Conducted by Professor Henry G. Bell

The object of this department is to place at the service of our farm readers the advice of an acknowledged authority on all subjects pertaining to soils and crops.

Address all questions to Professor Henry G. Bell, in care of The Wilson Publishing Company, Limited, Toronto, and answers will appear in this column in the order in which they are received. When writing kindly mention this paper. As space is limited it is advisable where immediate reply is necessary that a stamped and addressed envelope be enclosed with the question, when the answer will be mailed direct.

The Business of Farming.—I.

Farming is a composite business. It was once looked upon as the simplest of callings, and this it appeared to be when all that was necessary was to file a government claim for land, to sow the seed indifferently and to reap a bountiful harvest. However, the days of cheap land and virgin fertility are gone forever and the time is here when Canadian farming must become more and more intensive if farming as a business is to rank with other lines of manufacture.

There are various factors which operate from the outside and determine the success of the farmer's efforts. The man who most clearly visualizes these controlling factors and balances them in the order of their relative importance, is the man who makes best returns on his money. Some of the factors are business management, weather conditions, breeding, disease and insect control.

Canadian farmers are business men. According to the 1911 census, the farm investment in land, buildings and farm equipment in Canada totalled over 3½ billion dollars, while if we add to this the value of crops and live stock on the farm, it adds another billion of valuation. These farm valuations have increased enormously. In Ontario farming equipment totals over one hundred million dollars, while stock and crops approach a value of over four hundred million. Such an investment is large. If the Canadian farmer is to prove his success as a business man, he must look to the most effective use of capital. It is for this very reason that an increasing amount of study must be given to things fundamental to largest production.

Land is the basis of things agricultural. Ontario has become one of the most productive areas of the Dominion. Its soils are receiving more and more study, so that this productivity may be continued and increased. Now, soil is the product of disintegrating rock and decaying plant matter. The various soils are attributable to the intermittent action of the forces which have led to the breaking down of rock. For instance, the great northern part of Ontario is largely underlaid by rock of volcanic origin, in fact, rock of the very oldest formation, while that of the south and western half of the province is largely formed of rock which has been ground down by the action of wind and waves and deposited by the waters of the great lake that must have covered this area. Various rocks gave rise to soils of various types, which differ in chemical composition, size of soil kernel, color, weight, etc. The farmer classifies these rocks as sandy, clay, limestone loam, muck or peat. If sand is in evidence it is called sandy loam, on the other hand if clay predominates it is classified as clay loam. The important point is the size of the soil kernel. Dr. Hall, Secretary of the Board of Agriculture, said before the British Association in 1910, that he believed that, outside of the lime content of the soil, the size of the soil particles had more to do with the fertility of the soil than the actual composition of the particles. We shall see reasons for his statement as the work progresses.

Size of space between particles.

Sandy	32.49%
Loam	34.49%
Heavy loam	44.15%
Clay and loam	47.10%
Clay	48.00%
Fine clay	52.00%

The size of the soil space (which is the result of the size of the soil kernel,) determines the movement of water in the soil. Water is so important in farming because the plant cannot take up solid material, but must obtain all its nutriment (outside of carbon dioxide, which it takes in through the leaves.) in liquid form.

For germination the seed requires moisture, heat, and air. If any one of these factors is removed the seed will not germinate. Or in other words, if your soil is too dry, seeds which you plant will not germinate. If the soil is water-logged, and air is shut out, seeds will lie dormant in it. Until the soil heats up beyond 42 degrees F. the seeds of most farm crops will not begin growth. In order for the germinated seed to proceed with growth and reproduce, there must be added to the above, plant-food and sunlight. These are the fundamental requirements of crop growth, be it of flowers, fruit, grain roots or other crops.

As we said, water is all-important. It serves in plant growth in five ways:

Function of soil water.

1. To supply the living plant with hydrogen and oxygen.
2. To convey plantfood from soil to plant.
3. To regulate temperature conditions of the soil.
4. To carry off excretions from plant life.
5. To give turgidity to plant cells.

The amount of water required by crops is fairly constant. Various investigators differ slightly in figures they obtain. The average of several investigations are as follows:—

Amount of water required by crops.

One acre 40 trees gives off approximately 600 tons water in one season.

One acre grass probably gives off 500 to 700 tons water.

Water given off per pound of dry matter.

	Average.
Wheat	292 lbs.
Barley	435 lbs.
Oats	541 lbs.
Corn	252 lbs.
Clover	344 lbs.
Beans	238 lbs.
Peas	384 lbs.
Potatoes	423 lbs.

The water in the soil rises from the permanently damp soil by clinging from particle to particle of soil, rising through the spaces that we noted when we spoke of the size of the soil kernel. This water which rises from the water table or the permanently damp area of the soil, is the water which carried the dissolved plantfood. It does not entirely fill the space, but allows of considerable circulation of air.

Water is stored up in the soil by deep fall plowing and the addition of plant matter, such as second crop clover, grass, grain stubble, etc. When the soil is deeply stirred in the autumn it is in shape to catch and hold a maximum of autumn, winter and spring rain and snow. In view of the great amount of water which is required by growing crops it is very important that the practical farmer should give careful attention to conservation of soil waters.

The breaking of the soil surface by plowing, disking or harrowing, prevents the rise of moisture to the surface of the soil and the waste of valuable soil moisture. Sometimes soils are too open, hence some treatment that will compact the soil and press together its particles is desirable. This is accomplished by rolling. As a rule, rolling of the soil should not be done, especially on clay when the soil is wet. When a field is rolled in most cases the rolling should be followed by a light harrowing, so as to stir the immediate surface and prevent the escape of moisture.

(To be continued.)

Seven years ago I started with four single comb White Leghorn pullets and a cockerel. At different times since then I have sent to reliable breeders for stock and eggs, getting more interested all the time. Finally I decided to trapnest, which to my mind is the only way. I trapnested a pen of forty, and all but four of them went over 150 eggs each, eighteen reached the 200 mark, one laid 269, another 246. I shall not keep any for breeding that do not lay at least 200 eggs.

My stock is kept in a house 10 x 12 feet, made of clapboard siding, painted white. The inside of the house is covered with paper and sheathed with matched pine. In one end is a window 2 x 3 feet, and there are two openings in front 3 x 4 feet, covered with wire mesh and cloth curtains, the latter to be let down at night or on stormy days. It has double doors, a floor which is also double, with paper between, and this makes a very warm house. My birds never freeze their combs, although the temperature falls as low as 25 degrees below at times.

I use shavings and straw for litter, which is cleaned out as soon as it gets dirty. The droppings are cleaned every morning. I have found that cleanliness pays.

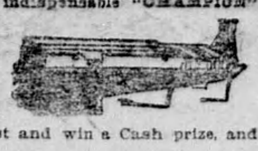
I scatter cracked corn, wheat, oats, or a good commercial scratch feed in the litter at night, enough for their supper and breakfast, so that as soon as the birds are off the roost in the morning they have something to keep them busy. About 8.30 o'clock they are fed sprouted oats, all that they will clean up in about ten minutes; at 11.30 a wet mash, consisting of meal, wheat bran, beef scrap and a little charcoal and salt. I keep dry mash, oyster-shell, beef scrap and grit before them all the time.

The drinking fountains are washed every day and the water changed twice a day.

One man with three large draft horses can do as much farm work as two men with four small horses. All of our improved machinery requires an even, steady draft to perform its best work, and light horses cannot perform the work with ease and promptness, no matter how faithful they may be.

Don't Lose Sight

Of our remarkable $1,000.00 Maple Syrup and Sugar prize competition previously announced. This is open to all users of our indispensable "CHAMPION" EVAPORATOR. Cash prizes to the value of $600.00 will be awarded in the Syrup contest and $400.00 in the Sugar. Entries can be made in either or both classes. Full particulars to be had by writing for one of our special "Prize Competition Circulars."



This contest should powerfully appeal to non-users of our "Champion" machine—the one Evaporator giving 100% results. Why delay your purchase any longer? Buy now, enter the contest and win a Cash prize, and thus reduce cost of the machine.

The Grimm Manufacturing Company, 58 Wellington St., Montreal, Que.

What Little Bear Saw on Candlemas Day.

Early on Candlemas Day, as the round, red sun rose to shine on the snowy world, the Ground Hog went for a walk in the ancient forest. He walked along slowly until he reached the cave where the Three Bears and Cousin Blackberry Bear were sleeping.

"I think I'll peep in," said the old Ground Hog to his shadow. He knew his shadow was trailing along with him because by that time the sun was shining bright. He probably knew, too, that it is down in the books that, if the sun shines on Candlemas Day, there will be six weeks more of winter.

"I must step softly," said the old Ground Hog, "lest I waken my friends too soon!"

So the old Ground Hog stepped softly, peeped into the save and listened. Huge Father Bear was sound asleep and snoring loud Father-Bear snores that sounded like Ker-r, ko! k-kerr, ko! Mother Bear was asleep and snoring loud Middle-Sized-Bear snores that sounded like Furr, purr! Fur-r, purr! Little Bear was asleep, too, but he was not snoring; he was breathing soft Little-Bear breaths that sounded like Wee, hum! Wee, hum! Wee, hum!

The old Ground Hog smiled and backed his shadow away from the cave, and because he was walking backward he stepped on a twig. The twig broke with a loud crack, and straightway Little Bear woke, sat up in bed and rubbed his eyes. He was glad that he had wakened in the winter; he knew it was winter because it was so cold and still. He longed to pull Blackberry Bear's nose, but he was afraid that Blackberry might make a noise that would waken Mother Bear; and she would say, "Little Bear, go to sleep!"

Out of bed crept Little Bear softly, wrapped himself in a blanket and went out to play with the children; but there were no children in sight. The ancient forest looked white and strange. Huge pine boughs were weighed down with snow, icicles hung, crystal clear, outside the cave, and it with bitterly cold. Little Bear walked on, looking at the trees and shaking the snow from his feet as he stepped. He felt as if he were in a world that he had never seen before; and suddenly he was lonely, so lonely that he decided to return to the cave.

As he turned he looked down for the first time, and there saw something black just behind him that moved when he moved. Little Bear was so frightened that he began to run. He looked over his shoulder and saw that the black thing was running, too, and so he ran faster than ever until he heard the friendly voice of the old Ground Hog calling:

"Little Bear, that's your shadow! You silly creature, that is your shadow!"

But Little Bear did not stop running until he reached the entrance to his cave; then he turned round and looked. Sure enough, the black thing was nothing but his shadow!

Little Bear laughed at himself for a silly fellow, but he was so cold and shivery that he was glad to cuddle down in his bed again and to think about his adventure. And as he was thinking and smiling and smiling and thinking he fell asleep, and had another nap that was six weeks along—Wee, hum! Wee, hum! Wee, hum!

INTERNATIONAL LESSON
FEBRUARY 16.

Lesson VII.—The Ten Commandments —Exodus 20: 1-17. Golden Text, Luke 10: 27.

1. "And God Spake." God speaks with the voices of nature (Psalms 19 and 29), and through the lips of His servants (Jerem. 15: 19). What Moses spoke and wrote, in making Israel's laws, is described as spoken or written by God. See again 18: 15-16 and 31: 18, and compare Heb. 1: 1 and II Peter 1: 21.

2. "I Am The Lord Thy God," In the original Hebrew the words are "Jehovah thy God." Compare Deut. 5: 6, and, verse by verse, the Ten Commandments as they are repeated in that chapter. This was the fundamental fact for Israel as it is for us. God is the fountain head of all law and all justice. Apart from our faith in Him and obedience to Him, no law would have permanent or binding value. The so-called "law of humanity" has its supreme sanction and authority in Him.

3. The First Commandment requires that Israel shall worship Jehovah alone. "Thou shalt have none other gods." Other nations about them had, some one, some many, gods. Israel must have but one. This law is the forerunner, and ultimately becomes the law, of Israel's pure monotheism. Of the same sort, in Deut. 6: 4, 5, is the command, "Hear, O Israel; the Lord our God is one Lord; and thou shalt love the Lord thy God with all thine heart, and with all thy soul, and with all thy might." Compare Exod. 23: 13; 34: 14; Deut. 6: 14; 7: 4; 8: 19-20, and many other passages.

4-6. The Second Commandment is against idolatry, or the worship of images. The "graven image" was made of carved wood, sometimes overlaid with sheets of brass or gold, or of stone. Among the images of deity, or sacred figures, of those days, in Egypt, Canaan, Babylon, and elsewhere, were representations of the sun, moon and stars, statues of men and beasts and fishes. All these are forbidden to Israel.

"A jealous God." The reason given for the observance of this law is that Jehovah will have no rival in the love of His people. He will not share that love with another god.

The law puts emphasis upon the just judgment of God, who has so ordained the course of human life that children are involved in and suffer the penalty of the guilt of their fathers, and that the rewards and benefits of goodness reach out to "thousands," flowing from the lives of those who love God and keep His Commandments.

7. The Third Commandment enjoins reverence and sincerity in using the name of God. It is not swearing that is forbidden, but taking God's name "in vain," that is frivolously, falsely, or insincerely. Compare Psalm 24: 4. The commandment is not broken when, in a matter of serious importance, as before judge or jury, one takes God to witness by an oath that he speaks or will speak the truth. Yet the ideal of speech is that enjoined by our Lord Jesus Christ, which requires that a man's simple word shall be good in every case, as good as, and so making unnecessary, his Oath (Matt. 5: 33-37).

8-11. The law of the Sabbath gives preminence to this feature of ancient Hebrew worship over every other form or custom of that worship. There were other holy days, but this day was to have highest importance. The reason given for its observance here is drawn from the story of the creation of the world in Gen. 1: 1-2; 3, but in Deut. 5: 14-15 it is the simple human reason "that thy manservant and thy maidservant may rest as well as thou." It will always be found by those who think deeply that the divine and human reasons are not out of harmony. The reference here to God's work of creation points to the profound truth, that rest, as well as labor, is a law of God's universe.

12-17. Honor to parents, the sacredness of human life and of marriage, and the rights of property, are enjoined in the Fifth, Sixth, Seventh and Eighth Commandments. The ninth forbids false witness, and the tenth covetousness.

The Food Board Says

Chairman Thomson of the Canada Food Board is calling for the greatest possible production of maple sugar and maple syrup this coming spring. Farmers with maple groves might well prepare to tap an unusual number of trees. In the opinion of those in the export business there will be a profitable market for maple syrup and maple sugar. Indication also points to a favorable season as the winter has been mild and there is plenty of moisture in the ground to insure a good run of sap.

Last year, although weather conditions were not favorable owing to the prolonged and steady cold and the lack of bright warm days until comparatively late in the season to start the sap running, the production of maple sugar and maple syrup showed a considerable increase over 1917. Customs Department figures show that the export of maple sugar was augmented by 26%, while the value of this export business showed an increase of 76% owing to higher prices received for the product. The United States is a good customer for our maple products, while England and France, when trade conditions are adjusted, will also prove good customers, as Canadian soldiers have introduced maple sugar into those countries and a taste for it has been inaugurated.

When it is considered that our net debt has increased by over a billion dollars since the war, or 300%, every dollar of export trade Canada can develop is needed. The re-adjustment of our finances and of our trade balances require the utmost utilization of our agricultural resources and the maple sugar and syrup crop, although comparatively small up to the present time, may be greatly increased if farmers realize the opportunity and make the effort.

Only a mother can lick 'em and love 'em at the same time.

Mothers and daughters of all ages are cordially invited to write to this department. Initials only will be published with each question and its answer as a means of identification, but full name and address must be given in each letter. Write on one side of paper only. Answers will be mailed direct if stamped and addressed envelope is enclosed.

Address all correspondence for this department to Mrs. Helen Law, 231 Woodbine Ave., Toronto.

Anxious Mother writes: "I am terror-stricken because my two girls, eleven and thirteen, already talk about 'when we leave the farm'. All my people have been farmers and all my husband's. How can I make my children like farming?"

We can never make anyone love anything, dear friend! If you and your husband show a genuine and enthusiastic love of farming, you have given your little girls the first best start toward following in your footsteps. Perhaps it will be best to say nothing before them indicating your fear. This may be but a passing childish idea. On the other hand, study carefully to have the children see the pleasure side as well as the work side of farm life. And teach them also to find the pleasure side in all work! Do you know this secret yourselves? If the farm has been in your family long, tell the little girls stories of the old days so that they may feel a vital tie between their young days and the days that are gone. Tie them fast, too, by making them feel it is their home and their farm. Give them each a little bank book and start them out with their own deposits. Get them into the Boys' and Girls' Agricultural Clubs. Give them a calf to raise or chickens or even a colt. And do not worry! Cultivate a happy confidence which will drive away your fears. Besides, if the little daughters should not stay with farming, they can still be useful, splendid women, can they not?

Dorothea:—If you will send a brief description of your farm, mentioning some of the outstanding features. I shall try to find a suitable name. Perhaps one of the following will prove to be just right: Valley Farm, Wheatland, Fertile Acres, Homestead Pride, Mount Hope, Golden Harvest Dairy Farm, Green Meadows, Running Brook, Heart's Delight, Plum Grove, Maplerow, Sunny Slope, Cedar Lawn, Hillandale, Fairview, Elmhurst.

R. G. asks for a recipe for trying out beef tallow to use for shortening.

Beef suet should be cut in small pieces and tried out like leaf lard. It is better if cooked in a double boiler with about a pint of water added while cooking. When all the fat is cooked out, pour off into a crock, allow it to cool, then pierce the fat which has hardened on top and pour off the water. Suet should be softened if it is to be used for shortening by adding either some lard or a small quantity of any of the corn oils or vegetable oils on the market. About one-fourth pound of leaf lard to every three-fourths pound of suet is a good proportion, and one cup of oil to every three of melted suet should give very good results.

Few farmers realize the importance of regularity in feeding and milking the dairy cow. They do not realize how easily disturbed the cow really is. It was called to my attention several years ago in this way; we were milking one afternoon when a strange dog chased one of our barn cats through the stable and under some of the cows. The cow that the writer was milking shut off her milk the moment the dog ran through the stable. The hired man remarked that the cow he was milking was holding up her milk. How did those cows do it? They certainly held up their milk, and did not give down again for some time after the dog had gone out. When the calf is taken away from the cow she will frequently hold up her milk. In these cases it is not an act of will but an unconscious effect upon the nervous system.

Several years ago the writer had a beautiful Jersey heifer which had recently calved and was doing finely. We were so pleased with her that we took her to the village for a family cow. One day she got out of the yard and wandered into a field of grain. Some boys set a dog onto her and it was two days before she came back to her milk. She was so excited and nervous that somehow unconsciously her muscles contracted in such a way that the milk would not run down.

This perhaps can be appreciated more readily when one understands the peculiar structure of the udder. Above the teat is a small milk cistern holding about half a pint, and above that are little canals or ducts, which divide and sub-divide, and at every division there is what is called sphincter muscles. The cow has a certain control over these muscles. When anything occurs out of the ordinary she closes those muscles and shuts off her milk—not all of it but some of it. Now, when we abuse a cow, or fail to feed, or fail to milk her, or in any way disturb her nervous condition, it does something to her which causes her to unconsciously hold up her milk or a part of it. And that is the reason for kindness and care and regularity in the care and management of cows.

THE TRAPPER.

Two Good Methods of Trapping Muskrat.

At the foot of slides or runs is generally the best place to take muskrat. Traps should be placed in shallow water and the bait hung about five inches above the trap. A weed or piece of brush on which is placed a few drops of the best muskrat bait will do; it should be fastened securely so that it will not float away on the current. A sheltered place is the best for setting the trap; if this cannot be found, a break of wood or stones should be made in order to protect the trap and bait.

Another method which many trappers have found to be very successful is to build a mound of mud and stones in shallow water, set the trap at the bottom of the mound under the water, and then sprinkle a few drops of selected muskrat bait on top of the mound. The mound should always be a little above the water in order that the bait will remain on it. The trap should be staked firmly in deep water so that the muskrat will drown itself in its struggle to get away after being caught.

Muskrat should be cased pelt side out and all superfluous meat and fat scraped off thoroughly before shipping. The tail should be cut off as it is absolutely worthless, and needlessly adds to the shipping weight. Skins should be dried in a cool, shady place, not exposed to the sun. When the skin is dry enough to hold its shape it is ready to ship.

The droppings from the cattle will benefit the pasture more if they are spread or broken up with a spike-tooth harrow with the teeth set well aslant. This prevents the grass from being killed out and weeds coming in where the droppings have lain.

The Highest Price

SHIP ALL YOUR **RAW FURS** to us, no matter what quantity. We pay the highest price, also express charges.

Try once and you are assured of satisfaction.

ABBEY FUR COMPANY
310 St. Paul W. Montreal, P.Q.

Reference: Bank of Hochelaga, St. Henry.
In business for 30 years.

Send your

RAW FURS

TO

A. J. Alexander FURS
428 St. Paul St. West MONTREAL

Being manufacturers and not buying to re-sell we always assure the fairest grading and the highest market prices. Quick returns!

No price list issued but we guarantee to hold your skins separate until you accept or reject our offer. 60

Use **Harab-Davies Fertilizers For Profit**

Write for Free Bulletin

Ontario Fertilizers Limited
Toronto