

attacked. If there is water nearby the cattle commonly rush into it for safety. Perhaps this is because some instinct tells them that the water will protect the part the flies assail chiefly, namely, the lower portions of the legs. Interesting stories are told of oxen drawing a plough or other loads suddenly becoming frenzied and rushing into the water with their loads to the dismay and amazement of their drivers.

Life-history.

As those who have observed the stampeding of cattle know, the flies themselves appear during the months of June and July, being seldom seen earlier or later than these dates. Soon after their emergence they seek cattle to lay their eggs upon; calves as well as older cattle being chosen. Very rarely are other animals of any kind attacked. The favorite place for the egg laying is the legs, especially the lower parts of them. Occasionally eggs are laid along the lower portions of the side. When desirous of ovipositing the fly darts clumsily at the leg and hanging on for a moment fastens firmly an egg well down on the hair near to but not touching the body. Then she lets go her hold and in a very short time repeats the process. Several eggs are thus laid in succession, the fly darting at and striking the animal each time, and being apparently incapable of fear. It is this bull-dog pertinacity that terrifies the beast attacked.

When the eggs hatch the little maggots work their way down alongside the hair into the flesh just below the skin. Here they remain sometime and feed upon the juices of the flesh. On older animals swellings often appear above the place where the larvæ are and, if several larvæ are near together, the swelling may be quite conspicuous. After a time the larvæ migrate in a remarkable way and finally reach the back, where they form the well-known warbles under the skin near the backbone. Warbles are also formed here by the other species of Warble Fly, *Hypoderma lineata*, but this fly has not the same egg-laying habits as the one described and never causes panic among cattle.

The larvæ when full grown are large, whitish maggots and work their way out of the skin through a hole made sometime before. They can be squeezed out of this hole by the fingers. After emergence the larvæ, if in the stable, work their way into a crevice, or, if in the field, into the soil, and then pupate. The emergence of the larvæ takes place from about mid April to the end of June. The pupal stage lasts a little over a month and the adults emerge in June and July, then, after egg-laying, die.

Damage Done.

The loss from Heel or Warble Flies is large, especially in some districts. There is first the loss due to the weakening of cattle when attacked and stampeded. This results in a lessened milk flow and in a loss of flesh. Then there is the injury to the hides caused by the warbles along the back. Warbly hides do not grade in the A class, and bring from 1 to 5 cents per lb. less than sound hides. It is said that over 50 per cent. of all the hides some months are warbly.

Origin and Distribution of the Insect.

This insect is well known in Europe and causes the same damage there as here. There is no doubt that it has been imported into North America on cattle from the various European countries. How long since it first arrived no one knows, but it must have been in the country for many years, or at any rate in parts of the country. It now occurs in apparently every province in Canada and in much of the United States. There seem, however, to be portions of Ontario where it is not yet present and where no one has seen cattle stampeded by it.

Methods of Control.

There is no doubt that natural forces do much to control the insect, especially in the full-grown larval and the pupal stages; for many larvæ after coming out of the cattle must perish before they can find suitable places to pupate. Moreover, many pupæ must perish from unfavorable surroundings or weather conditions. It has also been observed that wet, dark weather is unfavorable for the flies and that they thrive best on bright weather, so that nature helps in preventing a very rapid increase of these insects.

Man, however, can do much to assist. In Denmark the practice is followed of removing in spring and destroying the larvæ in the back of the cattle. If this were generally done in Ontario we could look for a rapid decrease of the pest. Farmers' clubs, agricultural representatives, veterinary surgeons, the press and others who are interested should help agitate for this work. As the larvæ cannot be squeezed out until nearly mature and as some mature six or eight weeks before others, it will be necessary to begin the squeezing-out process early in April and repeat it once a week until all the larvæ are removed from the warbles. To facilitate the removal of the larvæ it will be well first to soften the affected area with soapy water and to use a pair of forceps.

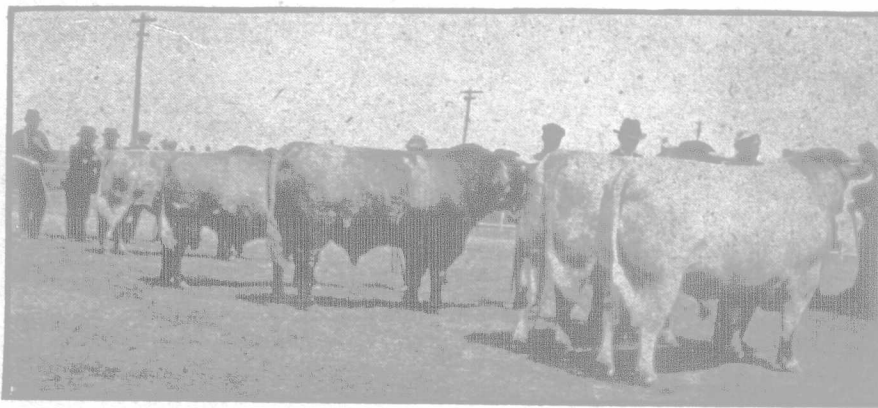
There is some evidence to show that where cattle are dipped for mange or other troubles they are not much infected with warbles. Further investigations may therefore show that by applying certain washes to the parts where the eggs are laid, these or the larvæ or both may be destroyed. The writer understands that Seymour Hadwen of the Health of Animals Branch has been investigating this subject. There is no doubt that as soon as any helpful new measures are discovered that Branch will give the public the benefit of them.

In cases where cattle are greatly tormented by the flies much benefit would be obtained by keeping the cattle in the stables in the day-time, especially on bright, hot days. Flies do not enter buildings.

Breeding Counts in the Feed Lot.

Standing at the unloading point in the stock yards or looking into the pens where stockers and feeders are kept pending sale, one sees not only evidence of crossing and recrossing of breeds, but the value of good blood in the economical production of meat. There is to be seen the thick, low-set, smooth animal, with broad, comparatively short head, which one would pick on immediately as being a good doer. Alongside of it may be a long, narrow-bodied, up-standing steer or heifer with that long, narrow, lifeless-looking head, which experienced feeders shun if possible. The former are readily picked up at prices considerably above what the latter class brings. On enquiring into the history of these animals it will likely be found that the former is the progeny of a well-bred cow of one of the beef breeds mated with a pure-bred bull of high quality and of beef conformation. The dam of the other calf may be a fair cow, but from the appearance of her progeny she was mated with an inferior animal, whether pure-bred or grade. The breeder who raised this latter calf undoubtedly found it a poor doer as a youngster, and the feeder who possibly is forced to take it in order to secure others of higher quality, knows before he places it in the feed lot or stable that he dare not count on much more than breaking even at the end of the feeding season. The poor quality feeders are quite numerous—why is it?

Feeders claim that a few years ago it was much easier to pick up a carload of top-notch feeders than it is at present. In fact, some contend that it is practically necessary to keep a herd of cows and raise feeders if they are to secure the quality they desire. One reason for this situation may be the introduction of blood of one of the dairy breeds into the herd. A breed that has been selected and bred for milk generation after generation cannot be expected to throw the quality of feeders one would expect from a breed that was bred and selected for beef production. Neither will an inferior female of any breed throw as good stock as one which has quality as the result of grading up the herd by the continued use of pure-bred sires of the desired type and conformation. There is too much crossing of the breeds and not enough attention paid to the quality of sire used.



The Aged Shorthorn Bulls at Regina.

From right to left they stand: Newton Loyalist, Augusta Star, Silver Mint, King James, and Happy New Year.

Those who cater to the feeder trade should at least stick to a beef breed and endeavor to grade up the herd to as high a degree as possible. It will result in more rapid growth than will be the case in haphazard crossing of breeds or the lack of selection of breeding stock. This will create a keen demand and result in obtaining better prices than the progeny of crossing and recrossing or mixing the breeds will bring. It will also result in better use being made of the feed grown.

At the Illinois Experimental Station various grades of feeding steers were collected and fed on a similar ration for 179 days, in order to determine the difference in gains and also the difference in per cent. of dressed carcass. Lot 1 were fancy, selected feeders, containing about 100 per cent. of the blood of beef breeds; lot 2 were choice feeders of the beef breeds and possessed large frames; lot 3 did not have the quality of the former two, although the beef blood still predominated; lot 4 were classed as medium feeders. They were of mixed breeding and showed a degree of coarseness. There was little evidence of beef blood in lot 5. They were coarse-boned and plain throughout, while lot 6 were classified as scrubs. The following table as given in Henry's "Feeds and Feeding," give the results of the experiment:

	Lot 1 fancy feeders	Lot 2 choice feeders	Lot 3 good feeders	Lot 4 medium feeders	Lot 5 common feeders	Lot 6 inferior feeders
Weight at beginning, lbs.	935	1,115	1,019	1,022	966	965
Dry matter in ration per 1,000 lbs. live weight						
Concentrates, lbs.	15.2	16.0	16.0	15.8	15.6	15.2
Roughage, lbs.	6.8	7.0	7.0	7.1	7.1	7.0
Daily gain, lbs.	2.57	2.45	2.34	2.13	2.21	1.96
Dry matter per 1,000 lbs. gain, lbs.	995	1,209	1,208	1,305	1,200	1,293
Dressed Carcass, per cwt.	61.6	61.5	60.7	59.7	59.9	59.4
Caul and rough fat, per cwt.	9.5	9.7	10.6	10.8	10.1	11.8

The above table shows that it took no more concentrates and scarcely as much roughage to feed the fancy feeders as it did the inferior lot, but yet the daily gains were much in favor of the first lot. A feeder would naturally expect the first lot to be the most

profitable, and he can afford to pay more for such animals. But to produce these the blood of a beef breed or breeds is necessary. There will always be dairy-bred animals on the market, and some make very good gains, but the man who makes a business of growing feeders should stay with a beef breed and improve the blood by using the best sire of that breed procurable. There is a feeling with some that because they only have a grade herd they cannot afford to purchase a really good bull, both in individuality and breeding. They buy a second or third-quality animal to place at the head of their herd, and as a result continue to have but an average herd of cows and turn off average feeders, when by using a better sire and selecting the females for breeding purposes they would soon have top-notchers to place on the market. The cheapest herd improvement comes through the use of the right quality of sire. If the knife were used more freely, and the best bulls kept in service longer than is now the custom, improvement would soon be manifest and higher quality feeders would be seen in our stables and stock yards. This would result in both the grower and finisher of these cattle getting more remunerative prices for labor and feeds. It is an undisputed fact that the well-bred steer of beef breeding and conformation will put on flesh more economically and will sell for a higher figure than will the animal of nondescript breeding.

Milk Records of English Shorthorns.

England is the home of the milking Shorthorn. Individuals of this breed have been relied upon to maintain the milk supply for the large population of the Old Land, and they have done it without unduly sacrificing the beef qualities for which the Shorthorn breed is noted. In Canada the Shorthorn has been spoken of as the pioneer cow, owing to the ability of this breed to give a profitable flow of milk and also to produce a calf that will fatten readily. There are different strains of the Shorthorn breed. The breeding of some families has been along beef lines only, which has resulted in that deep, thick, low-set, high-quality, sappy individual being produced. Other families have been bred and selected for milk production, and it must be said of the breed that it has produced individuals capable of giving

a creditable flow of milk without detracting too much from the beef conformation. In Canada and the United States more attention has been given of late years to the milking Shorthorn strain than was the case a few years ago. There is a tendency on the part of some breeders to intensify the milk production, with the result that the beef conformation is sacrificed. This we believe to be a mistake. The Shorthorn has always been an animal with good beef conformation, but it is possible to select and breed the beef out and leave the dairy type in its place. For a dual-purpose cow it is not well to aim at too high a milk record. A profitable flow of milk and

a good calf each year is better than an exceptionally heavy yield of milk and a loss of quality in the calf. The following table gives the names of some Shorthorn cows together with their milk yields:

Name of Cow	Milk yield, pounds	Days in milk
Hadnock Musical 2nd	13,837½	365
Dolphinlee Foggathorpe 3rd	13,660¾	365
Redvales Jessamine 2nd	13,437	365
Somerford Flower 2nd	13,070	311
Rose of France 62nd	12,245	365
Veracity	12,078	331
Rosamond Queen	11,723	321
Morecombe Lily	11,355½	330
Darlington Cranford 27th	11,216¼	314
Dot	11,154	317
Duchess of Cranford 3rd	11,165½	301

Several of them have given over 13,000 lbs. of milk in a year. If beef conformation can be retained in the progeny and such milk-producing qualities transmitted

to the heifers, such cows are dual-purpose in the highest sense of the word. It too often happens, however, that some of the heaviest producers are unable to transmit those qualities in a like degree to their progeny. There is always the danger of going to extremes. Selection