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be pure-bearded, and the remainder or one-half of hybrid character, but exhibiting the appearance of either of the two parents, whichever was dominant. The second generation, the 25 per cent. pure-bearded would produce nothing but pure-bearded plants, the beardless nothing but pure-beardless, and the hybrids would split up in the proportion of two hybrids, one bearded and one beardless. In subsequent generations the proportion of hybrids would gradually decrease, and the plants with pure characters gradually be differentiated. In other words, and according to the language now more commonly used, in the course of a few generations the characters would become fixed. One of the great differences between these principles of breeding, as enunciated by Mendel, proven by various other experimenters and now generally credited, and those formerly accepted, is that all the progeny of a cross was considered hybrid in character and would continue to vary for a number of years, but according to Mendel, the characters of a fixed proportion of a cross are fixed as firmly in the second generation as in the tenth. A vigorous selection in the second generation would, therefore, result in the elimination of many individuals that could not possibly produce what was required. But even with what Mendel has given us as the result of his elaborate experiments and with the discoveries in recent years by others working along similar lines, the door has just been opened to a field of unlimited expanse for useful work. The principles that apply exactly to one kind of plants may be different for another, and again different with animals. There is no longer any doubt, however, that there are laws that underlie the transmission of characters from generation to generation. What we hear spoken of day after day as prepotency, atavism, etc., are merely terms expressing phenomena unexplained. It will be the business of the animal and plant breeders in the next decade to get at the reasons why we find in breeding what we do.

Winnipeg, Man.

JAS. MURRAY.

Weaning Pigs.

The practice of the most expert in the raising of swine, either for breeding stock or the block, is to wean the young pigs at eight weeks. They have previous to that time been taught to eat shorts and sweet milk, shared with the sow, and are strong enough to do for themselves. The boars in the litter should be castrated a week or so before weaning, as such an operation seems to affect them less when on the sow than later. At weaning-time cull the stronger from the weaker ones, and pen separately. Warm skim milk, in which is sprinkled some shorts, gradually increasing until the mixture is as a thin porridge, is about as good a thing as any for the young pigs. The addition of oil meal, one quart to the barrel of shorts slop, is a good thing. The pigs' bitters mixture (wood ashes, charcoal, salt and sulphur) should be kept in a box accessible at all times. A month after weaning the ration may be made of equal parts shorts and chopped wheat or barley. The hog-pasture should be one worthy of the name if gains are to be made, and for that there is nothing better than rape in rows, and the young pigs should be pastured separately from the brood sows. Experiments have shown that the most profitable gains are made when the hog pasture (either rape, clover, peas and oats) is supplemented with some grain, and not enough to make them lie down all the time. The ration mentioned above, plus buttermilk, is very good. At 5½ to 6 months they may be penned and finished on shorts and crushed barley, and, if available, a little pea meal; or, better, let them rustle peas in the straw. At 6½ to 7 months, with careful feeding they can be made to weigh 180 to 220 pounds, or what is termed by the packers—selected weights.

Regenerative Power in Animals.

Everyone is familiar with the physiological phenomena by which animals maintain their corporeal entity by replacing parts of the body that may be lost by accident. The extent to which this process of repair will go not being well defined, a noted German experimental biologist has been investigating this circumstance, using animals of lower orders for experimentation.

Since it was known that the parts in the region of the bill in birds is renewed after injury, the question arose as to whether there would be a corresponding renewal of organs having the same functions in the reptiles, which are closely related to the birds. For this purpose lizards were used, certain bones in the jaw being removed, and it seemed to make a difference in the results obtained as to which bone was removed. A particular bone removed is protected by a bony shield, but after regeneration this shield was replaced by several small plates of bone. This was considered as an indication of a reversion to an ancestral type, in which the armature of the head originated as numerous small plates, which later on in the development of the race fused into the more substantial shield.

Experiments were also conducted with the crawfish, legs being removed from a large number of specimens. After two months, with a few no leg had been replaced,

with others a new leg grew perfect in shape but smaller, and with several a perfectly normal leg, having the usual number of joints with pincers at the end was formed.

These experiments show the wonderful power of regeneration possessed by the lower orders, and when it is remembered with what difficulty some simple flesh wounds in the higher orders are healed it would seem to indicate that the higher up the order of development we ascend the less becomes the power to replace lost or worn tissue.

FARM.

Flax Fiber for Binder Twine.

According to the Farm Implement News, a promising industry for the near future is the manufacture of binder twine from flax fiber. For nearly twenty years experiments have been made along this line, only to be abandoned because of some deficiency in the quality of the twine, or because it could not be produced at as low a cost as that made from manilla and sisal. That the practicability of the manufacture was recognized may, however, be judged from the persistence with which the experiments were continued, and within the last few years that persistence has been crowned with success, several satisfactory systems being now in use. Among these one of the most notable was devised by Mr. George Ellis, under the direction of Mr. William Deering. This is the system now being utilized by the International Harvester Co., by whom an extensive flax twine plant has been established and is now in full operation. The Ellis machine not only extracts the fiber, but separates the weak from the strong, which alone passes out to be made into twine. The refuse is used as cheap upholstery tow, bedding for horses, and fuel for the plant.

Other systems are being found equally satisfactory, and are being put into operation by the Summer's Fiber Co., at Port Huron and Chicago, and the Continental



Success.

Hereford Stock and Show Bull, bred by Major Hengate, Herefordshire, and owned by Sir Chas. Rouse Boughton, Downton Hall, Salop, England.

Fiber Co., of Northfield, Minn., both of which, like the International Harvester Co., are contracting with farmers to grow flax, and supplying the finest grade of seed; clean flax only being suitable for the manufacture of the twine. Experiments made by the International Co. have demonstrated that one acre of flax will produce 360 pounds of twine, or enough to bind 144 acres of grain, on the basis of 2½ pounds of twine to the acre. It is expected that the amount of flax used this year will be much greater than last, and a constant increase for the following years is predicted.

A Tenderfoot Speaks from Experience.

I am a tenderfoot as far as farming is concerned, having been in business nearly all my life, and will say your splendid paper has been a great help to me, as it must be to any person requiring pointers along agricultural lines. I cannot for the life of me understand why every farmer in Canada does not take it, for I find the opinions and experience of our best and most successful farmers are learned through its columns as well as a great amount of information that, if followed, is sure to make for success. I find the most prosperous farmers in this section are the men who take and study the "Farmer's Advocate." Wishing you and your paper prosperity.

AUSTIN MILLER.

Norfolk, Ont.

Mr. Downey's wood-lot tax-exemption bill before the Ontario Legislature was withdrawn, and the subject referred to a select committee to report at the next session of Legislature.

Turnip Culture.

The experience of successful feeders of cattle and sheep has satisfied them that for the healthy growth and development of young stock of these classes, for the rapid putting-on of first-class flesh or the making of milk in large quantities, turnips are one of the most valuable stock foods that can be grown and fed. Those who grow corn successfully and preserve it in the silo, have a succulent food that may to some extent take the place of roots, but not wholly, and the most successful feeding is done where there is a combination of these feeding materials with others, constituting a balanced ration. There has evidently been a considerable falling off in the growing of turnips since the advent of the silo in Canada, many farmers having given up their culture entirely. This, we believe, is a grave mistake. Fewer turnips may suffice where ensilage is fed, but roots should be provided in at least a moderate supply, in order to get the best results in feeding.

If well managed the turnip crop is not a very difficult or expensive one to cultivate and harvest. The land should be fall plowed, and if manure be available, the best results may be had from its application at that time; if not, it may be spread on the surface, during the winter, or even at this season, being well worked into the land before it is ridged for the sowing, or else spread in the space between ridges, splitting the ridges to cover the manure. It is important that the land be thoroughly cultivated to reduce it to a very fine tilth, to induce quick germination of the seed, and in order that the young plants may be enabled to appropriate the elements of growth in the soil and go forward rapidly without check. Any time up to the 20th of June is early enough to sow, and we have known good crops from sowing as late as the 10th of July where the circumstances of weather and culture were very favorable. We prefer to sow immediately after a rain rather than before, as a rain is apt to pack the fine soil top closely, and a crust forming, excludes the air and hinders the plants from getting through, while if sown after the rain these hindrances are not so likely to occur.

Two pounds of seed per acre is sufficient, sown on drills or ridges which may be rolled to flatten them after sowing or when the plants begin to show, if the land is dry enough not to crust afterwards. Care should be taken to check weeds in the early stage by cultivating with the horse hoe, or better, with a wheel hoe, which may be run by hand astride of the row, stirring the surface and effecting the triple purpose of destroying weeds, admitting air, and conserving moisture. Much of the satisfaction of handling the crop depends upon killing the weeds in their incipient state, as when once they get strong

it is much more troublesome to conquer them. Frequent cultivation with the horse hoe, running it as close to the plants as can safely be done, is, therefore, of the utmost importance.

As soon as plants are large enough for thinning or singling, the hand hoe is used for this purpose, striking out the width of the hoe, and thinning to single plants at about twelve inches apart. This can well be done without putting the hand to the plants; simply by pulling and pushing the hoe, being careful to destroy every weed, root and branch, and move the soil around each plant, so as to give it liberty to grow and do its best. With practice, a man can go over a good deal of ground in a day in this singling process. After this, repeated horse-hoeing every week or two, and especially after a rain, will keep the crop going on to perfection. If weeds appear, or the singling has not been really well done, a second hand-hoeing will pay well for the doing.

The harvesting may be most rapidly done by cutting the tops off with a sharp hoe, striking the tops of two rows together, and running a plow-share (the mouldboard being removed) under the turnips, cutting the taproots and turning the bulbs over on the row of tops. With three double rows, a wagon and team straddle the middle row, and with three men or boys, one on either side of the wagon and one behind, the loading is rapidly performed, the turnips being rapped together while in the hands to knock off any clay sticking to them. It is well to use a slatted screen when running the roots into the cellar, to prevent earth going in with them; which is liable to cause heating and rotting at the place where they fall.