Canada's Young Farmers and Future Leaders.

Estimating the Farmer's Business.

A few days ago we were on our way to a pure-bred stock sale and overheard four farmers discussing the farm surveys which are being conducted by the Ontario Department of Agriculture. One man said, 'I haven't seen those government fellows around our part of the country lately; I guess they must have given it up for a bad job." The next man said, "perhaps there were too many like myself, couldn't give them a very good idea about a lot of things they wanted to know. I heard that they had moved to Quebec some place, when they didn't make it go very well here in Ontario."

"John Smith's boy was home the other day, I guess he's got a pretty soft job. He's on this farm survey work too, and draws big wages. From what I hear, they get out about 9 o'clock in the morning and quit about four o'clock in the afternoon with a couple of hours off for dinner."

"Oh well," the third man said, "I suppose they have to stop early and figure out what they have done during the day. I heard the man in charge, from the College at Guelph, talking about the results from the survey in Peel County last fall, and about all they had found out was that it paid better to run a big farm than a small one. We knew that before, but I suppose the Government has to find some way to spend money and I guess that is as good a way as any other."

Last fall when the Caledon township survey was being conducted in Peel County, it was our privilege to spend a day with those who were taking the records, in order to see how it was done. Some men didn't see the good of the survey any more than the men quoted above and one man said "Well, I'm pretty busy digging potatoes and, anyway, I don't see why I should take two hours or more of my time to tell somebody else all about my business. I don't see how I'm going to get anything out of it; I just wish I could use all the education I've got. If you want my opinion of the whole business, I think its just a scheme of the council to raise our taxes. They may not do it next year but they will do it just the same."

Fortunately, most of the farmers appreciate the purpose of the surveys that are being undertaken even though they have not taken the time to study out the many ways whereby they themselves may be benefited by a careful analysis of the information secured regarding the agriculture of their own community. It is not the purpose of this article to discuss the importance of these surveys, although it does appear to us that there are two very great benefits to be derived from them, either one of which would of itself warrant the expenditure of time and money entailed. In the first place, the advantage of direct value to the farmer lies in the fact that he can, after the results are published and he has received a report on his own farm, check up his farming methods with the average for the community. He can tell whether he has farmed as good as, or better than the average and if he has failed any place, it should not be difficult to find out just where he fell down. The advantage of knowing this pretty accurately and of knowing also what crops or types of farming have proven most profitable in his own township or section, can scarcely be measured in dollars and cents, but anyone who is progressive cannot fail to appreciate the value of the survey, especially after sufficient data has accumulated to make the figures absolutely reliable. In the second place many wrong impressions prevail among those who are not farming regarding the profits that farmers make. Like sin and the devil, these impressions are always operating against us. Only figures can combat them. "Figures can't lie but liars can figure" is an old saying and to prevent liars from figuring wrongly and to secure figures that really will not tell a lie, they must be gathered from the farms. No good would come from publishing profits from John Brown's farm, but if his profits are averaged with hundreds of others, the evidence cannot be disputed and critics must be silenced or made to appear ridiculous. Not long ago a man, who should have known better, said to us that farmers were getting rich out of the war and that they were the greatest "cold storage" manipulators in the country. This was a little too much for us so we quoted a few yards of figures from the Caledon Survey. The figures were correct and could not be disputed, so this gentleman was obliged to acknowledge a wrong impression.

It is more justifiable to wonder how estimates of crop yields and cash returns can afford a safe guide to the actual profits in farming. Certainly the estimates of a few men would not prove reliable, but the estimates of a few are not depended upon in these surveys. It has been found that where sufficient numbers of estimates are taken, the law of averages comes into operation and the figures of farmers who overestimate are nearly balanced by those who underestimate; so that the result is correct for all practical purposes, provided that those who take the records, check up a man's statements so far as possible and discard those records where inaccuracy is detected. Perhaps the following extract from a bulletin by Spillman of the U. S. Department of Agriculture, referring to a survey in which the reliability of farmers' estimates was checked up, may be of interest:

"Among the several hundred farms included in the survey were 135 that sold milk to creameries. Each of these farmers was asked to give as accurate an estimate as possible of the amount of money he had received for this milk. After the survey was partially finished it occurred to the investigator that it would be possible to secure a check upon the accuracy of these estimates by obtaining the actual figures from the creameries themselves. It was decided also to test in a similar manner the farmers' estimates of the quantity of milk each had sold to the creamery. The estimates as to quantity of milk sold were then obtained from the 79 farms visited after the decision had been reached to make this test. The farmers did not as a rule weigh their own milk and were not as accustomed to dealing with weights as they were with money; it was to be expected, therefore, that the estimates of quantity of milk sold would be less accurate than those of money received, and this was the case, as will be shown below. After obtaining the estimates from the farmers, the actual figures, both for weights of milk sold and for money received, were secured from the creameries that had purchased the milk.

Estimated pounds of milk sold (79 farms)	3,518,816
Actual pounds of milk sold (79 farms)	3,487,320
Difference	31,496
Estimated value of milk sold (135 farms)	$106,163.00
Actual value of milk sold (135 farms)	106,155.50
Difference	$7.50

"It is seen that the error in the quantity of milk sold is a little less than 1 per cent. of the whole. At the same time the individual estimates of pounds of milk sold were in error by amounts ranging from 40 per cent. above to 36 per cent. below the correct figures. In the total these errors tended to counterbalance each other so that the sum of the estimates was quite accurate. In the estimates of money, in terms of which the farmer is accustomed to reckon, the error in the total is less than one-hundredredth of one per cent. These instances will serve to show something of the measure of accuracy attainable in the results of the farm management surveys."

Automobiles, Farm Machinery and Farm Motors.

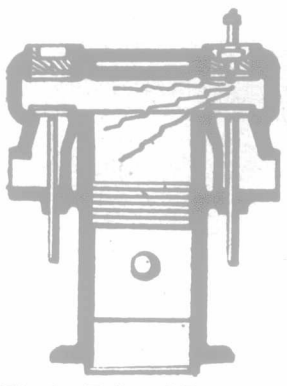

Fig.1—T-head Engine.

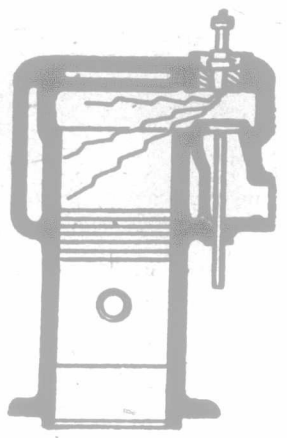

Fig.2—L-head Engine.

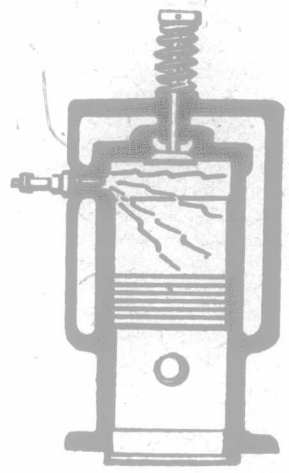

Fig.3—Valve-in-head Engine.

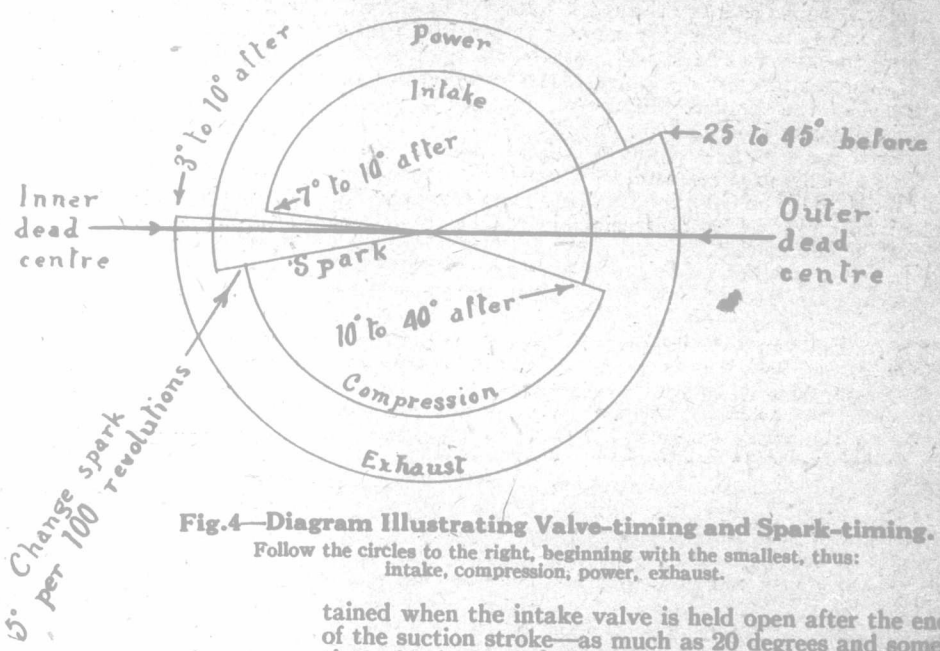

Fig.4—Diagram Illustrating Valve-timing and Spark-timing.
Follow the circles to the right, beginning with the smallest, thus: intake, compression, power, exhaust.

Valve Action.

BY PROF. W. H. DAY.

In the four-cycle engine let us study the cycle, or rather its production, a little more closely. Some intake valves open by suction, as has already been mentioned. It is evident that in such cases the valve cannot open until the piston moving outward has created sufficient suction to overcome the spring that holds the valve shut—the stronger the spring the later the valve will open, and the weaker the spring, the earlier. The inrushing mixture restores the pressure in the cylinder thus reducing the suction, consequently, the valve closes before outer dead centre, just as soon indeed as the suction again drops down to equal the strength of the spring, but the action is the reverse of the former, i. e., the stronger the spring the earlier the valve closes, and the weaker the spring the later. In engines of large bore and low speed, especially of the hit-and-miss type, the automatic intake has been found to give fairly good results, but for high speed engines it is not so satisfactory, because the valve action is sluggish and besides the strength of the spring lessens with age, thus deranging the timing of the valve. Moreover it is found that better results are obtained if the intake valve is held open until after the piston passes outer dead centre. Consequently in high speed engines the intake valve is operated by a cam. So also is the exhaust valve in all cases, whether the engine be of low or high speed.

The method of operating the valves depends upon the type of head used. If it be a T-head, as shown in figure 1, the intake valve is on one side of the cyclinder, and the exhaust valve on the opposite, and it requires two cam shafts, one for each. Also note the valves open upward being operated by push-rods as the cams come round. In the L-head, figure 2, both cams are placed on the same side of the cyclinder, and both cams are placed on the same shaft. Here also the valves open upward. But in the valve-in-head type, figure 3, the valves must of necessity open downward, hence the push rod must be attached to a "rocking arm" which presses downward on the valve stem when the cam moves the push rod upward.

Valve Timing.

When the valves are mechanically operated the mechanism may be so adjusted as to open and close them at such times as will give greatest efficiency. Since the fuel is taken in by suction there would be no advantage in opening the intake before the beginning of the suction stroke. As a matter of fact it is usually opened from 7 to 10 degrees after inner dead centre, the exact amount depending upon the design of the particular engine in question. In a few cases, however, the intake valve really opens before the suction stroke begins, and as already intimated, best results are obtained when the intake valve is held open after the end of the suction stroke—as much as 20 degrees and sometimes 30 degrees past outer dead centre. Why better results? An automobile is going at high speed. The power is shut off and the car is carried forward a considerable distance by its own momentum, i.e., the force arising from its weight and speed. The same applies to the fuel mixture. The suction sets the air moving rapidly through the carburetor carrying fuel with it, and when the suction is shut off the momentum of the mixture keeps it still flowing into the cylinder. The result is that each charge of fuel mixture is larger than it otherwise would have been, hence the engine develops more horse-power, simply because the intake valve is held open by the cam and push rod.

Let us turn now to the exhaust valve. As already stated, it is opened before the end of the power stroke, thus allowing most of the burned gases to escape by their own expansive power, consequently there is little back pressure during the exhaust stroke—only a small portion of the gases remain to be driven out and the exhaust valve is wide open to permit their easy escape. And this valve also is held open a few degrees after dead centre, the momentum of the gases continuing to scavange the cylinder for a short time after the piston starts downward. Of course the exhaust valve must close before the intake again opens, except in a very few specially constructed engines.