

glass splinter covered with shellac, dissolve off the shellac, and then extrude the splinter. This shows us that such apparently purposeful actions are not necessarily a manifestation of vital activity, and that some of the behavior of the lower animals may be attributed to entirely physical causes. But even in these lowest animals their behavior is not entirely mechanical. An Amoeba will respond to the stimulus of a food particle when hungry, but not after a meal. It will follow its prey, when the prey consists of an active form such as another Amoeba. It reacts differently to strong and weak tactile stimuli. Now all these responses are very much like the responses of plants,—the response of the shoot to gravity by growing away from the earth, and the root in a diametrically opposite manner by growing in the direction of the pull of gravity; the growth of the shoot in the direction of the rays of light; the response of the root by growing in the direction of water. Such movements in plants we call *Tropisms* (meaning "turnings"), and we apply the same term to similar movements in response to stimuli which are exhibited by the lower animals.

In the case of Amoeba there appears to be no definite front or hind end, and it is equally sensitive to stimuli on any surface of the "body". But in the Paramoecium, which is another microscopic, single-celled animal, somewhat cigar-shaped and covered with cilia (vibratile hairs) by the movement of which it swims, there is a difference between the two ends and it is far more sensitive to stimuli at the front end. So we see that even as low in the scale as the single-celled animals we have the beginning of what in the higher animals we term a head,—an anterior region in which are situated most of the sense-organs and the main nerve-centres.

It must of course be borne in mind that in the case of these lowest animals there is no nervous system, no differentiation into muscular and nervous tissue, and that the protoplasm as a whole functions as what in the higher animals becomes highly differentiated systems.

From the experiments which have been conducted with the Amoeba, Paramoecium and closely allied animals we are able to say that their response to stimuli is a matter of tropisms, simple turnings, but that the physiological condition of the organism makes a decided difference as to the response which a certain stimulus will call forth.

The next group which we should consider is the *Coelenterata*, pronounced See-len-ter-ray-ter, and derived from two Greek words meaning "hollow-gut") to which the Jelly-fishes, Sea Anemones, and the fresh-water Hydra belong. In this group there is no definite nervous system, but there are scattered nerve cells throughout the body. A large number of experiments have been made with animals belonging to this group, many of them of great interest and value but requiring a rather special knowledge of the anatomy and general habits of these animals for a proper understanding of the results. One result of prime importance however, is that though these animals respond to a light contact stimulus at first by contracting, they cease to respond if the stimulus is oft-repeated. While we should perhaps hesitate to say that they are thus capable of "learning", we have here at least something very much like what we call learning in higher forms, that is the *modification of a response by reason of previous experience*.

(To be continued.)

THE HORSE.

Work the Colt This Winter.

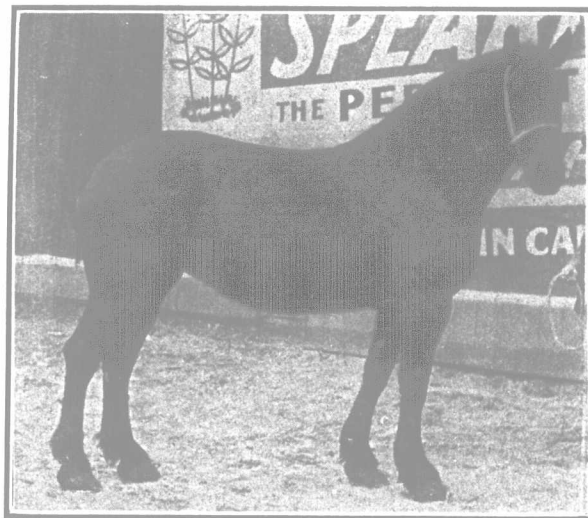
Throughout the country there are many horses which display bad habits, which make them very unpleasant to work. A good deal of this is caused by carelessness or poor judgment when breaking in the colt. Every spring a large number of young horses go into the harness for the first time, and are required to take their place with the older horses on the farm. It frequently happens that the colt never experiences the feel of the harness or pressure of the reins on the mouth until it is forced into the team in the rush of seeding. The ground is soft, the weather is usually warm, and the colt whose muscles are soft becomes leg-weary and tired. However, the grain must be put in the ground and the horses are kept going. Forcing a young horse against his will very often starts the habit of switching and kicking, and by giving it work which is a little too heavy for it, balking is oftentimes started. It is rather exasperating to the farmer to have his horses play out in the midst of seeding. There would be no need of it if a little time was taken during the winter to get the colts used to work. The muscles would become hardened and the animal would gain some idea of what was expected of it. Use the colt along with one of the older horses to do light teaming and hauling out manure, always being careful to be kind but yet firm. When the colt is commanded to go it should not be immediately stopped. "Whoa" and "get up" should not be said in the same breath. It appears that horses are not driven so much by the word as they used to be. The horses which understand "gee" and "haw" are in the minority at the present time. When first breaking the colt to drive is the time to teach it these terms. They will be learned in a remarkably short time if proper care is taken by the driver.

Balking is usually started by the horse being overloaded when young. He attempts a load which does not give at the first pull, and very often he is afraid to bend his efforts to it again. Hauling manure from the barn-yard is a very good place to train the colt to pull. Load

very lightly the first time so that the colt and its mate can walk away with it quite easily. Put on a trifle heavier load the next time, but never make it so heavy that the colt finds the limit of its strength. In this way young horses can be trained to take exceptionally heavy draws, and if circumstances ever put them in a tight box they will pull every time the driver requests them. The colt started in this way will hardly ever turn out to be balky. It is really kindness to the young horse that must go into harness in the spring, to work it during the winter, when time is not so valuable.

Blanket the Horse.

A horse that is kept in a warm stable feels the cold when he is left out in the open, unless he is kept moving. Very often care is not taken to blanket the horse properly when he is left standing for a few minutes. We have often noticed two teams meet on the road and the drivers stop and discuss problems for possibly fifteen or twenty minutes, without blanketing or protecting their horses in any way. With a raw wind blowing, or even on an average winter day, the cold will penetrate the horse's body. No ill effects, however, may be immediately apparent, but sooner or later such treatment will tell on the health of the animal. If a horse is stopped for only five minutes a blanket should be thrown over him. Too many of the blankets are made to cover the main portion of the body but leave the breast, a vital part, exposed. Blankets that lap over in front and hang as far down as the knees give the horse protection where it is greatly needed. Then again many of the sheds where horses are let stand by the hour are in no way protected from the wind, and a draft constantly circulates around. Blankets will protect their bodies to a certain degree, but a draft around the horse's legs and head is very uncomfortable and is very often the forerunner of colds and distemper. Rather than leave a horse stand in a poorly-built shed it would pay the owner



A Good Type of Percheron Filly.

A former winner for J. B. Hogate, Weston.

to put him in a stable, supposing it did cost ten or fifteen cents for the afternoon. Men who get the most out of their horses, and have them looking the best, usually take these little precautions to protect their health. Never forget to take the blankets with you when teaming or driving, and don't forget to use them if you stop the horse even for a few minutes.

Horses Troubled With Worms do Not Thrive.

Many horses lose condition, or fail to make gains during winter months because they are infected with worms. This is especially true of colts. Horses suffering from worms generally have a good appetite, but apparently benefit little from the food eaten.

There may be no symptoms which point conclusively to worms, but this trouble is so common that if the colts and horses are not doing as well as they should for the feed given, a worm remedy may prove of decided value. In treating horses for worms, it is well to keep in mind that the drug is meant for the worm rather than the horse, and should, therefore, be given in as concentrated form as possible. To ensure this, little or no bulky food should be fed during the course of treatment, and as the parasites are stupefied by worm remedies rather than killed, the animal's bowels should be kept in an active condition so that the stupefied worms may be passed out before they regain their vitality. A well-salted bran mash once a day will generally ensure such an action.

The following formula is a worm remedy which is also of value as a tonic: Powdered nux vomica two ounces, powdered gentian root four ounces, powdered arca nut six ounces, sodium chloride four ounces, arsenious acid two drams; mix.

Give one heaping teaspoonful to every 250 pounds weight, every morning and evening for about 10 days. The medicine may be mixed with ground feed or sprinkled over oats which have been dampened.

LIVE STOCK.

Regulations re Live Stock Trading with United States.

For many years Canadians have carried on a bit of friendly trading in live stock with their neighbor, Uncle Sam. Several years ago United States breeders "mixed things up" in our auction-sale rings where pure-bred live stock were being offered, and many animals were bought by them at handsome prices. Laws and a temporary lull in the industry made things a little more quiet for a time, but during the last two years trade has been working up to a concert pitch, and we are glad to see our friends from the other side, whom we have come to know almost as well as our own breeders, back at the ring-side again looking for more of the good stock which do so well and are so favorably known under the Stars and Stripes. It is not altogether a one-sided deal either; we require pure-bred sires and dams occasionally from the United States' herds and flocks to infuse new blood into the industry which is making a healthy growth in Canada. It is quite natural that we should swap horses, cattle, sheep and swine when the occasion demands, and it is a good thing that we are not prevented from doing so when there are none of the Deacon and David Harum tricks mixed up in the transaction.

While the "bars" were up on both sides Canada's contribution of animals for slaughter to the stock yards and packing plants of the United States was not large, but at 9.10 p.m., Friday, October 3, 1913, President Woodrow Wilson took two gold pens and placed his signature to the Underwood Tariff Bill, which two hours and fifty minutes later became law, admitting our cattle, sheep and swine, free of duty, into the Republic. The fact that President Wilson used two pens has no significance of importance to us. So far as we are concerned he could have done the job quite as well with one pen, but the feature of that act at the White House on October 3, 1913, was that it let down the bars and allowed a very considerable quantity of our finished feeder and store cattle to move across the line. In this article we do not propose to deal with the effect this Democratic legislation had or may eventually have on the live-stock industry of this country. Our aim is solely to set forth a few of the regulations imposed by the United States and Canadian Governments which appertain to this exchange of live stock which takes place over the boundary line generally called "the border."

Since cattle, sheep and swine for the improvement of breeds, or, in other words, pure-bred live stock, can travel back and forth free of duty on both sides, the tariff element does not present any great obstacle. The majority of the restrictions emanate from the departments of the governments having an oversight with regard to the health of animals in Canada and United States. These are important, for the less experienced breeders of pure-bred stock do not yet realize the great necessity of keeping the herds and flocks absolutely free from disease. If the breeders in Western Canada had their way, the same regulations, practically, that govern trade between Canada and United States would govern interprovincial trade in the Dominion. There is more than a semblance of justice in these rules, for nothing can do more to curtail business than to burden a trusting customer, either intentionally or unintentionally, with a diseased animal, which in itself does not constitute the only loss; the herd or flock to which it goes is very likely to suffer or to be depreciated in value. The United States already has inter-state laws in this regard. The Argentine buyers caused an uproar in Britain some time ago by demanding stock with a "clean bill of health," and the general tendency is to forestall the introduction of disease through the addition of strange animals to the herd. These instances are cited merely to show the trend of national and international live-stock dealing, and for the present let us consider a few things which should be known by our breeders and farmers generally regarding international trade between Canada and the United States. The regulations from which this information is compiled were interpreted for us recently by the Health of Animals Branch, Ottawa. Amendments, etc., are declared from time to time to cope with conditions and circumstances as they rise, and notice of same is duly given through the farm press.

Regulations Re Cattle.

When cattle are going into the United States for slaughter there is, as a general thing, no inspection or quarantine, yet in some cases when cattle of dairy type are shipped for immediate slaughter the Bureau officer has full authority to detain them and test them with tuberculin.

Canadian cattle exported to the United States for breeding purposes, if over six months of age, must be accompanied by a tuberculin-test chart signed by a salaried veterinary inspector of the Health of Animals Branch, Ottawa, and also a certificate signed by such an officer stating that no tuberculosis has existed on the premises, and that no other contagious disease affecting cattle has existed in the district in which the animals have been kept for sixty days preceding date of exportation. If unaccompanied by such a certificate they are returned to the point of origin or held in quarantine for two weeks and tested. The owner or shipper must present an affidavit that the certificate applies to the cattle comprising shipment.

United States cattle imported into Canada, if over six months of age, must be accompanied by a tuberculin-test chart dated not more than thirty days prior to date of entry, and signed by a veterinary inspector of the