

become almost obsolete, and Labor and Science, or even a good general education, are looked on as having but an indistinct relation to each other. Hence the youth too often consider that there is no preparation needed to enter a shop, and they only stay long enough to become familiar with the ordinary routine which they consider is all that is necessary, and it is a question whether workmen as a class are the equals of those who have gone before them. It is not likely that we will ever revert to the old apprentice system, nor, did we do so, would it supply the wants of the present. The modern system, now introduced into most European countries, and also in the United States, recognizes the direct association between *Labor and Science*—the practice and principles of technology—by establishing technical schools, where both are associated in the instruction given, and the competent agriculturist or workman is the result. Recognising the duties of the skilled mechanic from his own most extensive experience, Sir Joseph Whitworth established in England, some years ago, a series of scholarships in the engineering trades, which has been productive of the best results. At that time technical schools were very few (they have increased greatly of late), and the opportunities of the apprentice very limited, but by the Whitworth system it was possible for the ordinary apprentice to properly qualify himself. Sir Joseph laid down a curriculum extending over three years, with yearly examinations, in theory by written papers, and in practice by manipulation in the workshop. The apprentice can learn from the published curriculum what the subjects for examination are, and by attentive reading of text books at spare hours, and by attentive work in the shop he can prepare himself to pass the competitive examination which gives him the £100 scholarship and may obtain it during each of three years in succession, and get a certificate that will give him a commanding position in his walk in life.

In Nova Scotia there is no reason why a system similar to this may not obtain, with very satisfactory results. Let facilities be afforded to make candidates acquainted with what each calling demands, and in a very few years the people would be so educated that technical schools would be not only supported, but established in every county in the Province, in order that the population could receive the special education that was most suitable for their district. The Nova Scotian youth is not behind any other in ability or energy, and a successful result can be depended on.

The farm will not be vacated for the precarious and, to many, the unsuccessful "life work" that attends the majority of

the residents of cities, and the necessaries as well as the pleasures of life will be more freely accessible to all the members of our rural and civic populations.

BREEDING IN FAMILIES.

The following article from the *Country Gentleman*, gives a very clear view of a subject on which information is much required by our farmers:—

While we shall not seek to disguise the fact that the breeding department of the *National Live Stock Journal* is conducted with much care and ability, one can scarcely fail to observe that an unreasonable prejudice is shown against the practice of in-and-in breeding. In the breeding papers which appeared in the last volume of the *Country Gentleman*, I attempted to answer some of the objections which had been raised against line breeding, and to bring out the exact influence to be derived from it; and as this is a peculiarly interesting subject, and one that is not less important than interesting, I will point out what appears to be unsound argument in the journal above referred to.

THEORY OF LINE BREEDING.

It is evident that extravagant claims may be made for in-breeding just as they are made for crossing, and, if we consider only the absurdities of those who advocate a practice, it is not difficult to place any system of breeding in an unfavorable light; but when we remember that, in the formation of nearly all our best breeds of animals, long and close in-and-in breeding was practiced, there certainly appears ground for looking at the matter from a reasonable and unbiased standpoint. The great law that "like produces like," *i. e.*, that everything inherited by the offspring must have previously existed in the ancestors, covers the whole subject of breeding, and how it can be supposed that an animal can transmit that which it does not possess, whether by in-and-in breeding or crossing, is incomprehensible. If those who favor line breeding are willing to admit this, is it asking too much if we expect our opponents to do the same? What we claim for in-and-in breeding is that it increases the *parental* power of reproducing themselves in their offspring, and in order to successfully dispute this, it is necessary to overthrow the whole theory that *like produces like*—that parents transmit that which they possess.

If we pair a thorough-bred with a Percheron, what can we expect? The offspring cannot be like both parents, because they are unlike; but long experience has demonstrated that it may closely

resemble either parent; that it may vary all the way between the parental extremes; or, finally, that it may revert to a greater or less extent, to the form of some remote ancestor. That is to say, such a union does not admit of any certainty as to the form and character of the offspring. If, now, we pair two thorough-breds, or two Short-horns, the produce will inevitably be a thorough-bred or a Short-horn. Why? Because the parents are alike in the characters which are peculiar to these breeds. But go a step farther: the members of one strain of Short-horns are good milkers, those of another are not. How shall we breed to perpetuate the milk-producing aptitude? Evidently by breeding within the milking strain; for if we go beyond, we have the same causes for variation—the same uncertainty of results—as in crossing the thorough-bred and Percheron. This much we think must be admitted, and, if so, it shows that a family may have the same "distinctive characters that are usually attributed to a breed or race;" and hence arises a necessity for line or family breeding.

Again, the simple fact that two animals have certain characteristics apparently in common, is no surety that if paired they will transmit them to their offspring; there are certain internal or physiological tendencies, of which we have little cognizance, except from their effects, which may be antagonistic and cause reversion. Thus two non-sitting varieties of fowls, though alike in this respect, when bred together often revert to the ancestral character of brooding; and so the union of different strains of the same breed often causes partial reversion, especially in color, as many of our breeders of show birds have found to their cost. But when bred within itself, a variety of everlasting layers will not produce broody offspring, nor will an established strain of any variety produce reversions of color. That is to say, the union of animals that are unlike, either anatomically or physiologically, whether they belong to different breeds, to different varieties of the same breed, or even to different strains of the same variety, produces variable offspring, and that which is peculiarly subject to reversion.

But how are we to know that animals are alike in characters or tendencies that are beyond our penetration? If two animals are descended from the same parents, the influence of the remote ancestors *must* be identical with each; and the immediate parental influence can only differ to the degree that any animal can change in physiological condition from one year to another; which, if they remain healthy, is a slight difference compared with that existing between different individuals. That this is true is shown by the class of