modern library affords. Needless to say, the list of children's books is almost endless, but so long as they are clean, easily understood, uplifting in character, and at the same time a source of pleasure, the matter of selection should not be so difficult. Providing the children and youth with good, wholesome, educative and pleasurable reading material should, I think, do something even toward solving the question of rural depopulation.

In conclusion, may it be said that the library is no longer a luxury but a necessity. It is one of the best forms of investment and one which might well be a feature on every farm.

Wellington Co., Ont. W. J. LOWRIE.

A Rural School Stock Judging Contest.

The following unusual scheme of conducting a live-stock judging contest among the rural school children in connection with the school fairs was put into practice by the Agricultural Representative in Wentworth County last year. Mr. Marritt wrote us as follows giving information as to how the many school teams were coached. The accompanying illustration shows the team of boys that won the county competition from all of the schools in the six school fair districts.

"In six of the school fair districts of the county, we conducted last year stock judging contests for the pupils. In the spring, announcements were sent to each school announcing the contest. Each school was required to appoint a coach who would train and choose the team which would represent the school. The coach was required to give his team at least two lessons in judging before the team could enter the contest. The coaches who were appointed were either college men, junior farmers or stockmen. The junior farmers took a great interest in the contest and spent considerable time in training their teams. Two classes were judged,—dairy cows and beef calves. The dairy cows, in three cases, were brought to the school fair by the stockmen. In the other three fairs, we went a short distance to the farmers and judged the cattle at the farms. The classes of beef were secured from the calves which were shown at the fairs. At four of the fairs, I used junior farmers as judges, who marked the cards and totalled the scores. At one of the other fairs an Agricultural Representative from an adjoining county judged the classes and marked the cards. At the last fair, I marked the cards. The work done by the junior farmers was satisfactory to everyone as I used the boys in adjoining counties.

"A cup was given to the team in each district which made the highest score. This cup was donated at five fairs by the junior farmers' association in each district. The cup must be won three years before it can become the property of any one club. Individual prizes were given to the boys who won the highest scores. The following are the number of schools in each school fair district, the number of teams entered and the number of coaches:

	Schools in district	No. of coaches	No. of teams	No. of boys
Binbrook	9	3	1	6
Mount Hope	10	6	6	19
Anscaster	11	12	12	36
Beverly	12	3	2	7
Freelton	7	6	6	18
Greensville	8	5	5	17
	60	35	32	103

"We consider this work most important and expect to develop it to a greater extent next year. The coaches were the backbone of the work. The Junior Farmers took a great interest in their teams and took them around to the different fairs.

AUTOMOBILES, FARM MACHINERY AND FARM MOTORS.

Concrete That is Waterproof.

The use of concrete on the farm is so general and so widely adapted for different purposes that it is well for the average farmer to have a good understanding of how to prepare it for use. This is especially true in connection with the waterproofing of concrete, because it is used so frequently for foundation walls, cisterns, tanks, water troughs, etc. The following notes should therefore be instructive, and are reproduced from the book entitled, "Practical Talks on Farm Engineering," by R. P. Clarkson.

Concrete needs no waterproofing if it is properly mixed and laid. Water leaks through because the mass is porous. If we consider the materials entering into concrete construction and the theory upon which the structure is based, this fact will become clear to us. Concrete contains cement, sand, and stone. The stone, if used alone, is extremely porous, for the spaces between the individual stones are quite marked. The theory is that the sand used goes to fill these spaces. Yet even then there are spaces between the sand grains and water will pass quite readily. These spaces, however, are filled with the cement, the particles of which are so very much smaller than the grains of sand. The cement particles do more than merely fill the spaces between the sand grains. They cover the individual grains and cement them together, embedding the stones within the whole mass.

It is apparent that if all the spaces are filled; water cannot leak through, while if the mass is filled with tiny pores not only will water pass through, but these pores or tubes will suck up or absorb water from the ground and from the mositure which condenses from the atmosphere. Such will be the case if the concrete is "poor" or "lean"—that is, if it does not contain the proper proportions of materials or the proper sizes of particles to enable the cement to thoroughly unite the ingredients. Cement is the costly part of the concrete and the temptation is to use as little of it as possible. This does not pay in building any foundation walls, cisterns, tanks, and such structures where it is necessary to prevent the flow of water through the walls. If the wall does leak, there are but two things to do in order to remedy the defect: Either the pores must be plugged up with some substance which is not porous to water, which is not dissolved by water, which may be easily and cheaply applied, and which will not chemically attack the concrete, or a separate layer of waterproof material must be laid against the surface of the concrete, using the concrete merely for its mechanical strength and trusting entirely to this auxiliary layer to repel water.

The Winning Team in the Wentworth County School Fair Live-stock Judging Competition.

It is perhaps obvious that in every case where it is possible to do so the waterproofing materials or layers should be applied to the concrete on the side next to the water. Unless this is done, the concrete will always contain water and the waterproofing will simply prevent the water from flowing out. Under these conditions neither the waterproofing nor the concrete is apt to give entirely satisfactory service. The construction of waterproof concrete needs carefulness and thorough workmanship, but when we consider the difficulty of making a real, lasting job of waterproofing, after a wall has commenced to leak, it will be seen that care in the mixing and laying is more than repaid. There are several good waterproofing proportions differing but slightly. The 1-2-4 mixture is most commonly used. This means one part of cement, two parts of sand, and four parts of gravel or broken stone. With these proportions, one bag of cement mixed with the proper amounts of sand and gravel will give a bulk of finished concrete measuring about four cubic feet.

Portland cement should be used for all work of this kind. It may be purchased ready for use in either bags or barrels, but the bags are far more convenient for handling. The sand and stone may be obtained anywhere. It is important, however, to have them clean, with no mud or sediment clinging to them or mixed with them. To be sure of this they may be piled on a sloping board platform and thoroughly drenched with water, turning them over several times in order to clean the bottom and interior layers. The sand must be coarse, or a mixture of coarse and fine for the most economical results. The total spaces between the particles of fine sand are more and the total surface of the sand particles which the cement must coat is greater with fine sand. Hence, the finer the sand the more cement must is used and the more expensive the concrete. Coarse sand, with a small amount of fine sand mixed in is desirable, for the fine sand fills up some of the spaces between the coarse particles and makes a more solid concrete. It will always pay to buy coarse sand rather than use fine sand which is free. The appreciable saving in concrete will be great.

Contrary to the prevalent idea, gravel makes a better concrete than broken stone. It is more dense and it is stronger after it has aged; particularly is this true of a gravel of quartz pebbles.

The concrete should be mixed a little weter than is ordinarily done, and the mixing must be thorough in order that the proportions may be properly intermingled. In laying, great care must be exercised not to separate out the ingredients by pouring or dropping from a bucket or barrow through a considerable height. If this is done, the job will be spoiled. After laying, the concrete should be tamped slightly in order to drive out the air and fill the voids or holes. Following this, the surface layers should be spaded. That is, a spade is placed in between the wall and the form and drawn up and down in order to slightly "puddle" the surface, driving back the gravel a little and leaving the surface with a grout as nearly airless and non-porous as possible.

By following the suggestions given, the concrete cannot be penetrated by water, but concrete that will not absorb moisture to some extent cannot be made. It is only possible to prevent absorption by adding some waterproofing compound to the concrete when mixing, or by treating the surface of the concrete after it is laid. The mixture laid under the above conditions is dense and close grained due to the excess of cement, and it is without air bubbles because of the excess water. It is filled with very tiny capillary tubes which will not allow the passage of water yet will absorb it is small quantities. This is undesirable in many places where concrete is used, and to prevent it some one of the following methods are employed.

If it is old work which is to be protected, only surface coatings can be used, and their object is a filling of the pores spoken about. Four substances are commonly used for this, namely. neat cement, asphalt, paraffin, and an alum-soap compound. This last is known as the Sylvester treatment, and is one of the most effective. In a different form it is used also for new work as will be explained later. For surface coating a hot castile soap solution is made by dissolving three-quarters of a pound of the soap in one gallon of hot water. A solution, of one-half a pound of alum to four gallons of water, is then prepared. The substances are thoroughly dissolved and alternately applied to the wall, the latter being perfectly dry. The hot soap solution is first applied, a flat brush being used and care being taken to avoid bubbles covering the work. After this coat dries for twenty-four hours, a coating of the alum water is put on and allowed to dry for a similar length of time. In this way, alternate coatings to the extent desired may be used, allowing a full day to elapse between the coatings. There is a chemical process which takes place between the substances used, the resulting compound plugging up the pores in the cement. The cost of this process for two coatings of each material will be from 35 to 40 cents per square yard.

Paraffin, although rather expensive, is often used for small jobs. It may be melted and applied while hot, the walls also being slightly warmed, or it may be dissolved in some solvent such as benzol, xylol, or even benzine of the common kind, these liquids quickly evaporating. Several coatings will be needed, and each coating will cost in the neighborhood of 50 cents per square yard. If you do the work yourself and do not count the cost of your own time and labor, this cost will be materially reduced.

Asphalt and other bituminous products are the easiest to handle and the surest of results in unskilled hands. They are applied as liquids, allowed to dry, and further coatings given. Probably the cost for two coats will not exceed 25 cents per square yard.

Cement grout is a mixture of cement, sand, and water or just cement and water, very liquid and applied like paint. It is not very efficient when used on old concrete, for it readily peels or cakes off after a short time. For a temporary repair this or a mixture of the same substances just plastic enough to handle with a trowel is the most universally used.

The surface coatings spoken of are as valuable for concrete blocks, brickwork, and porous stone as for straight concrete work. Good brick needs very little attention, although it will absorb from 3 to 5 per cent. of its weight of water, but such brick is expensive and seldom met with on the farm. The common brick used will often absorb from 15 to 25 per cent. of its weight in water. Concrete blocks, especially if made by the continually tamping process known as the dry process, are extremely porous.

While the above coatings appear to be satisfactory for simple work, in large structures such as dams, reservoirs, and sewers much more care must be taken. Strong layers are used because of the heavy water pressure against them. Felt or burlap saturated with tar or pitch, rolled in a continuous layer against the wall and held there, is not only a satisfactory water retainer but also prevents the leakage of foul gases which chemically attack the concrete. A method known as the integral process is practiced where it would be too expensive to use the thorough workmanship described in the early part of this article. This consists in the addition to the cement, when mixed, of some fine, dry powder consisting of extremely small particles, usually alum and lime. These, because of their size, may fill in the spaces between the cement and sand grains and make the whole structure more dense. Usually only the cement which lies near the surface is thus treated. Still another treatment is to add some soap or oil emulsion to the mixture. This forms a jelly within the concrete and fills the pores.

Lastly, the well-known Sylvester process before mentioned is used. Alum is added to the cement and castile soap is added to the water with which the mixture is made. Chemical action then goes on in the mass, forming a compound which, as before, fills the spaces.