot, Wis.

COST OF RUNNING A SIX-YEAR-OLD REO

BY E. J. ADKISSON

I have a Reo two-cylinder touring car of 20 horse power. It has seats for five passengers, but the rear seat is removable by loosening two thumb-nuts. A "wagon box" can be quickly put on in its stead. The box is 38 inches wide, 48 long, and 30 deep. It was made especially for hauling bees, hives, supers, and other things pertaining to beekeeping; but we find that it has many other uses. We use it for carrying any kind of light freight up to four or five hundred pounds. Freight shipments of supplies from the depot, twelve miles distant, and pigs from a neighbor's place four or five miles away, may be mentioned as having been carried by auto in that box. It will hold twelve hives of bees without crowding; but when bees are moved in this manner, both slow and careful driving are necessary. The machine however will not "run away," no matter how many angry bees are flying and stinging. I can hardly say as much for the "shofer," however.

We have used the old Reo for many business and pleasure trips to Nashville. While the car is far from being up to date in appearance, it has a good motor, pulling up the hills very nicely, and gives as much speed on the level as the condition of our roads will allow. There are usually only two passengers, in which case the tonneau is replaced by a covered box or deck. The box is ten inches deep at the front, sloping to eight inches at the rear. It covers the whole tonneau space, 35x35 inches. It is fitted with a removable top or lid, having lock and key. We find this box a great convenience in carrying small wares such as eggs, butter, extracted honey, etc., to market, and bringing home small purchases from Nashville and West Nashville. This old car has been in use six seasons, and is still in good condition and in good running order. The upkeep expense to 1910 was about $50 or $55 per year. Of course, this does not include the cost of gasoline and lubricating oil, but does include every thing else—even the tire expense.

In 1910 I had to have a new trasmission and water-tank put in, and also bought four Kimball steel tire-cases, a driving chain, one new tire, four inner tubes, tire-holder irons, horn bulb, tire-cover, tire-liners, tire-repair outfit, etc., amounting all together, including repairmen's and vulcanizer's charges, to about $200.

For 1911 my expenses, outside of gasoline, grease, oil, and dry batteries, were practically nothing.

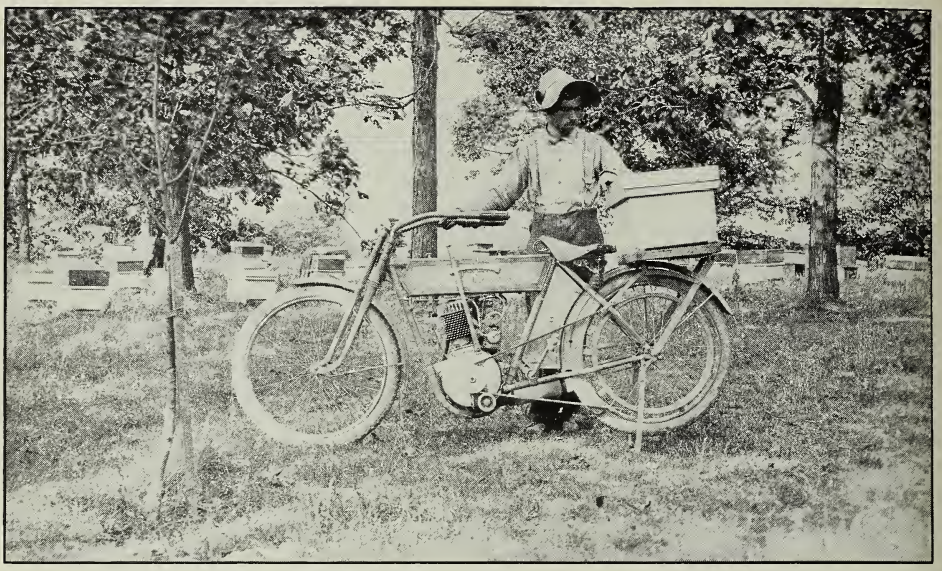
THE TIRE PROBLEM.

For 1912 the upkeep expense should be very light, as I do practically all of my adjusting and minor repairing. Two things of value that I have learned are that, with acid and cement properly used, an inner tube repair can be made that will hold as long as the tube lasts, and that a few drops of sulphuric ether on a sponge placed in the carburetor intake will cause a motor to start on the coldest morning with very little cranking. I have taken an old tire, three or four years old, apparently rotten and worthless, having suffered a blow-out and rim-cutting; had the blow-out vulcanized, put in an interlock inner tire around the tube, a Kimball steel case over the outside, and have run it for fifteen hundred miles without puncture or blowout. New tires at that time were selling at a frightfully high price. Considering the prices at which good tires can now be bought, it probably does not pay to bother with old tires after they once blow out. For some time there has been a discussion in the columns of *Motor Age* as to whether or not it pays to have tires retreaded and blow-outs vulcanized. The general censensus of opinion seems to be that the same amount of money invested in the purchase of new tires is more satisfactory than having old tires repaired. Of course, there are exceptions. One is that of a new tire, or at any rate a good one, that has been cut by running over a broken bottle. Such a tire should certainly be repaired. It all depends upon the condition of the fabric of the tire and the skill of the repairer. A poor job of vulcanizing will ruin a good tire, while the utmost skill in vulcanizing can not restore a fabric that is rotten or worn out. It pays *big* to keep the small cuts in the tread rubber repaired, so that water, sand, and mud can not reach the fabric. There are various compounds sold for filling such cuts; but it is probably best to use one of the small vulcanizers which are made especially for such work and for repairing inner tubes.

A friend of mine, a commercial traveler, is using, on his Hupmobile runabout, clincher tires 30x3 inches, for which he pays $10.60 each. He is going all the time, making from 25 to 125 miles a day, and states that these "cheap" tires are giving him a mileage of about eight thousand miles per set. He is a great believer in hard-pumped tires, keeping them inflated to even a few more pounds pressure than is usually recommended for tires of that size.

FRICTION TRANSMISSION BETTER THAN GEARS.

I am a regular subscriber to and reader of two of the leading automobile magazines; and the more I learn about motor cars, the more I am convinced that a car having a friction transmission is more satisfactory than one having a gearbox and clutch. It is generally known that the change-speed gears, the clutch, and the propeller shaft with its connections, such as bevel gears, universal joints, bearings, etc., are a frequent source of trouble—especially if these parts have had considerable use and are pretty well worn. A breakdown involving any of these parts is likely to occur far from home, and with little or no advance warning. The car must be "towed in" to the repair shop. Expensive new parts must be ordered from a factory which usually fills



Harley-Davidson motor cycle, used for carrying a load.

orders for such parts in a very leisurely manner, while you are losing the use of your car. None but an expert repair man should attempt to replace and to adjust such new parts.

In the usual course of events, however, the car is literally "torn to pieces" by young "cubs" who hardly know a monkey-wrench from a mouth-organ. When the time for reassembly arrives, a more or less skilled repair man tries to undo some of the harm the "cubs" have done. Such proceedings are not good for a car's health, to say the least. A well-designed and properly constructed friction transmission practically eliminates the troubles mentioned. It is easier to learn to operate than sliding gears, gives any number of speeds, is noiseless, does not break down suddenly, and repairs are inexpensive. The only part subject to much wear is the fiber facing on the cross-shaft wheel. It simply *wears* out slowly, giving ample notice, so that a new fiber ring can be kept ready to replace the old one when it becomes necessary. The services of an expert mechanic are not required, as almost any one can put in a new fiber ring in two or three hours' time, and the cost is about $3.00. One of my friends had a fine 1910 Cadillac. Some of his transmission gears stripped off, and the repairs cost him $40.00. The transmission of my old Reo "busted," and the cost to me was about $65.00. Compare these expensive and troublesome repairs with the cost of a new fiber for a friction transmission. It may make you decide, as I have, that my new car must have a friction drive.

The leading makes of friction-driven pleasure cars are the Cartercar and the Lambert. Others are the Lincoln, Sears, Petrel, Metz, Dispatch, Kearns, Duryea, and Rogers. So far as I can determine, the Lincoln and Sears are exactly the same car under different names at different prices.

Nashville, Tenn.

MOTOR CYCLE USED GOING TO OUT-APIARIES

BY W. F. DUNLAP

I am sending you a picture of a gentleman who, because of eye trouble, is unfit for many kinds of work. He has entered enthusiastically, and I might add successfully, into beekeeping. He is shown in the picture about to start for one of his outlying apiaries, on his motor cycle.

Milwaukee, Wis.

TROUBLE WITH THE SEARS

BY WM. MUTH-RASMUSSEN

During the 18 months that I have had my Sears machine it has been out of order nearly all the time, and I have been practically a prisoner at home. This car may do very well on city streets and on good hard roads; but with narrow solid tires it is entirely unsuited to sandy and soft country roads. I finally had to get a set of new wheels with pneumatic tires, for which Sears, Roebuck & Co. charged me $170.00—just double the difference between the price of a car with solid and one with pneumatic tires, although I labored with them about the unreasonableness of this exorbitant price.

As soon as the new wheels arrived, two of the tires were leaking. When I reported this, Sears, Roebuck & Co. sent me two new

inner tubes; but these too have been leaking, and I have had no use of the machine, to speak of, as there has been trouble every time I had it out.

The new wheels cost me, freight and all, over $200. The old wheels are useless to me; but if returned they would barely pay for the freight charges, as I have ascertained. I have spent over $800 on the machine, and it has been nothing but trouble and vexation to me so far. There is no prospect of selling it here, and it would not pay to send it to San Francisco. If I had a spare building in which to store it I would have bought a new horse long ago, as I used to keep one; but I put a wooden floor in my stable for my auto, which is now occupying that building, and I can not afford to throw it out on the scrap-pile.

Independence, Inyo Co., Cal.

[I am sorry to get such a letter as the above; but it would be manifestly unfair to give our readers the impression that running an automobile is all fair sailing. I have had some years' experience with autos, and our family have owned and have run a number of different makes of cars, and I must say the Sears car has given me more service and more satisfaction than any other I ever got hold of.

In regard to the solid-rubber tire, when I ordered my machine I thought solid tires would be best for the Florida sand; but the company wrote me at once that they were sure the pneumatic tires would be much better; but a brother in Michigan bought a solid-tire machine, and he and I rode many miles through sand and through mud, right after a rain, and over rocky roads, without any trouble whatever. He has since run it on long trips over the desert between Phœnix and Pima, in Arizona, and, I think, with very little trouble except that he had to wait for his new friction filler, which he should have ordered in advance.

Now a word about inner tubes. We can not order these in advance and keep them in stock; for I am told that, especially here in this warm region, they last only about a year before they get rotten, or something like it. When I ordered my machine I also got an extra tube to be held in reserve; but this tube that wasn't used at all seemed to go to pieces about as soon as the others. Well, if this is true (but I *hope* it isn't) suppose a dealer tries to keep a stock on hand (to fill "emergency" orders), if he should happen to keep a tube a year it might give no service at all, even if it was brand-new. Three of my four tubes began to give trouble in just about a year, and yet I had the very best make in the market. In the above case the company furnished two new inner tubes without cost, and yet it may not have been any fault of their own. Of course, I do not know just what kind of roads our good friend Muth-Rasmussen has in his neighborhood; but my impression is, if he will be patient and gradually learn to make needed repairs himself he will yet get not only much service, but much enjoyment out of his machine. This will have to be done, more or less, with the best machine made, no matter what it cost.

Permit me to mention, in closing, that Sears, Roebuck & Co. have just sent out the finest and plainest instruction book for their car I have ever seen for any automobile. It is profusely illustrated, and made so plain with arrows and numbers that any ordinary mechanic, with such a help, should be able to make his own repairs. Yes, it does usually cost something to keep an auto in repair; but it costs nothing when idle, which is not true of a horse.—A. I. Root.]

THE SEARS FRICTION-DRIVE TRUCK

BY GRANT ANDERSON

I have used an automobile for visiting my out-apiaries and for hauling light loads for several years, and would not think of doing without one. Several of my apiaries

If a box is properly strapped or tied to the luggage-carrier, quite a load may be carried successfully on a motor cycle.

are between ten and fifteen miles from home; and to drive that distance with a horse is tiresome and a waste of time. Then when a visit has been delayed from some cause, which will happen sometimes, and one finds several swarms out when he reaches the apiary he can hop out of the car and begin to hive swarms; but if he has a horse he must look after it first, to say nothing of the hour or hours lost on the road in getting there and the same in getting back or to the next yard. With an automobile I can reach any of my apiaries in less than an hour, and can work till dark if necessary, and run home by lamplight.

The first auto I bought was a Holsman, with high wheels and solid tires. This car has a long body and a removable rear seat. With this seat removed I have room for a lot of hives, camp outfit, or a lot of baby nuclei. This car has done good work for five years, and is in good condition yet, except the front axle, which was broken yesterday in a collision with a runaway mule team in the streets of San Benito.

I have another car that I bought from Sears, Roebuck & Co., Chicago. This car is a light truck with a long body and droptail gate. The wheels are 36 inches high, with solid tires. While I have not had it long, I am well pleased with it, and believe it will be a great help in hauling bees, honey, and other goods, as I can dispense with the horse and wagon to a marked degree. This little car was not built for speed, but it makes as much time, when not loaded, as I care for.

I believe this to be one of the best and handiest autos for beekeepers that is on the market to-day, and the price ($375) is within the reach of all. I would advise everybody, before purchasing an auto, to write Sears, Roebuck & Co. for an auto catalog; also to The Chilton Printing Co. for a copy of *Cycle and Automobile Trade Journal*, Market and 49th St , Philadelphia, Pa. In that journal many makes of automobiles are advertised. I believe all the leading beemen in Texas have an automobile. San Benito, a town less than four years old, has over one hundred automobiles in town and on adjoining farms.

Brother beeman, get you an auto and add ten years to your life and many dollars to your bank account.

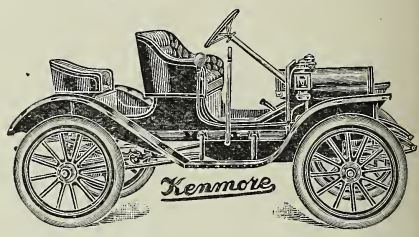
San Benito, Texas.

THE AIR-COOLED AUTOMOBILE PREFERRED

BY LOUIS WERNER

The first automobile that I owned was a 7 h. p. Brush runabout, equipped with a water-cooled one-cylinder motor. I ran it one year; but it was too small, and lacked power. I also had a good deal of trouble with the radiator, as it kept leaking; and other things got out of order, so that I sold it last fall and bought a new machine—a 14 h. p. air-cooled Kenmore. This car is equipped with solid tires, and I can use it for delivery purposes or for pleasure. By adding another seat it will carry four persons.

The cost of upkeep I have found to be very small, the only expense I had during the first six months being 75 cts. for a muffler. I have no tire trouble, and there is no radiator to leak. I find I can run this car for $2.50 per month, including every thing. A horse would cost me $10.00 to $15.00 per month, whether used or not. The car costs $500, and it is the best investment a beeman can make.



This machine is well built, is strong and neat, and is very easy to run, so that I think it is an ideal machine for a beekeeper who has an outyard. It can be driven right in among the bees, and there is no danger of any horses being stung. I am in favor of an automobile every time, instead of horses, around bees.

Edwardsville, Ill.

WHY I BOUGHT AN AUTOMOBILE

BY P. H. BALES

I have 670 colonies of bees, located in ten apiaries from five to twenty-four miles from home. With the machine I can go to the furthest apiary, do a day's work, and return the same day.

European foul brood broke out among our bees, and they required so much care that I needed to be at several apiaries the same day. I bought the machine thinking I could give my bees so much better care that they would make enough more honey to pay for the machine, and I think they have done it—and the fun!

WHY I BOUGHT A MITCHELL

My machine is a four-cylinder, 1910 model, five-passenger Mitchell "30." I paid $1750 for it two years ago. I bought this machine, because I thought it would give the best service for the money, and I think (after two years of use) I made no mistake.

I have driven 13,000 miles, and have discarded only one tire casing. The repairs have been practically nothing.

For hauling supplies I have an extra body that takes the place of the back seat. I have moved 260 colonies of bees this winter, 14 at a load, with extra supers on.

My machine failed just once to go, and I was seven miles in the country. I telephoned for the machinist to come and haul me in. He came out and threw off the emergency break, and said, "Now you are all right," and so I have been ever since.

My advice to prospective buyers is to use the same judgment in buying a machine as in buying a horse. The one that costs the least is not always the cheapest in the long run; and if the machine is being sold with a 3½-inch tire, have a four-inch put on instead. It will be money well spent.

Hanford, Cal.

USEFUL HINTS FOR THE PROSPECTIVE PURCHASER OF AN AUTOMOBILE.

BY CYRIL BRODNIX.

From my ten years' experience with gasoline engines and automobiles of some twenty-five or thirty different makes, I find that one of the most misunderstood points is the question of horse-power. The Society of Automobile Engineers' (S. A. E.) rule for obtaining horse-power is to multiply the square of the diameter of the cylinder by the number of cylinders, and divide by 2.5. The number of revolutions per minute, and the length of stroke of the piston, are not counted, although each has something to do with the actual horse-power that the engine is capable of developing. This rule, therefore, is only approximate.

An engine that will develop 15 to 20 horse-power is usually sufficient for a machine seating two or three people; and one that will develop 20 to 32 horse-power for one seating four or five people. A larger engine costs more to operate, and nothing is gained; for twenty-five to thirty miles per hour is as fast as it is safe to drive on country roads, and this speed may be easily maintained with the sizes of engines given.

The single-cylinder machine is the simplest, most economical, and the lowest in first cost; but single-cylinder motors are limited to 10 or 12 horse-power on account of the difficulty of cooling the piston if a larger cylinder is employed. The two-cylinder engine has some advantages over the single cylinder; but the four-cylinder engine is usually considered to give the best service on account of its more uniform power and comparative lack of vibration. The six-cylinder engine gives still steadier power, and has almost no vibration; but it is more complicated, more expensive, and much heavier than a four-cylinder engine of equal power, and for this reason it is very seldom used on cars selling at a medium price. The water-cooled four-cylinder engine, therefore, of the four-cycle type, located under the hood, gives the best service in medium-sized cars.

The engine should be so placed in the frame as to be easily reached for cleaning, adjusting, and repairing. It is a good thing if the crank case has handhole plates on the side to permit adjusting the crank pin or main bearings without having to remove the under half of the case.

The valves in the cylinder head should be of ample size, and located so as to permit easy cleaning and grinding. The valve stems should have ample guides to keep them in line, and should be protected by some kind of housing or cover plate to keep out the dust and dirt, and also to muffle the noise.

If a water-pump is used it should be located so that the packing may be easily renewed.

The magneto should be in such a position that the contact point and connection may be easily inspected and tightened.

The carbureter should be set high enough in relation to the frame so that the gasoline feed-pipe may be readily disconnected for cleaning.

The oiling system should be capable of delivering plenty of oil to all moving parts all the time. Such parts as the pistons, wrist pins, crank pins, crank shaft, the half-time gears, cam shaft, cam-push rod, and valve stems should be automatically oiled. There should be rollers on the cam end of the valve-push rods.

The three-speed forward and reverse selective sliding-gear transmission is the one most used, and the one to be preferred on account of its positive action, long life, and freedom from trouble.

The clutch that gives the least trouble is the one that is the simplest and that has the fewest parts. The cone clutch having an asbestos fiber face is usually to be recommended on this account. A leather face is all right, although it is more likely to burn if the clutch slips.

The universal joints of the shaft drive should be so made that they run in oil, thereby reducing their tendency to cut.

The rear axle to be recommended is of the full floating type; that is, one in which the weight of the car does not come on the shafts that drive the wheels. The best rear axles are equipped with Timkem roller bearings throughout.

There should be two sets of brakes acting independently of each other, acting on the drum attached to the rear wheels. The one set should be internal, expanding metal to metal, and the other external contracting, the band having an asbestos lining. The external brake should be used for service, and the internal for emergency. The objection to a brake on the driving shaft is that it sets up undue strain and jars on the differential and the rear-axle assembly in general.

Before buying a car it would be well to ask the dealer the following questions:

How many miles per gallon of gasoline and oil will the car travel?

Are the valve stems and springs of the motor protected from dust?

Is the water-pump easily repacked?

Are the magneto and carbureter accessible?

Will the clutch act somothly without sticking or slipping?

Is the transmission case accessible?

Is the rear axle strong enough?

Thorp, Washington.

BUZZINGS ROUSED BY THE MARCH 1ST ISSUE

BY ALLAN LATHAM

It is but natural that an unexpected article such as "A Contrary Beekeeper," March 1, page 133, should stir said beekeeper out of lethargy. Months have passed since Latham has written any thing for publication, his many irons in the fire occupying all his attention. There have been many times when he wanted to get up and speak, but failed because of insufficient stimuli. Large entrances, hard winters, paper protection, etc., as brought to the front March 1, together with that article of Miller's, are too strong, so here goes.

What the editor has to say about wind, protection, and cold spells is all good sound sense, even if he is a little off about inside temperatures. Wind is the great enemy of bees in winter, and no small antagonist in summer. Unless the hive be fitted with air-tight cover, with no chance for a draft, it would be folly to subject a colony to the rigorous trial which a cold wind will put upon it. Still air at zero is less of a hardship for a colony than a gale with the temperature 30 degrees higher. Large entrances so placed as to let a steady blast of cold air in upon the cluster will bring disaster. That same entrance so placed as to receive only winds of moderate temperature or deflected cold winds will tell a different tale.

Steady cold? Yes, that is what kills lots of colonies. The contracted cluster consumes all the fuel within reach, and starves. How combat such a foe? Fortunately, steady cold is rarely accompanied by sunless skies for many days at a time. So, let the sun break up the continuity of that steady cold. Here is where the big entrance and the black paper do the work. The black paper catches the heat and passes it slowly through the walls of the hive, and stirs up that contracted cluster. New fuel is brought in from the stores near by. The weary insects stretch their limbs and take new courage. The big entrance carries away the dampness, and the cold is less deadening. Night comes with the steady cold again ascendant, but the little furnaces are going full blast with plenty of oxygen to furnish good clean burning. What satisfaction to see the vigor and clean health of those same bees when April comes!

True, there is much in locality. I have found it true even with "let-alones," and there is one place down on Cape Cod where I have had to cut down those big entrances. Why? Because a long stretch of sand allows the damp ocean breezes to sweep unobstructed right into those hives. This present winter I have again left them wide open to put the matter to a further test. The severe winter will give a faithful test.

Yes, it is a severe winter here; but, though Norwich is but 50 miles from Providence, where Miller lives, this winter does not compare in severity in Norwich with the winter of 1903. That winter no flight came to the bees from Nov. 19 till March 22. It was stated that 75 per cent of bees along the New England coast perished that winter. This present winter will see the end of many colonies, but only of those not properly supplied with stores or those weak in bees. My own colonies at present date (March 8) are in splendid condition, having enjoyed flights in December, January, and February, each month furnishing an ideal day for a cleansing flight.

Mr. Miller has painted a very rosy picture of the let-alone hive. Be it known that there are troubles with these let-alones which are peculiar to them. This system of beekeeping has its fine features, and teems with interest; but it furnishes no quick road to wealth, nor need a lazy man look upon it with too optimistic a gaze.

Norwichtown, Conn.

PUTTING BEES ON THE SUMMER STANDS

BY B. H. TRIPP

With the first warm days of spring comes the desire to get the bees out on their summer stands. Oh how one longs to watch the busy little workers hustling with their duties for the good of the colonies! But it will not do to be in too much of a hurry, for there will be many days when they will be better off in the cellar or cave than outside, huddled together so closely as to chill the outer brood or eggs.

My 28 colonies are in a cave 6×8 feet square. I have been down to see them but once since Jan. 1, and have just put some rubber roofing over the snow that covers the hatchway, in order to keep it from melting as long as I can. My object is to keep them as nearly dormant as possible until there is something for them to bring in.

When the snow is all gone, and fair weather comes, I shall keep my weather eye open for a cool spell, when the bees will not fly for a couple of days; then I'll open the doors about sundown and leave them for two hours to cool off. Then, after placing a wet cloth over the entrance, I will gently carry them out and place them on their summer stands.

By way of assistance to them in their housecleaning, I will (on the first warm day) place them on fresh clean bottom-boards. This, I think, is important, as it saves a lot of hard work removing the dead bees and cappings that have accumulated during the winter.

As this stuff is more or less damp, it is a sanitary precaution to remove it as soon as possible. At the same time I will remove the empty or moldy combs and shove the remaining combs and followers to the left side of the hive. My followers are always on the right side, as my hives face the south. I think that they afford some protection against the cold west winds of spring, and ater, from the hot afternoon sun.

Brooklyn, Iowa.

Heads of Grain from Different Fields

Solid vs. Pneumatic Tires; Friction Transmission

I should be pleased to know the respective advantages of solid tires and pneumatic tires, taking into consideration the question of cost. Is there any particular advantage in the friction transmission? For utility, would something like the International auto wagon be better than an ordinary car with trailer?

Wesley, Ont. GEORGE WOOD.

[On practically all of the motor trucks and wagons used and manufactured in this country, solid tires have been found to give the best satisfaction. They are not adapted, however, to speeds above fifteen miles an hour; but since this is plenty fast enough for a machine carrying a load, it is evident that the high wheels and solid tires are much to be preferred to the pneumatics for the light trucks and wagons used by beekeepers. The hard tires will ordinarily wear about two years, although the character of the road has a great deal to do with the question, since rough stony roads grind away the rubber much faster than clay, sand, or even gravel roads. Pneumatic tires, if used on a truck, would not last as long as this. They would cost much more in the first place; they would require expensive repairs continually, and there would be many delays when time is worth money. As the commercial vehicles are used more and more by all classes of business men instead of horse-drawn delivery-wagons, etc., blacksmiths over the country will gradually put in a machine for re-tiring the wheels. A great many blacksmiths (in the larger towns at least) are already equipped for putting rubber tires on buggy-wheels.

Of all the different kinds of transmission or devices for changing speed, the friction transmission is the simplest, the cheapest to maintain, the most trouble-proof, and the easiest to operate. Among the disadvantages may be mentioned the fact that the friction transmission, if properly designed, costs more than a sliding gear, for instance, and it is slightly less efficient on low speeds especially. However, this loss of efficiency is far less than many imagine, which fact is shown by the increasing popularity of this form of drive for light trucks and commercial vehicles of all kinds. Personally we are quite in favor of the friction transmission.

Regarding the use of a trailer, we will say that, for some reason or other, this has not proven very practical. We noticed an account not long ago of a piano dealer, however, who was moving pianos very successfully on a trailer, which may possibly indicate that one reason why trailers are not used more is that there has been so little experimenting done along this line. Mr. F. B. Cavanagh, of Hebron, Ind., uses a two-wheel trailer, as illustrated on p. 500 of the August 15th issue, 1911. His trailer, however, is pretty hard on the rear tires of the auto; for, in addition to standing the wear and tear of attraction, they have to hold the weight of a good share of the load. It may be, moreover, that the bearings, which are not designed for such a heavy load, will give out. A four-wheel trailer would overcome this objection; but at the same time such an arrangement is rather hard to manage in turning corners, etc. We presume that the most economical way is to use a commercial vehicle designed for carrying a load, in order to avoid these complications.—ED.]

500 lbs. of Comb Honey Carried in a Ford

I did not purchase my automobile for the express purpose of using it in connection with the apiary, but more as a pleasure vehicle for the family; but I find there are many uses to which it can be profitably applied in connection with the apiary, especially in marketing the crop, if sold to consumers or grocers.

My machine is a five-passenger Ford; and, although designed especially for a pleasure car, I have marketed all my honey the past two seasons with the best of satisfaction to myself and to my customers.

I can carry four or five hundred pounds of comb honey each trip, and the honey is delivered in the best condition, crates all clean and fresh, and not a broken section at any time to mar the appearance and sale. The beekeeper does all the handling himself, and handles it as it should be, thus insuring first-class delivery. Besides, it is cheaper than freight or express, all things considered. I have also transported bees, hives, queens, and supplies to some extent; and I find that an automobile adapted to the purpose can be made a useful and profitable adjunct to all kinds of apiarian transportation, and a great source of enjoyment in making business and pleasure trips.

Athens, O. J. C. ATKINSON.

Moving Bees in Record Time with a Buick Truck

On a November morning, with the mercury at 40 degrees Fahrenheit, with twenty handy screens to close hives, and twines ready cut to wrap each end of a hive, a start was made at 6:30 from the city for bee-moving four miles in the country. The necessary work of closing hives and tying was carefully done. 20 hives loaded, and moved three miles to a purchaser's location, and the return made to the city, ready for our delivery work at the grocery, at 8:45. What about this for a good record with a two-ton Buick truck?

Thirty-four hives of bees at a load were hauled one July night a distance of six miles in this same auto truck from one side of our city to new pastures. These bees were all prepared at sundown; loaded, moved, and placed, and the return home was made by 12:30 P.M. We have solid tires. The pneumatic are easier.

I have a 1912 Cole car; one brother has a Reo; another brother an E. M. F., and my father wants a Cadillac.

Evansville, Ind. W. W. VICKERY.

Is the Friction Transmission Reliable?

I am thinking of buying an automobile the coming season, and I should like to get your opinion of the Cartercar. Do you think the friction transmission and chain drive are what the manufacturers claim? I want a machine that I can depend upon to go through sand and mud, and over the hills. I should like the best there is in a medium-priced car. There are no Cartercars around here, and I have never seen one; but I have their literature, and am very favorably impressed by it; but I should like to learn from good good authority whether they are thoroughly reliable.

Scottville, Mich. L. D. ALLEN.

[We have driven a Cartercar for nearly three years, and so have had a good opportunity to judge of the merits of this particular car. It is not as low in price as some of the other machines of the same size, but we do not believe there is another car on the market so economical in upkeep. It is almost impossible to abuse the machine; and it will stand hard continuous pulling with the friction-wheel set close to the eenter of the disk—low-speed position—without wearing out any thing nor doing any damage whatever. Furthermore, the changes in speed may be made at random, from low to high or high to low, regardless of engine speed, and while the car is running in either direction. We have no hesitation in recommending it as the easiest car to drive of any that have come to our notice.—ED.]

The Ford Contemplated

I want an automobile that I can run every day to my outyards, and one on which the upkeep cost is not too high. Do you think that the Ford could be run a good deal cheaper than the 30 h. p. class, E. M. F., Buick, or Overland? Do you think the Flanders is a better car than the Ford? The Ford was used here last summer; but it has not been here long enough for me to judge much about it. I run five outyards, and want a car that will be the least trouble to look after, and the cheapest to keep up. It must also be rather small to be handled around the yards easily.

Spanish Fork, Utah. THOMAS J. STANTON.

[There are several Ford automobiles in this vicinity; and our opinion is that, for a light pleasure car, this is the best proposition on the market, for the money. The E. M. F., Buick, Overland, etc., are all much heavier cars, and consequently larger and more expensive tires are needed. Some have thought the Ford too light for strength; but those around here seem to be giving very little trouble.

There is really little risk in buying a machine that has been on the market for a year or two, from any of the old companies that have been in the business long enough to understand the construction of a car. We would not buy a new model just brought out by any concern, for it takes at least a year for the mistakes in design in a new machine to be corrected by the tests made in service.—ED.]

Cement Track for the Auto Instead of a Driveway

My occupation is that of deputy examiner (deputy collector and inspector). Our examinations being made at the factories, I bought a third-hand auto to enable me to get to the different points, which are sometimes four miles apart, in a short space of time. I find that I save about two hours a day in this way.

I used to have a good deal of trouble in the spring from the auto wheels cutting ruts in the lawn nearly a foot deep as it came up the steep grade in front. So I dug two parallel ditches, 56 in apart from center to center, and put in cement tracks 8 in. wide and 6 deep, with a half-round groove in each, 4 in. wide and 2 deep. I laid a galvanized wire cable in the center of each track to reinforce the cement. This arrangement fully meets my expectations; for when the wheels are once in the groove it would be hard to get them out, even if I desired to. When running in I can hit the grooves every time at a ten-mile speed; and in backing out I merely have to be careful to get the hind wheels started right, and then the front wheels are almost sure to enter the grooves themselves. As soon as all four wheels are on the track I can let go of the steering wheel, as the grooves attend to the guiding.

Bridgeport, Ct. S. J. GRIFFIN.

Mitchell Runs 50,000 Miles

In June, 1909, I purchased a 20-25 h. p. Mitchell car, and it has been in constant use since then. In all, it ran over 50,000 miles, and is still in good repair. My expense for extras has been less than $100, while my tire expense has been about what any other car would average under the same circumstances. I had never had any experience with an auto or other machinery; but I have been able to handle my car to my entire satisfaction. I would not be without a car, and am aiming to purchase another Mitchell this spring, as they will do the work under all circumstances.

Belgrade, Mont. J. M. GRAYBEAL, M. D.

International Auto Wagon a Time-saver

Last spring I bought an International auto wagon which I have been using since, and find it perfectly satisfactory. As a time and labor saver alone the machine is worth its cost; and, besides, I never have to worry about bees making it break loose and run away.

To-day a hunter brought in the report that one of my houses at an outyard 3½ miles away was open. In forty minutes afterward I had been out, looked after things, returned, and put my car up. How does that compare with harnessing a team?

Rocky Ford, Col. A. S. PARSON.

Auto-repair Man Advises the Cartercar

At present I have about 150 colonies of bees, so I have a great deal of time in the fall and spring to work at my trade—that of repairing automobiles.

Just recently I examined the driving chain in a Cartercar which had been driven 25,000 miles, and neither the chain nor the sprockets show any appreciable wear. Nearly all cars with sliding-gear transmissions and driving pinions must have several replacements before they have been driven that far.

The Cartercar costs more money than some of the others; but it is the cheapest one to buy in the long run. It has one of the best engines that can be built, which gives ample power to handle the car with ease as slow or as fast as one wishes to go. The ignition is all right, and will require practically no attention. I have seen these cars driven 2500 miles without having the engine touched.

This car has the friction transmission. It would be impossible to produce any thing simpler, more efficient, or more economical in the way of automobile transmission. There are any number of speeds which are brought into use with the greatest simplicity. This construction does away with universal joints, driving shaft, the inefficient troublesome cone clutch, and also the possibility of spinning the tires on the ground with the car standing still. This increases the service of the tires a great deal over those on cars with cone clutch and geared transmission. There are no gears in this friction transmission, and no beveled driving pinion or gears, which are expensive to replace, and require a great deal of attention.

Richmond, Ky. CLIFTON WEAVER.

The Brush as a Hill-climber

When looking for a serviceable auto for apiary work, do not overlook the Brush. It is a powerful little 10 h. p. machine—a regular little burro for grade-climbing, and as reliable as any in the market.

Redlands, Cal. P. C. CHADWICK.

Forty h. p. Overland Run 25,000 Miles Among Queen-rearing Yards

Two years ago I invested in the best touring car the Overland people put out—a 40 h. p. machine costing $1725 delivered in Beeville. So constantly have I used this car in the management of my outapiaries that it has become a positive necessity as well as a decided luxury; and to do without it would surely handicap me in my business, my 15 yards numbering about 1200 colonies, scattered in a circuit of 85 miles—the nearest being 5 miles and the furthest 25 miles from home. This made it imperative for me, if I wished to keep pace with the times and the bees, to adopt a faster method than the wagon and horse. By the old way it took one week to get around and see the bees; but now I can see them all in one day if I wish. The old way required two teams and a buggy and horse. Since getting the auto, one team can do all the hauling, and the horse and buggy are not needed.

As to how both time and money can be saved by the use of the auto I will cite one instance. In last season's work, when the first fall rains fell, there were six yards that I knew needed about two hours of work at each. To work them in the old way would have required three days with wagon and team—a day to go out, and the best part of another to return. With the auto we worked the six yards, wife and I leaving home at noon on Tuesday, returning by the queen yard, caging and mailing 42 queens, and were at home at 6 P.M. Wednesday.

We never abuse the auto by making a dray of it, although we sometimes load a thousand pounds of honey in bare cans in the rear, carefully placing and packing to avoid chafing the inside finish of the car.

Unlike a wagon and team, we can run right into the yard, among the bees, with no fear of runaways or smashups. We have found the auto a great convenience in moving heavy loads of honey right out of the beeyard to a safe distance so the team could be attached. I believe I could pull a 2000-pound load on a trailer all over this country; but, unlike our friend Cavanaugh, whose pictured trailer he gave us last season, I have been too much afraid injury would result to my car by pulling a trailer, as it did to his.

Now as to the expense, which should be discussed and thoroughly understood before investing in an auto; for we can not operate a car without expense, any more than we can operate a team and wagon without cost. The first cost of a car is the first to be considered; next, its upkeep. If my car did no more mileage than my team, the cost of upkeep would be less than that of a wagon and team.

I have had a few minor breaks. Three transmission cases were broken in the first 3000 miles. These were replaced by the company free of charge. Later, after 18 months' use, an axle was broken. There have been also a few smaller troubles, all of which were easily adjusted. Gasoline and lubrication have been the greatest expense, as with heavy cars they average about a cent per mile. I have run some 25,000 miles, and to all appearances my car is as good as new, and I can not see why it should not run a hundred thousand miles. A new set of inner and outer tubes have been purchased only once, at a cost of $174.

Beeville, Texas. W. H. LAWS.

Our Homes

A. I. Root.

Jesus answered and said unto her, If thou knewest the gift of God, and who it is that saith to thee, Give me to drink, thou wouldest have asked of him, and he would have given thee living water. The woman saith unto him, Sir, thou hast nothing to draw with, and the well is deep: from whence then hast thou that living water? Art thou greater than our father Jacob, which gave us the well, and drank thereof himself, and his sons, and his cattle? Jesus answered and said unto her, Every one that drinketh of this water shall thirst again: but whosoever drinketh of the water that I shall give him shall never thirst; but the water that I shall give him shall become in him a well of water springing up unto eternal life.—John 4:10-14.

Ever since childhood I have been more or less interested in springs, and springs of "living water." Near my childhood home there were many springs, and in my play I had more or less to do with them. I built dams, had little sawmills, and made tubes of hollow reeds for hydraulic experiments. Since then our readers will remember I have written up springs more or less; in fact, I have visited some of the finest and largest springs in the world. Just of late I have been interested in making artificial springs, and this is what I want to tell you about to-day. We have artesian wells in our vicinity, it is true; but the artesian water is not as good as water from a spring. We also had quite a little expense, as we recently put up a windmill with a ten-barrel tank elevated twenty feet. This windmill, of course, gives us running water until the tank is empty; but where we open a half-inch pipe, a ten-barrel tank full lasts only a few hours. In making our garden, I very soon discovered that, when we have excessive rains, such as we have had this past winter, it is extremely important that our ground be underdrained, and I finally purchased a thousand tiles, shipped from Georgia, for this purpose. Right at the head of our garden, at the highest ground, we commenced our line of tiles and went down (to get good underdrainage) between four and five feet. Then the tiles were carried along with just as little fall as possible and have a running stream. After carrying them down three or four hundred feet we found the ground so porous that the water we had secured at the head was lost in the porous soil. In order to obviate this we ran the tile back to where there was a pretty good stream running into a half-barrel or keg. This half-barrel had a wire-cloth partition across the middle in order to prevent sediment from going into the iron pipes that are attached to the barrel. We used old iron pipe, second-hand, that cost but little, in place of the tiles; because when the water once gets into the iron pipe it is secure and can not soak into the loose ground nor evaporate. Well, in the fall we were greatly pleased to find that this half-inch iron pipe gave a full half-inch stream. This stream was allowed to run into a tank of water in the duck yard in the lower part of the garden.

I now want to digress a little to tell you that down here in Florida we have an abundance of rats. They are not the same kind of rats that we have in the North, but they are bad enough. Where we feed chickens by scattering the grain on the ground, the rats will come in and do a thriving business. Well, I have explained to you already that we head off the rats in our poultry-houses by keeping all of our grain and feed in galvanized iron tubs, and these tubs are suspended from the ceiling by three wires Now, we can not do this very well in case of the ducks, because they can not climb up and get the feed out of the tubs; but I have got on to a plan which seems to answer about as well. Our corn and wheat, or what else is fed to the ducks, is put into the bottom of these pans where the running water flows in. The ducks, of course, like it all the better for being under water, and so far the rats have not discovered any plan whereby they can get the grain at the bottom of the pan. Now, with ducks we want running water; because if the water is not changed constantly, as any one who has had experience with ducks will recognize, it soon gets very muddy and foul; in fact, a water-pond for ducks that has not a running stream to keep it supplied and to keep the water moving will soon become any thing but a pleasant sight or smell.

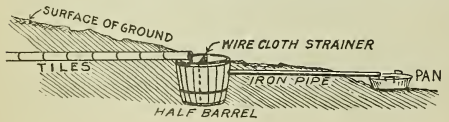
Well, this stream of running water has given me a great deal of pleasure every time I have passed it. There it runs, day and night, week days and Sundays. There is no letup nor stoppage—at least there has been none so far, and we are now in the middle of quite a severe drouth, yet my artificial spring continues to work just as it did at first. The point I am getting at is this: Almost any of you can have a spring of running water on your premises if you have an acre of ground, or, better still, a few acres. Rising ground, of course, is an advantage, because then you can get the necessary fall without any great expense.

Just a word in regard to a suitable place for locating these artificial springs. Some of our older readers may remember that some years ago I made a visit to Father Cole, as he was called—the man who put out the book entitled "Making the Water Captive." Well, Father Cole told me that he had discovered that most springs are at the bottom of a ravine with a surface-water drainage at the upper part. If you go out in the woods or in the fields, and find a place where the water has been running when there are abundant rains you will find, by digging down, that there is surface-water running at almost any season of the year. The best place in the world to do tiling for an artificial spring is in one of these surface-drainage spots. You may object at the expense of the tile; but if you are doing any thing in the way of making garden or

raising crops you will find that the tile will be an exceedingly good investment without considering the worth of this running spring. What is prettier or more exhilarating than to see a stream of water that continues to give pure, clean, health-giving water? The water in our spring which I have described is so soft that it washes with soap just as well as rain water. When visitors are around our premises they always utter an exclamation of surprise and delight when they see the corn for the ducks down at the bottom of that pan of clean sparkling water.

I have had great pleasure in raising ducks, as I have told you before. I have had excellent success; have scarcely lost one unless by some accident, and I think one great reason is that they have running water all the while—all they can consume. When they get to a sufficient age I give them this same running water to bathe, splash, and play in. Now, there may be something in animated nature more pleasing and more thrilling than young ducks playing in beautiful clean running water; but if so I have not found it. Whenever I feel dull, or when inclined to feel overburdened with care, nothing rests me like going out and looking at these young ducklings in their play. By the way, are there any of God's creatures as joyous and full of fun, and as happy, as a lot of ducklings? Just now I have a Leghorn hen leading about a flock of twenty-nine taken out of an incubator. They are just three days old to-day, and I wish the readers of GLEANINGS could get a glimpse of those twenty-nine ducklings as they rejoice and give thanks to God for the little lives he has given them—at least so I understand it when they flop their wings and start off full of exhilaration and thanksgiving for life. Just after dinner to-day, when I had first put them out on the grassy plot where they stay, and where they had been playing in the dropping water, the sun came out, and all at once they started on a sort of jubilee. I called it their Indian war-dance, and called Mrs. Root in a hurry to come out and see them perform.

If you have ground on your premises that you find higher than your dwellings, of course you can have this water piped into the house. In this case you would, of course, be careful to have your tile laid in ground that is not near to the barn or stables or other outbuildings. None but those who have tried it can realize what a blessing it is to have a stream of water running right into the kitchen. Even if it does cost some money, how can the money be better invested? If you have a sufficient stream or vein of water, even if it should be lower than your dwelling, by use of a hydraulic ram you can even then have a



stream of water running into your dwelling and to your barn and stable. Even a small stream, where it runs continuously day and night, week in and week out, will afford quite a quantity of water, as you can readily determine by figuring it up. The diagram will give a pretty clear idea of our spring.

Our older readers may remember that the fourth chapter of John is the one that I learned to read in Spanish when I was on the island of Cuba. Ever since that time this chapter has had a special attraction to me; and when I saw that beautiful stream of pure water running into that tank, and overflowing, giving life and enjoyment to my ducks, I kept thinking of this passage, especially of the living water. Just now in our nation there are a great number of people who are interested in the matter of drink. There are those who drink that which destroys both body and soul; and, worse still, who are engaged in manufacturing and recommending it, and demanding laws so that they can furnish it to their fellow-men. Do you think those who are interested in this sort of drink are the ones who are going to inherit eternal life, as mentioned in our text? What is to be the outcome of the great inventions and discoveries that are now coming so thick and fast? We have wireless telegraphy, the dictaphone (that I am using now while I am talking to you), the flying-machine that the Wright brothers are still pushing further and further, that is to be the great excitement of the whole wide world in just a few weeks more, and other discoveries that are coming thick and fast. The question naturally arises, "What about the future, and what is coming next?" Those of you who are getting old, like myself—say those who have passed the period of threescore years and ten, I wonder how many of you are thinking of what will be going on in this world of ours after we are dead and gone. Shall we know of earthly things after we have passed this brief stage of life? Our text tells us that we shall. But does it seem likely that those who are spending their lives for self and selfish purposes, with no thought of the future, with no thought about humanity, nor care nor regard for God or his creatures, shall inherit eternal life, and know what is going on, and what the outcome shall be of this world of ours? What did the dear Savior mean when he said, "The water that I shall give shall be a well of water springing up into eternal life," or into everlasting life? What shall we do, as the woman said, to have this water that we thirst not?

"Living water," as I understand it, is accepting Christ Jesus as our Lord and Savior, obeying his commands, and following in his footsteps so far as we can. If we commence to study his life here on earth, and the words that he spoke, we shall very soon have it plain before us what it is to be a follower of the Lord Jesus Christ. Thus there is the promise that they shall have eternal life, and this spring of water that is to be given by this one who has decided to be a

follower of Christ is like the little spring I have been telling you about—the little stream of pure clear water that runs on day and night, week in and week out, for ever and for ever. This stream given by any Christian or follower of Christ is to be a life devoted to the benefit of its fellow-men in lending a helping hand, even as Christ Jesus himself lends a helping hand to bless and help and alleviate the ills of humanity.

Pure water is life and health, not only to humanity but to every living thing. I have spoken before of the duck. Perhaps no other animal cares for water, or wants it so constantly, as the little ducks. Water seems almost to them like air. They must have it always before them. They want it pure and fresh and sweet. They can not take their food without having constant access to water. Just to-day we have been moving the pen of little ducks so that they can go into the canal I have already spoken of, and enjoy themselves in the running water. They are separated by a fence from the matured ducks, because it would not do to let them get together. The feedpan is arranged close to the water so that, when they come to drink, they can take a bite at their feed. In order to do their best, I manage to have their feed close to them so they can help themselves whenever they feel prompted by hunger.

Now, this spring of living water that is promised to Christians is always constantly by you. It is not only an unceasing stream, but the amount is without limit. There is no limit to the work one may do to help his fellow-man if he is prompted by the love of Christ Jesus in his heart. And to such, and such only, is promised everlasting life. This spring of living water is to humanity what the running water is to the little ducks. It is, in fact, life itself.

Let me illustrate what I have been telling you by a little sketch of the last few days. I have mentioned the wicked boys who have been taking my ducks one after another on God's holy sabbath day, until I almost felt compelled to give up my plan of growing ducks in the water. However, after the boys were arrested, and one of them put in jail, I thought my troubles were over; but one morning, after a beautiful moonlight night, one of the older ones, fully half grown, was missing. Besides that, three more were gone out of the next size that came out of the incubator. Perhaps no one but those who have lost poultry in this way can understand the feeling of sadness that comes when, day after day, more poultry is missing. Of course, it is not the loss of the fowls altogether, but the knowledge that vicious and wicked people are becoming encouraged. It is probably boys or young men who are engaged in this kind of pilfering; and if the matter is allowed to go on unrebuked or unpunished it is encouraging a school of crime. Well, each time I lost any ducks I had a feeling of sadness or discouragement that took several days to wear off. This last time, when four were taken in one single night, I felt not only that I must give it up, but that I was losing faith in the character of the good people in our neighborhood, and (I fear) to some extent losing faith in humanity. Of course, I prayed over the matter; in fact, I prayed more earnestly than I had for some time in regard to it. Finally I went off by myself and asked the dear Savior to give me peace of mind, and happiness and enjoyment, notwithstanding these discouragements, and begged for wisdom and understanding in taking care of the matter. Then I went on about my work, and finally succeeded in forgetting for the time being all about my troubles. All at once, when I was not thinking about it at all, and the matter had passed from my mind, a still small voice seemed to speak to me, almost as plain as words, "Lay not up for yourselves treasures on earth, where moth and rust doth corrupt, and where thieves break through and steal." Then it dawned on me that I had been giving too much thought, and making my happiness too much dependent upon the things of this world. I thank the Lord for this recent answer to my prayer; and, a little after, in talking with my neighbor, our good friend Mr. Rood, about it, he said he felt certain that no boys nor anybody else disturbed my ducks. After asking several questions about it he decided that some of the Florida owls that are out, especially during bright moonlight nights, were to blame. He was all the more sure of this when I told him that it was the first time I had let the smaller flock of ducks stay outdoors over night during the very warm weather we had. The older ones, that are fully half grown, had been outside some time. I asked him if it was possible an owl could take a duck as large as a good-sized chicken. He said there was no question about it. After shutting up all the young ducks we have had no more losses of this kind. My good friend Mr. Abbott also told me that whenever they had very bright moonlight nights (and I believe that here in Florida we have a brighter moonlight than anywhere else I have ever been) they were almost sure to hear a commotion among his poultry. Mrs. Root reminds me that there was a loud cackling among our chickens that same night. I didn't hear them as she did, on account of my deafness. Of course, the answer to my prayer did not bring back my ducks nor the pay for them, but it brought a feeling of relief to find it was pretty certain that it was owls and not the dear boys who "are of more value than many sparrows."

The *Sunday School Times*, in a recent editorial, said that we as Christians may thank God for difficulties, especially the difficulties that send us to the Lord in prayer. I must confess that much of my praying and most of my most earnest prayers are generally at the time when I get into trouble.

Now, this living water that Jesus furnishes to his followers is always on hand. It is always running, and it is always ready for our wants. He is always ready to hear our

prayers, and listens to our troubles and gives us relief, and relief in a way that will benefit and bless our fellow-men and not do them harm.

I have recently been reading in the papers the contest we are having in Ohio in regard to the liquor business. I have been amazed to see the way in which the daily papers treat the matter. I have such papers from different parts of our nation in our Southern home, and I am interested in noting the way in which they make reports. A great part of them seem to report the progress of temperance and intemperance as they would report the progress of the different political parties. Let us look at it a minute. The Anti-saloon League, in which I am and always will be interested, works for the good of humanity in spending its money and its means in benefiting and lending a helping hand to children and mothers, and all who need that kind of help. The competing parties in the contest are the liquor men, who have no interest at stake except the interest of making money—nothing to urge in the way of an uplift to humanity. The strongest argument they can bring to bear is that, if the liquor traffic is outlawed, hundreds and perhaps thousands will be thrown out of employment—that is, employment in the breweries and the distilleries. In view of all this I am positively amazed to think that so many counties in Ohio have, after having tried prohibition for a term of two or three years, gone back and voted the county "wet." It seems incredible that it can be a fair and honest vote. It could not be if the wives and mothers had a hand in deciding the matter. May God grant that they will soon have a hand. What for? That "whosoever drinketh of the water that I shall give him shall never thirst."

The *Chicago Advance* recently had an editorial in regard to melancholia*, and they seemed to treat it as one of the unpreventable and incurable diseases. I was surprised that they did not suggest that the one afflicted with melancholia should get busy (to use the slang expression) in working for humanity and spreading the Gospel of Jesus Christ in furnishing to humanity its living water that always refreshes and benefits and that does no harm. They ended their editorial by recommending that the best relief for melancholia is to get busy and keep busy, and this I can most heartily endorse. The past winter has been one of the busiest I ever passed in my life. During the past few days it seemed as though I had not a single minute, and sometimes hardly a second, to spare or to waste.

* My good friend, it is *sin* to indulge in melancholia—a grievous sin. It is an insult to the great loving Father who gave you a human life to live. He who drinks of that "life-giving fountain" mentioned in our text will find himself too busy in passing it on to a famishing and thirsting world to have time for such thoughts. It is the outcome of selfish indolence. I know, for I have *been there*. Say, "Get thee behind me, Satan," and then "get busy." Melancholia is the "stepping-stone" to the terrible "suicide mania."

SWEET CLOVER, AN UP-TO-DATE REPORT.

A field of forty acres on our Kentucky farm has been sown to sweet clover, the past season being the second after sowing. During the blossoming period, which lasted from the middle of June until the middle of August, the field was covered with honeybees.

Sweet clover is a legume. Practically the same bacteria live on its roots that live on the plant-roots of alfalfa. Some people will say alfalfa is so much better than sweet clover, why not plant it? How do they know if they have never planted sweet clover? We first used sweet clover as an inoculator for alfalfa. The bacteria developed much faster in the soil sown to sweet clover than that sown to alfalfa. I have noticed that the plants of sweet clover do not depend on artificial inoculation or fertilization as does the alfalfa-plant. Another advantage is that seeding may be later. The seeding of sweet clover may occur with us any time after the first of October up until the first of December. We have the entire season for the maturing of other crops before having to remove them for preparing the land for seeding.

MAKING SWEET CLOVER GROW.

On land where the following crops are grown—corn, tobacco, potatoes, or tomatoes—all that is required in preparing the soil for seeding is a deep disking with a sharp disk harrow, and a complete working with the float or plank drag. This levels and firms the soil without making it too compact; and when the seed is sown and lightly harrowed in with a sharp-toothed drag harrow that leaves small ridges and furrows, the soil crumbles around the small plants during the winter and early spring, which starts them off before other vegetation has made its appearance.

To sow as a soil-restorer, on old fields that are badly gullied, there is no preparation required. The seed is sown broadcast, about 25 pounds per acre, any time during the fall, winter, or spring.

The seed of sweet clover should be sown thinly on old and tired fields, then the stalks will be large and branching, bearing much seed and quickly reseeding the field. The brushy stalks may be cut and placed in the small washes, which they stop by catching the silt and small trash that would otherwise be washed away and lost.

A description of the sweet-clover roots will show that they are a high-class fertilizer. Unlike the roots of other leguminous plants, those of sweet clover are somewhat fleshy and not fibrous. During the first year the roots reach far into the ground and draw up from considerable depth an abundance of plant-food, which they store up for the second year's growth. On the death of the plant, at the close of the second year, the fleshy roots decay more rapidly than the fibrous roots, and their nitrogen becomes more readily available for other crops.

PREPARES THE LAND FOR ALFALFA.

We think sweet clover is one of the finest things in use to prepare the land for alfalfa. Sow to sweet clover for one year; break the land, turning under the young growth the second spring about the first of May, and cultivate until ready to seed to alfalfa. The germs of bacteria will increase rapidly, and the soil will be filled so full that the alfalfa-plants will grow right off and make two or more cuttings the first year after sowing in the early fall. As a soiling crop, it is right up to the front. Combined with bluegrass, it makes one of the finest pastures known to stockmen. Unlike alfalfa, it improves by being pastured; yet again, like alfalfa, the stock have to become accustomed to it before they will eat it with a relish. But when once they have learned to eat it they prefer it to all other grasses.

As a pasture for hogs, the chief difficulty lies in the fact that the hogs want the roots as well as the tops. They eat the grass readily from the first, seeming to like its peculiar flavor, and are also fond of the hay, eating it more readily than that of red clover. One of its many good qualities is that cattle may be fed exclusively on sweet clover, and under the conditions most favorable to bloating without any danger from this trouble. The principle which gives it its bitter taste effectively prevents the fermentation that results in bloating.

I believe that every farmer who owns hill land not suitable for alfalfa should give sweet clover a trial. Then, after a few years, when sweet clover has made good, alfalfa will be the next in order.—*Farm and Fireside.* J. W. GRIFFIN.