chick that dies is a loss and takes so much off your profit, and is a great discouragement. I would certainly rather have a comparatively small hatch and a large percentage of the chicks live than to have a large hatch and a high rate of mortality. The Chinese treat their eggs entirely differently for the first ten days to the way they do the last, and I believe their is something for us to learn in the manner of starting the germ. I think it is most important during the first twenty-four hours. If you have the germ well started in a vigorous condition, I think that imparts a characteristic to the chick. A very young doctor in France made a close study with regard to the incubation, to find out, if he could, the cause for deformities in chicks. He tried artificial incubation at various temperatures, treated the eggs to all sorts of conditions, gave them shocks from end to end and side to side, and sent them away on railway journeys, and he found that, by giving comparatively low temperature at the early part of the hatch, the development being sluggish,they imparted the sluggish character to the chick and it had not a vigorous growth; and I think that is an answer to the question so often asked,"Why do so many chicks die in the shell?" Some say that it is due to not giving them enough moisture at the end of the hatch. I think the answer is the chicks had not strength enough to kick themselves out, and the reason was because there was not vigorous growth at the start.

Q.—Do you run your incubator with the suspended thermometer?

A.—I think every person should run his incubator with two thermometers. Have one suspended by wire from the top of your machine, with the bulb of the thermometer half an inch from the top of the eggs. I have a veterinarian's thermometer, which cost 75c., and it will record much more accurately than the ordinary incubator thermometer. I think it is best to keep the thermometer on the eggs at 102 ½ to 103. I think 103 is better than the lower temperature. I think it is well to keep the ventilators closed up during the early part of the hatch to that there will be no great draft, and I think the open bottom incubator had better be closed up as much as possible and keep a uniform temperature. The Chinese give their eggs no ventilation whatever until they pick them out of the baskets to cool them. While they are actually in the oven, they have no ventilation during the first ten days, and in the last ten days they are right out on the open shelves.

Q.—If your germs are strong, do you think a few degrees in the incubators makes any difference in the results?

A.—I do not think it does later on in the hatch.

Q.—Why be so particular as to the exact points of temperature? I think there is a great deal of trouble made for the farmer by this kind of work. I think we should get things down as simple as possible, so that the boys and girls can run the incbuators. My experience, extending now over nearly one-quarter of a century, is that there is more in the germ than there is in the incubator. I have had incubators that were drafty and they hatched out the chicks. I told the maker his incubator was drafty, that it would hardly hold the heat, and he said: "I made it so as to let wind into it."

A.—I prefaced my remarks by saying that I did not want the audience to be frightened by the cautions I gave, because a great many amateurs who start out are wonderfully successful..—L. H. BALDWIN at the great Canadian Poultry Show at Guelph, 1906.

Horticulture and Forestry

Horticultural Progress.

Prepared for the FARMER'S ADVOCATE, by Prof. W. T. Macoun Horticulturist, Central Experimental Farm, Ottawa.

Trees, Fruits and Flowers of Minnesota, 1906; Vol. XXXIV., Minnesota State Horticultural Society:

The Minnesota State Horticultural Society is one of the strongest Horticultural Societies in America. It has a membership of over 2,000, and the executive is using every possible means to increase it to 2,500 this year. This Society publishes a monthly journal called the *Minnesota Horticulturist*, and Vol. XXXIV. embraces the twelve numbers of this paper for the year 1906 together with the transactions of the Society for that year. This book of 526 pages contains most interesting reading to one who desires to grow fruit and flowers successfully in colder parts of Canada. When the Society was organized, about forty years ago, little was known of the possibilities of fruit culture in Minnesota, while to-day many acres of apples and other fruits are produced, and all is enthusiasm. The chief want now being a hardy [illegible] appearance and [illegible] encourage the search [illegible] liberal prizes are offered [illegible] and several smaller [illegible] have been entered [illegible]

seedlings is encouraged in every possible way, and the Society recently distributed seed to its members for this purpose. Much interest is taken in Minnesota in improving seedlings of the native plum, and many fine ones are reported. It is expected that when some of these are propagated sufficiently to be ordered for sale, they will take the place of those already on the market.

The great importance of having trees grafted on hardy roots is discussed in this report, many of the early failures in Minnesota having been due to the fact that the trees planted were grafted on tender seedlings. Crab-apples seedlings are recommended as stocks, and particularly the *Pyrus baccata*, the wild Siberian crab apple.

There are about 150 subjects and papers dealt with in this report, covering in a large measure the whole field of fruit and flower culture in the North, and this report should prove very useful to Canadians in Manitoba and other prairie provinces, where the conditions are somewhat similar to these in Minnesota. The latest list of hardy varieties of apples, crab apples and plums prepared by the Minnesota Horticultural Society is published in the *Minnesota Horticulturist*, Jan., 1907, and is as follows:

Apples.—Of the first degree of hardiness: Duchess, Hibernal, Charlamoff, Patten's Greening, Okabena.

Of the second degree of hardiness: Wealthy, Tetofsky, Malinda, Peerless, Northwestern Greening.

Most profitable varieties for commercial planting in Minnesota: Wealthy, Duchess, Pattens' Greening, Okabena, Northwestern Greening.

Varieties for trial: Anisim, Yellow Sweet Brett, University, Newell's, Lowland Raspberry, Iowa Beauty, Jewell's Winter, Yahnke, Gilbert.

Valuable in some localities: Wolf River, McMahon, Yellow Transparent, Longfield.

Crabs and Hybrids.—For general cultivation: Florence, Whitney, Early Strawberry, Minnesota, Sweet Russet, Gideon No 6, Virginia, Transcendent.

Varieties for trial: Lyman's Prolific, Faribault, Shields.

Plums.—For general cultivation: De Soto, Surprise, Forest Garden, Cheney, Wolf (freestone) Rollingstone, Wyant.

Most promising for trial: Ocheeda, New Ulm, Stoddard, Mankato, Brittlewood, Compass Cherry Terry.

Most of the varieties in the above list have been tested at the Central Experimental Farm, Ottawa, and their relative hardiness, as experienced in Minnesota is confirmed by the test at Ottawa. Some of these varieties have also been tested, with similar results, in New Ontario and Southern Manitoba.

Wants Pointers on Root Growing.

From New Ottawa, Sask., comes the request for pointers on raising potatoes,turnips, mangels, etc. The enquirer pleads to being a new comer and knowing nothing about preparing the land or sowing these crops. We have often tried to realize the position of the man who begins farming without having had previous experience of the business, without knowing, as if by instinct, as those who have been country trained know, when land is fit for different crops, and all the other little but intricate bits of knowledge which are in daily requisition.

In raising a root crop, whether it be of turnips, potatoes or mangels, there are some general conditions which should obtain. The land should be rich, and if not so previously should have a coat of manure, which should be applied if possible in the fall or winter, so that it will have parted with some of its fertility to the soil through leaching. If applied in the spring the manure is apt to dry out the soil, and the fertility it contains may not be available early enough in the life of the crop.

Soil for root crop should also be deep and pliable, so that the roots can go down and expand. We cannot give any hard and fast rules to follow in bringing land to this condition, but generally speaking a deep plowing early in the spring, followed by packing with the harrows or a heavier implement, then surface cultivation afterwards, will give good conditions. (See comments on corn-growing in this issue.) Where land has been so treated rows may be made with a plow three feet apart and the potatoes planted about eighteen inches apart in the row. Planting may be done during May and the land harrowed every week until the plants are well above ground; then the [illegible] should be cultivated. The seed should be covered to a depth of about five inches. The same preparation of the land for mangels and turnips as for potatoes can be given, but the mangel seed should be sown from the middle to the end of May, in rows about three feet apart. If the soil has been firmed after plowing and the top kept harrowed so that it is in the form of a dust mulch, the seed should grow readily, but if the ground is loose and dry, then one had better pack it as much as possible and not sow until after a rain. Then harrow and sow with a drill by hand. If sowing by hand a scratch in the ground may be made by four or five pins attached to a wooden timber and drawn across the field with a horse. This arrangement may have handles and shafts improvised. The seed can then be dropped by hand, through a stiff paper funnel to obviate the necessity of bending down. Drop the seeds about an inch apart. The seed may then be covered with a hoe or rake. If a heavy rain should follow and a crust form on the soil it should be broken with a light harrow or by dragging a heavy brush over the field. Cultivation should follow as soon as the rows are visible.

Turnip seed may be sown in the same way and if possible just about the time of a rain. Rains, by the way, usually come about turnip seeding time, last part of June, so that weeds often appear quite thickly, necessitating cultivation as soon as the rows can be seen.

Our correspondent and all others of limited experience should observe the effects of certain treatment upon the soil, and should try to avoid cultivation or manuring that makes the land too dry about the roots of the crops, but should cultivate shallow on the surface to arrest the rise of moisture just below the point of cultivation. It is difficult to give on paper details of treatment and knowledge of the soil that can only be acquired by contact with it. Nevertheless we hope the above will benefit the enquirer and others.

DAIRY

Cleanliness, Cows, and Milk.

EDITOR FARMER'S ADVOCATE:

There is a crying need in both town and country for a supply of pure wholesome milk, and this cry will be kept up until every dairyman observes cleanliness in milking. It is quite a common occurrence for men to milk with wet hands, that is, wet with milk. This habit, which is dirty in the extreme, when seen should be instantly stopped, for to procure a good article from dirty milk which is teeming with bacteria is an impossibility, unless it be pasteurised, etc., a method which is not common on the farm. As every one knows, milk is very susceptible in carrying disease; hence rigid cleanliness should be observed in handling milk. Good milk, as well as being a refreshing beverage, is what can be termed a whole food as it contains all the substances necessary for growth and nutrition.

As soon as milking is completed the milk should at once be removed and placed in a cool room, which is well ventilated. If the milk is to be kept it should be strained, and cooled quickly to 35 or 40 degrees F. The lower the temperature it is cooled to the longer it will keep sweet. The addition of chemical preservative, for the keeping of milk should be strongly condemned. If the milk is required to be kept for any length of time any of the three following methods should be resorted to:—Sterilizing. Pasteurising, or Cooling.

The simplest and easiest way for the dairyman to be successful is to have a good retail milk business in an adjacent town, but that is not possible for all. so the others have to be content to adapt themselves to circumstances and use the milk for either butter or cheese-making.

All up-to-date dairymen are aiming to produce the maximum amount of milk for the minimum of cost. But to carry this out successfully the breed of the animal has to be taken into consideration to a large extent. A cow bred or born to give rich milk will always do so, providing she is properly fed and treated, but if a cow starts early in life giving milk of a poor quality, no method of feeding or anything else will alter the quality of her milk. It is generally supposed a cow gives the richest milk between the third and fourth calf. There is no doubt that milk secretion is influenced very much by the nervous system of the cow (a cow is a highly nervous animal) Anything which interferes with the general state of the body will indirectly affect the composition of the products. Food also affects the composition of milk, in so far that an insufficient quantity fails to restore the milk secretory cells in the udder, ensures an abnormal state in the body, thus reducing the vitality of the animal, also affecting the quality of the milk. The permanent quality of every cow's milk is in the cow herself

Pincher Creek, Alta. NINISTOKA.