

support. The largest of them, the Marine Biological Association's station at Plymouth, is faced with a serious deficit, and is forced to contemplate the curtailment of its operations. The amount of sympathy and support which the cause of "pure" science can evoke in Great Britain is, unfortunately, very small. We should therefore regret very much to see another "station" started, especially as the staff at Plymouth have carried out just such a faunistic survey of the coast near Plymouth as Mr. Pace desiderates.

Mr. Pace believes that the intrusion of the economic motive "must arrest, if it does not entirely hinder, scientific research." If the zoological schools of this country would concentrate on supporting one station, economic work might be dispensed with, and we might have a purely scientific biological station like Wood's Hole in America. But this goal is far off. Each new zoological school seems to desire its own station, and since the "stations" must look outside the ranks of professional zoologists for support, this support must be attracted by the promise either to devote part of the energies of the staff to economic problems, as the council of the Plymouth station have done, or to undertake the dissemination of popular knowledge of natural history, as the council of the Millport station has done. After all, the foundations of our knowledge of natural history were laid by the splendid amateurs of the last generation, of whom the founder of the Millport station was one. A great service to science would be accomplished if we could resuscitate this race.

We agree with Mr. Pace that it would be an admirable thing if marine biological research in this country could be organised; but it seems to us that the first step in this direction would be the whole-hearted support of the Marine Biological Association, which was founded for this purpose, and this association, if adequately financed, could provide a steamer which would serve the purpose of faunistic investigation better than the movable laboratory which Mr. Pace desires. Mr. Pace's scheme is an admirable one for starting investigation in a new country—it was that adopted by Canada for seven years; but in Canada it has been given up, and a permanent station on the model of Plymouth has been substituted for it.

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#### INHERITANCE IN THE DOMESTIC FOWL.<sup>1</sup>

IN the conditions under which they work, students of genetics enjoy exceptional advantages in America, where the munificence of private benefactors or the enterprise of various States has already led to the creation of several institutions specially endowed for this line of research; and from time to time the record of their work may appear in the form of a sumptuous publication issued by the Carnegie Institution of Washington. Dr. Davenport is already known for his investigations on heredity in poultry, and the present volume forms a continuation of the account of his researches to which a volume in the same series was devoted in 1906.

The memoir deals mainly with characters which, at any rate in some cases, are remarkable for the considerable grading that is found among the offspring of the various crosses. To this category belong the feathering on the shanks and the extra toe, both normally found in certain breeds of fowl. It has been recognised for some years that the inheritance of polydactylism in poultry often exhibits irregularities as compared with that of other characters where the mode of transmission is of a simple Mendelian nature. There are cases where the polydactyl condition may behave as a dominant to the normal in the ordinary way, but there are also cases where a bird with normal feet, bred from a polydactyl strain, may transmit the polydactyl condition to some of its offspring, *i.e.* where the individual does not exhibit the extra toe, though breeding tests show that the factor or factors for it must be carried by some of its germ-cells. The dominance of such a character as exhibited by the zygote may range from completeness down to *nil*. Nevertheless, some of the  $F_2$  birds are without the extra toe, and are incapable of transmitting it; in other words, some of the germ-cells of

<sup>1</sup> "Inheritance of Characteristics in Domestic Fowl." By C. B. Davenport. Publication No. 121. Pp. 100; 12 plates. (Washington: Carnegie Institution, 1909.)

the  $F_1$  birds are completely free from the element, whatever it may be, to which the extra toe is due.

Hitherto it has not been possible to express this case more precisely, and though Davenport's results confirm our previous knowledge, he has been unable to construct a definite factorial scheme to cover the facts. He concludes that in polydactylism, as also in other cases, such as rumplessness and the feathered shank, dominance varies quantitatively, and that the degree of dominance is inheritable; but, of course, this does not help us in understanding what these varying degrees of dominance are due to. It may be that further work will make this more clear, or it may be that the heredity of these meristic characters differs from that of other characters in some way that has not yet been perceived. For the present, we can only confess to ignorance.

An account is given of crosses between either Houdan or Polish and single combs, and an attempt is made to explain the results on the supposition that two comb factors are concerned. Here again the irregularities between normal expectation and observation are attributed to quantitative variation in the degree of dominance. Experiments with fowls' combs have hitherto given such well-defined results that it seems not impossible that the complexities encountered by the author are due to the fact that he is dealing with more than two comb factors in this particular cross. The author's statement that many forms of comb appear in the  $F_2$  generation is probably not without significance.

A chapter is devoted to the inheritance of the high and widely open type of nostril found in the low-combed Polish and Houdan breeds. From an elaborate system of grading his data, the author concludes that the widely open condition is dominant to the more usual narrow form of nostril, and that the intermediate grades are the result of imperfection of dominance, though here again no suggestion is given of the cause of this imperfection. There is little doubt that this character of wide nostril is largely dependent upon the size of the comb, and we cannot help feeling that the treatment of the question would have been more satisfactory had the nostril and comb characters been worked out in relation to one another.

The inheritance of crest Davenport considers a somewhat more complex case than it was originally thought to be, and he suggests that its nature depends certainly upon two, and possibly upon more than two, factors.

A short chapter is devoted to the results of breeding from a wingless cock. When crossed with normal birds the offspring were all normal, and some of these bred together again produced nothing but normals. Davenport suggests that winglessness is dominant to the normal condition, that the wingless cock was heterozygous, and that dominance in subsequent generations was imperfect. It may be pointed out that the facts accord equally well with the view that the abnormality was a purely somatic one, and was not reflected in the germ-cells of this wingless bird.

A number of experiments were made on plumage colour, largely with the view of elucidating the nature of buff and of black, and the author has seen his way to express his results in simple terms. Perhaps one of the most interesting results is the appearance of a definite proportion of white birds in the  $F_2$  generation from a cross between black and buff Cochins. The author is, however, less happy in his discussion of the inheritance of blue, and his attempt to make the colour-inhibiting factor of the white Leghorn partly responsible has led to an account that is inconsistent with itself.

The memoir concludes with a general discussion on topics connected with heredity.

#### AGRICULTURE AND ALLIED SCIENCES.<sup>1</sup>

THE number of agricultural and horticultural publications has reached somewhat alarming proportions during the last few years, but there is always room for really good works; and in this category must be placed the Journal of the South-eastern Agricultural College, Wye, Kent, No. 18 of which is under notice. This publication

<sup>1</sup> "The Journal of the South-eastern Agricultural College, Wye, Kent, No. 18. Pp. 443. (London and Ashford: Headley Bros., 1909.) Price 6s.; Residents in Kent and Surrey, 3s.