

Are Acquired Characters Transmitted?

The Chicago Horseman has published a series of interesting articles by Prof. Casper L. Redfield, expounding some theories based upon the results of investigations relative to the effect that condition and age in sires or breeding stock generally may have upon their offspring. Confining his study to trotting horses, he has tabulated evidence to show that apparently the best performers have sprung from adult horses that had been in the best possible condition for service on the track, and from this fact endeavors to deduce that a degree of the acquired dynamic qualities, i. e., force or power, possessed by the sire at time of breeding is in some way transmitted to the progeny, and that the converse applies to stallions that have been pampered or have not had these qualities developed.

In a recent issue of the Horse World is a further article by the same author, under the title, "The Assumed Inheritance of Acquired Characters; Its Relation to Organic Evolution." While it is not unlikely that Prof. Redfield's conclusions rest upon a foundation of fact, it is by no means certain how far he is right. Some of his theories are ingenious, not to say far-fetched. But we will let him speak for himself, in the following words:

"By tabulating animals which breed in pairs and at successive times, it is found that each increase in the age of the parents at the time of reproduction causes a corresponding increase in the natural longevity of the offspring. This increase in longevity is accompanied by later arrival at maturity and capability of reproduction at a later age. The propensity of animals to fight at the beginning of the breeding season operates automatically to increase the age of the parents at the time of breeding, and this in turn increases the longevity of the progeny."

"When an animal fights he exercises his physical and mental organism, and exercising these organs develops their size and strength. When males fight for the possession of females, these fights take place before breeding occurs. To a large extent many of these fights occur a considerable time before breeding, and as a consequence, nature in a very large degree develops her animals before she breeds them."

"By tracing backward from the best trotting horses of to-day to their progenitors of three or four generations ago, it is found that those progenitors were exercised at the trot to a considerably greater extent than were the average animals of the same breed which were at that time used for breeding purposes."

"These and other examples indicate that the development acquired by activity in one generation becomes part of the heredity of the next. . . . When any organ is developed so as to make it stronger, that development is a gradual process and not an instantaneous result. Development increases with time, and becomes greater and greater the longer the time during which it is continued."

"Longevity in offspring is increased by anything which increases the age of the parents at the time of reproduction. Contest between males for the possession of females is one of the things which acts to delay reproduction until the animals are fairly well advanced in age, and these same contests develop the dynamic qualities of the animals."

"In America the trotting gait in horses has been more cultivated and exercised than in any other country, and, by descent from horses developed in that way, we have produced the best trotters in the world. From a different stock and by similar training and development continued through a number of generations, the Russians have produced trotters second only to the Americans. The English Thoroughbred consists of Arabians and Barbs grafted on common stock. By training and racing these horses generation after generation we have horses much superior to either of the originals. In 1825 a young hunter bought a brace of ordinary setters from his neighbor. For forty odd years this man used these dogs and their uncrossed descendants for hunting purposes. Being a hunter and not a breeder, he did not ordinarily breed his dogs until they became so old that it was necessary for him to provide for their successors, and being an enthusiastic and indefatigable hunter, he worked his dogs from daylight to dark every day for weeks together. At the end of this forty odd years of crowding the greatest possible amount of development into his dogs before breeding them he had the best setters in the world."

"These examples indicate that a high degree of activity and a continually increasing length of time between generations are the most important elements which enter into a complete theory of organic evolution. So powerful are these two things in promoting progress from a lower to a higher scale that I do not hesitate to state unequivocally that I consider them more influential in true evolution than are all other factors and influences put together. These are things over which man has or may obtain control, both as regards himself and as regards the lower animals, and I have sufficient confidence in the evidence obtained to go on as saying, that through them man may build up any kind of animal he may wish, and to any degree he may desire—even to the extent of making one of the lower animals superior to what he now is himself."

"I say that the length of time elapsing between generations is one of the fundamental elements of organic evolution, and that the breeders of men, of horses, cattle, dogs or fowls can, by controlling this

element of evolution, produce any kind of result desired. Not all of the results desired are of the same kind, and to produce results of different kinds this control must be exercised in different ways. But if we are to take control of nature's laws and direct their action along such lines as seem to us advantageous, we should not confine ourselves to directing one thing, we should direct all of these things which come within our reach. Besides controlling the age at which reproduction takes place we should control the degree of activity and the lines along which we wish it to go. We should also take intelligent advantage of each accidental variation in form or color which will assist in rapidly reaching a desired goal."

"The first thing for the breeder to recognize is that all of the animals which we know to-day have been developed by a process of evolution from previous animals of an inferior quality. The next thing is a recognition of the forces which have kept that process in operation until they have brought about the results which we now see. And the third step is to keep those forces acting continuously in a desired direction, so that each step may be a forward step. With such knowledge properly applied the practice of breeding animals will be as certain in its results as are the results of ordinary manufacturing process, and the rate at which improvement will be secured will exceed anything the world has yet seen."

Possibly Prof. Redfield's conclusions are extravagant. Dr. A. S. Alexander, a well-known authority on horses, goes so far as to say in commenting on the theory:

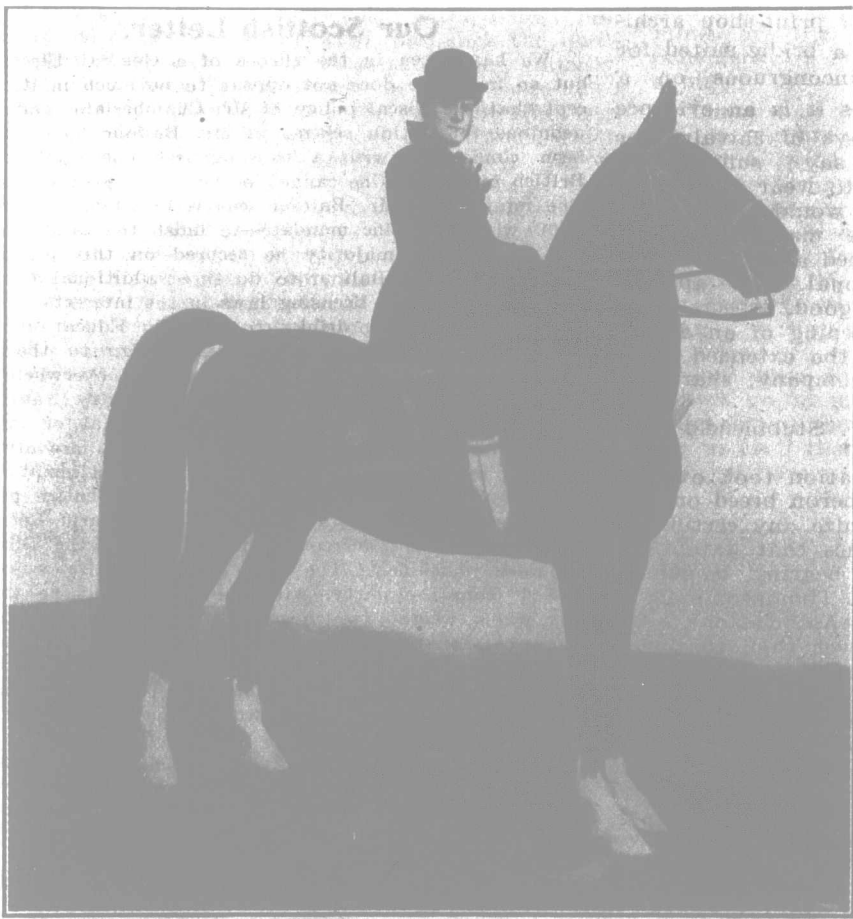
"Whether the age of the sire or dam affects the

What Should be the Farmers' Horse-breeding Policy?

The question is sometimes asked, "Have we, with all our excellent breeds of horses, one, the grades of which are, in any frequent number of cases, exactly suited to the purpose of farm work?" We have the Thoroughbred and Standard-bred, both good for the respective purposes for which they have been bred, viz., speed at the running and the trotting or pacing gaits, but only in occasional instances do they get possess the weight and the steadiness to meet the requirements of the farm work-horse. The Hackney, also, would be a better farm horse if he had more size, and his characteristic action is none to his advantage so far as work is concerned. We have the French and German Coachers, but they lack prepotency, and, so far as our observation goes, their colts are often disappointing. We have the Clydesdale, king of draft breeds, but he is scarcely so active as the majority of us would like. The plow-horse of the Old Country is, not, the farm horse of Canada. The same observation applies also to the Shires. The Percheron is frequently deficient in his underpinning, and, while some of the stallions put up a flashy show, and some excellent individuals are produced, inspection of the line-up at an exhibition such as the Chicago International, fails to convince the farmer, as a general rule, that any good can come of transferring his favor from the Scotch or English to the French draft breed. Had we a stout, clean-limbed, fairly active and prepotent breed, of about the Clydesdale's scale, but with a conformation modified in the direction of the old Morgan type, it seems to us we would have a breed the stallions of which, when mated with the common mares of the country, would get a large proportion of useful farm horses, and that such would no longer be, as they now are, an accident of breeding. However, since we haven't such a breed, and are not likely to have one for a good many years to come, the question is, what breed should farmers use to produce horses that will best meet their own needs, as well as the most profitable market requirements. There is, beyond question, a great deal of injudicious mating done every year for lack of a clearly-advised policy in this regard. Seeing that our reputation as a horse-raising country depends upon our adopting and adhering to some one or more systematic general lines of breeding, and seeing, further, that the subject is of direct interest to every farmer, we believe an open discussion in "The Farmer's Advocate" at this season would be advantageous.

The questions we present for consideration are: Should a farmer's principal aim be to produce a horse for his own use, or a horse for the market? What breed of horses in this country will, when mated with the general run of mares, produce the largest proportion of useful farm horses? What light breed of horses will get the largest proportion of stock that will bring the surest and best average market returns? What breed of heavy horses will get the largest proportion of stock that will bring the surest and best average returns? What breed is likely to get the most profitable stock for the farmer, considering his own as well as the market requirements? What classes of horses are likely to increase and what to decrease in demand during the next ten or twenty years? Admitting that there will continue to be some call for all our present breeds and recognized classes, what should be advocated as the line of breeding for farmers to adopt most extensively? Is it advisable to encourage additional breeds, or confine our attention to a few of the best we have? We will be glad to know if your label has not been changed. This is our busy season.

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progeny, or whether the prepotencies already possessed by the parents can be intensified by training in the direction of a particular prepotency—for fast trotting, as an example—cannot be asserted with any degree of assurance, and so far as our own observation and experience goes we do not believe that the prepotency is so affected or susceptible of change other than that due to the state of health of the animals at time of mating."

Our own opinion on the matter, if we were to take the privilege of speculating, would be that working draft stallions and mares, or development of speed in trotting horses, would have a tendency to develop power or speed, respectively, in the progeny, and that lack of such working or training would eventually result in the impairment or loss of the dynamic qualities for which the ancestry had been noted. It is probable that the results of one policy or the other would not be marked in the first generation, but more and more pronounced in succeeding ones.

What is the Shetland pony but a product of environment? What is the action of the Hackney but the result of training which developed a tendency that has gradually become hereditary? Going to cattle for an illustration, how is the milking tendency of certain breeds accounted for but by the hereditary transmission of milking quality developed in successive generations by careful and persistent milking in each lactation period from the first calf on? Do not the facts point to the probability that man in improving breeds of horses or other stock, can supplement and reinforce the effects of selection by developing in his breeding animals those qualities he wishes to fix in their progeny?