THE DAIRY.

Weed out the scrub.

Cow testing is a war measure!

The largest individual milk cheque for any month that we have heard of is $1,062. Can any one beat it?

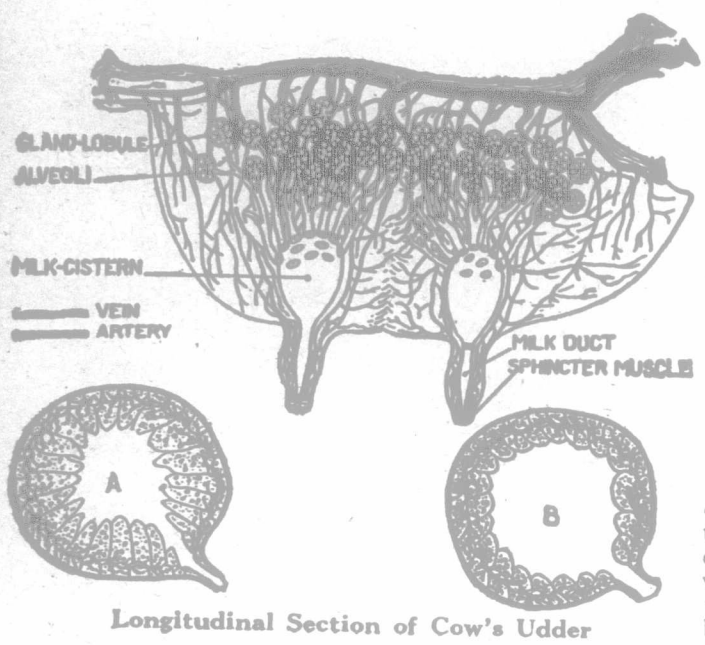
When you squeeze the teat of a cow you provide an outlet for the milk at the same time that you release the brakes in the milk factory and set it going. When the raw material gathered since the last milking is used up you have milked the cow dry.

The Regional Milk Commission for New England has agreed upon an increase of ½ cent per quart for August and September, the increase all to go to the producer. Milk is now selling in Boston at 15 cents per quart to homes and 14 cents per quart to stores.

The advantage of having cows calve when in good physical conditions is illustrated by the performance of Nella Jay a 20,709-lb. cow, whose fat production was 1,019.25 lbs. This cow started in on her test period weighing 1,500 lbs. and came out weighing only 1,285 lbs. although in splendid physical condition.

The Manufacture of Milk.

Any man who has thoughts of becoming a machinist would be foolish indeed if he attempted to operate a machine without first understanding something of the way in which it operated. It is true that he might manage to get along for a time without knowing very much about it, but sooner or later something is bound to happen which will put him in a quandary unless he has taken some time to master its first principles. Exactly the same thing is true with reference to the dairy cow and her apparatus for the production of milk. The formation of milk in the udder of a dairy cow is essentially a manufacturing process, in which the milker himself has no little part to play. Machines have no nerves although some are no doubt very delicately constructed but no machine yet invented has anything to compare with the complex organization of the living animal. It therefore behooves us who are engaged in the feeding and the handling of animals for profit, to understand these animals and the ways by which they become of use to us, as best we can.



Longitudinal Section of Cow's Udder

As stated before, milk formation is essentially a manufacturing process. We are given to understand that the structure of the cow's udder is to be regarded as having evolved from the glands of the simple surface skin. Many things are excreted through the udder, as through the glands of the skin and, as evidence of this we have the fact that oftentimes medicine intended for the calf is administered by way of the cow. The cow's udder consists of a mass of framework and gland tissues, supplemented by a large number of blood vessels veins, arteries, nerves, etc. There is a partition extending lengthwise through the udder separating it into two parts. Each part is provided with two glands and each quarter contains masses of tissue divided into lobes and again into single lobules possessing milk ducts or tubes to take the milk from each quarter to the milk cistern at the base of each teat. Surrounding each half of the udder is a strong fibrous sack and from this sack, passing through each quarter of the udder, are layers of this same fibrous tissue, which constitute the framework of the udder. This framework does not exist in each udder in the same amount and it is easy to see, therefore, why some cows with large udders are not any more productive than others with smaller udders, because a relatively smaller amount of the latter is occupied with this unproductive framework tissue. In and about the gland tissue and the framework are to be found a great many blood vessels, veins, lymph vessels and arteries. The arteries carry the blood to the udder and the lymph vessels distribute the needed material to the cells manufacturing milk. The veins carry the impure blood back to the heart and lungs. There are also large numbers of nerve fibres and these play a very important part.

The milk cells are collected together in the form of globular masses. These groups or masses are called alveoli and surrounding them are the finer blood vessels and lymph vessels in addition to the nerve fibres which are so situated as to be able to put a brake on the manufacturing process by regulating the amount of raw materials furnished. It is thus that the nervous system of the animal practically controls the production of milk. Animals which are very highly sensitive, therefore, require very careful handling. The alveoli are gathered together in masses with their necks opening into collecting tubes and during pregnancy the alveoli and the tubes become filled with masses of cells which divide as the period of pregnancy progresses. These loose cells pass out with the first milk in the form of colostrum and thus furnish the calf with the peculiar food which the newly born animal apparently needs. The remaining cells in the alveoli immediately go into the manufacturing business and proceed with the formation of fat and the remaining constitutients of milk, such as casein and sugar. There is no milk, sugar or casein in the blood and therefore their formation indicates that the elements necessary to make them are taken from the blood and combined properly in the udder. The material used comes from the lymph vessels and is passed through the fence so to speak into the alveoli where it is operated upon by the milk cells. Similarly, the fat of milk is not contained in the blood, or in the lymph fluid. The cells of the alveoli manufacture the fat and this accumulates in the end of the cell. Later, this free end of the cell separates from the remainder, which remains attached to the membrane of the alveoli and the fat is liberated in the form of minute globules such as we find in the milk. The fat is thus shed off from the milk cells and passes through the cavities of the udder to the milk cistern at the base of the teat.

From what has been said we can readily understand that the composition of the milk from any one cow depends entirely upon the hereditary characteristics of the cow. The amount of milk, however, depends primarily upon the amount of blood which is allowed to flow through the udder. This is dependent upon the blood vessels, which in turn are dependent upon the nervous system for their carrying capacity because of the fact that they are surrounded by certain muscle fibres. These muscle fibres are expanded or contracted by the nerves running through them and the flow of blood to the udder is controlled in this way. This is merely an explanation of what is already common knowledge, that excitement or high nervous tension will reduce the milk flow. Returning to the influences determining the milk flow, it is also true that the amount of milk produced is dependent to a certain extent upon heredity, since, if we take it for granted that the amount of blood furnished to the udder is sufficient, the use of this blood depends upon the presence of a sufficient number of milk cells. The number of these in turn depends upon the relative proportion of gland tissue and constructive framework in the udder, and heredity is largely responsible, probably, for this condition as it is found in each individual.

So much for the machinery of milk production. It remains for the feeder and the milker to see that the machinery is allowed to work smoothly. This necessitates a constant consideration of the nervous temperament of the animal.

HORTICULTURE.

Getting Color in Apples.

The question is often asked "Why is it that apples of good color, or other fruits of good color, taste better than fruit that is green?" Directly related with this question is the well known fact that apples of good color will invariably sell better than fruit that is green and uninviting. It is commonly said that most fruit is bought with the eye; in other words, the appearance of the fruit will sell it far easier than its actual dessert or cooking qualities because these are seldom considered. Sometimes consumers are very badly mistaken in the purchase of apples because of this habit of buying upon appearance. For instance, the Ben Davis apple when well grown is very beautiful and attractive, in spite of its exceedingly inferior flavor until well on toward the last of April or the month of May. This variety, as well as others of similar beauty and equally inferior quality, is very frequently sold for higher prices both at wholesale and by retail than other varieties of the very highest quality, such as, perhaps, Northern Spy and Wagener, which are much more difficult to grow to perfection.

In judging fruit at an exhibition, whether it be for commercial purposes or as typical specimens of a variety, much stress is laid upon the color of the fruit; in fact, the best judges of apples in Canada and the United States place a value upon color alone which varies from twenty to thirty per cent. of the total number of points for all the qualities considered. There is no character or quality which is given greater importance than color. Size is not nearly so important, freedom from blemish is of no greater importance, and uniformity is frequently rated lower than color. It therefore becomes an essential in good orchard management to know so far as possible how and when color is produced. It also becomes of very great value to know what orchard practices may be followed which will tend toward the development of very high color. There are in reality only two factors which are immediately concerned with the production of high color; these are sunlight and maturity. In other words, an apple that is thoroughly matured and has been subjected to an abundance of bright sunlight should show a very high color, provided it is in a healthy condition. It is well known, of course, that light or sandy soils are favorable to the production of high color, while apples grown on clay soils will show colors which are duller and less attractive. This fact is so well known that it needs no amplification. It is commonly supposed also that potash and to some extent phosphoric acid in the soil encourage the development of color, but the probability is that fertilizer of itself has practically no influence upon the color of the fruit. It is perhaps logical to assume that potash and phosphoric acid have a positive action favorable to color development greater than nitrogenous fertilizers or manure. The fact, however, as proven by experiments, is that nitrogenous manure, such as nitrate of soda, has an injurious effect upon color, while phosphoric acid and potash have practically no effect whatever. This, therefore, would account for the common opinion that potash particularly will produce color on fruit.

It is well known that nitrogen added to the soil will stimulate growth. This is particularly noticeable in the case of such fertilizers as nitrate of soda, which has a very quick and positive action in stimulating leaf and wood growth. This fertilizer also has the effect of increasing the size of the fruit, but as mentioned previously it decreases the amount of color. Some explanation is needed here, however, for this statement, which is but partially true. There are two principal colors to be considered in the case of apples, the red and the yellow color, or the over-color and the under-color. Apparently the yellow color is connected with minute colored bodies in the cells nearest the surface of the apple. This yellow color is in no way related to the amount of sunlight, since it will develop in the dark and depends altogether upon the maturity of the fruit. Red, however, is a constituent of the sap in the cell and can be influenced by a number of agencies, among the more important of which is the amount of light received during the later stages of maturity. An experiment conducted at the Pennsylvania Experiment Station showed that the exposure of apples to sunlight after harvesting increased their color by thirty-five per cent., while practically no increase was noticeable with those kept in the dark or exposed to electric light. If trees are manured heavily and forced to grow late in the season, the fruit also is forced to grow and is not given an opportunity to mature before being harvested. Experiments with peaches at the New Jersey Experiment Station showed very conclusively that the injurious effect upon color produced by applications of nitrate of soda to peach trees was due simply to the fact that the maturity of the fruit was delayed, or, in other words, if such fruit were left on the tree for about ten days longer than fruit which had not been kept growing by applications of nitrate, it developed a similar color to that of the fruit on unfertilized trees. With apples, of course, a large share of the harvesting is done just previous to the coming of frost, and the best practice, therefore, is that which enables the fruit to mature as fully as possible before it need be taken from the tree.

It is commonly said that if apples are grown in sod they will develop better color than if the orchard is cultivated. This is quite true and has been proven by long years of experiment, as well as by the practical experience of orchardists. It is, however, simply another phase of the relation between color and maturity. Apples grown in sod mature from two to three weeks earlier than those cultivated, simply because the tree is not able to make such good growth as another tree in a well cultivated soil, and the result is that leaf and wood formation stop earlier and thus provide opportunity for the maturing of the fruit. Experience has also shown that trees which are carefully pruned will bear fruit of a higher color than those which receive little or no treatment of this kind. Pruning also is but another way of providing additional sunlight for the fruit. A well-pruned tree is one which has an abundance of clean, healthy, vigorous wood sufficient to mature a good crop of fruit. The fine point in pruning comes, however, when one attempts to regulate the quantity of wood necessary so as to provide as much sunlight as possible in order to secure fruit of high color.

FARM BULLETIN.

Canadian Pressmen Return Home.

The party of Canadian publishers and editors who recently spent 43 days in Britain and France, as guests of the Imperial Government, returned last week after an eventful and inspiring visit in the War Zone. John Weld, manager of the Wm. Weld Publishing Company, London, who was one of the party, was greatly impressed with what he saw at the battle front in France and the magnitude and efficiency of the organization back of the lines which makes it possible to maintain such an effective fighting force. Besides being shown samples of the fighting on each of the Allied fronts in France the party visited the grand fleet where all types of war ships were observed, including the submarine. Air flights were made in the large Handley Paige bombing plane and the more bird-like observation and fighting machines. The people of Britain and France, now confident of victory, expect the supremacy of the air which the Allies enjoy to hasten the end and make things very uncomfortable for the enemy and the Hun population at home. In both France and the United Kingdom all classes were found united in their endeavors and unsparing in their efforts to do their bit in the great cause, while the part being played by women was described as nothing short of wonderful. Some of Mr. Weld's experiences while overseas and observations made in the several countries visited will be related in early issues.