

rocks are, in Great Britain and Ireland and elsewhere, deficient in lime. In our own experience we have seen most valuable results produced by the application of lime to these soils; and we learn from M. Burat that by the same means several districts in the West of France, which formerly were unable to maintain their people without extraneous supplies of food, have (*i.e.* by the use of lime) become the largest exporters of grain. All the author's illustrations are taken from France, but they have their counterparts in these islands.

On the whole, we are justified in saying that the little work will well repay perusal.

OUR BOOK SHELF

Flora of Dorsetshire. By J. C. Mansel-Pleydell. (London: Whittaker and Co. Blandford: W. Shipp.)

Flora Cravoniensis: or, a Flora of the Vicinity of Settle in Craven, Yorkshire. By John Windsor. (Manchester: Cave and Sever, 1873. Printed for private circulation.)

ALTHOUGH the boundary-lines of our counties are, as a rule, purely arbitrary, it is probably wise for the compilers of local floras to maintain them rather than to erect new ones of their own. The area of their observations is, at all events, thus rendered perfectly clear and certain. Dorset has long been famous for its palæontological wealth, both vegetable and animal; and we have here a record of its living flora, which, as might be expected from its length of sea-board and its variety of geological formations—lias, oolite, forest marble, Oxford clay, coral rag, Kimmeridge clay, Portland sand, Purbeck, chalk, and Eocene—is a rich one. The value of local floras depends greatly on the dependence that can be placed on the determination of the species by the editor and his *collaborateurs*; and on this point it seems to us that the present work can be safely trusted, great pains having been taken to establish the authenticity both of the localities and of the nomenclature. The county is divided into seven districts determined by the drainage, and therefore generally separated by high land; and a very good map of the county accompanies the volume. Among the greatest botanical rarities of the county (some of them almost unique) are—*Polycarpon tetraphyllum*, *Lotus hispidus*, *Simethis bicolor*, *Leucojum vernum* (doubtfully native), *Carex clandestina*, *Scirpus parvulus*, and *Cynodon dactylon*. The flora is confined to flowering plants and vascular cryptogams.

Mr. Windsor's "Flora of Craven" (the veteran author did not live to see its publication, or rather printing) is compiled on a different plan, the area being a somewhat arbitrary one: "about Settle and its neighbourhood to a moderate distance, generally within twelve miles, but in a few instances extending somewhat further." The district is a remarkably interesting one, whether from a geological or a botanical point of view; and the flora has been compiled with as great care as in the other case under notice, with the assistance of several good local botanists, and includes not only the flowering plants and vascular cryptogams, but also the Characeæ, Mosses, Hepaticæ, and Lichens. A district that includes among its native plants such rarities as *Polemonium cœruleum*, *Epipactis ovalis*, and *Cypripedium calceolus*, is of no ordinary interest.

Both these volumes are useful contributions to our library of local botany. We would especially commend to compilers of similar works the plan adopted by Mr. Mansel-Pleydell, of giving the geographical range of each species in the neighbouring counties of England and on the opposite coast of France.

A. W. B.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Migration of Birds

THE subject to which Prof. Newton has called attention is one of great interest to all naturalists, and requires to be studied systematically; for I can hardly think that the solution is so "simple in the extreme" as Mr. Newton thinks it may be.

It appears to me probable that here, as in so many other cases, "survival of the fittest" will be found to have had a powerful influence. Let us suppose that in any species of migratory bird, breeding can as a rule be only safely accomplished in a given area; and further, that during a great part of the rest of the year sufficient food cannot be obtained in that area. It will follow that those birds which do not leave the breeding area at the proper season will suffer, and ultimately become extinct; which will also be the fate of those which do not leave the feeding area at the proper time. Now, if we suppose that the two areas were (for some remote ancestor of the existing species) coincident, but by geological and climatic changes gradually diverged from each other, we can easily understand how the habit of incipient and partial migration at the proper seasons would at last become hereditary, and so fixed as to be what we term an instinct. It will probably be found, that every gradation still exists in various parts of the world, from a complete coincidence to a complete separation of the breeding and the subsistence areas; and when the natural history of a sufficient number of species in all parts of the world is thoroughly worked out, we may find every link between species which never leave a restricted area in which they breed and live the whole year round, to those other cases in which the two areas are absolutely separated. The actual causes that determine the exact time, year by year, at which certain species migrate, will of course be difficult to ascertain. I would suggest, however, that they will be found to depend on those climatal changes which most affect the particular species. The change of colour, or the fall, of certain leaves; the change to the pupa state of certain insects; prevalent winds or rains; or even the decreased temperature of the earth and water, may all have their influence. Ample materials must exist, in the case of European birds, for an instructive work on this subject. The two areas should be carefully determined for a number of migratory birds; the times of their movements should be compared with a variety of natural phenomena likely to influence them; the past changes of surface, of climate, and of vegetation should be taken account of; and there seems no reason to doubt that such a mode of research would throw much light on, if it did not completely solve, the problem.

This is an appropriate opportunity for making a suggestion which has long been in my mind. It is, that it would be a valuable and interesting addition to NATURE, if we were supplied with a weekly (or monthly) "Calendar of Periodical Phenomena in Natural History," such as the average dates of appearance and departure of migratory birds, of the opening and fall of the leaf of our forest trees and common cultivated trees and shrubs; of the flowering of our common field and garden plants; and also the mean *highest* and *lowest* temperature of each *day*, the direction of the wind and amount of rainfall for each *week*, according to the Greenwich averages. None of this information is given in the usual almanacks or periodicals, and it is by no means easy to find it when wanted. Yet it is surely of much value to everyone who lives in the country, and would be the means of exciting an intelligent interest in such observations and inquiries as those to which Prof. Newton has called our attention in his interesting article.

ALFRED R. WALLACE

Regular Motion in Clockwork

IN order to ensure perfectly regular motion in the clockwork which drives the revolving dioptric apparatus made by Messrs. Chance, Bros. and Co., I have recently introduced a centrifugal governor, which might perhaps also be useful for the clocks of equatorials. Though it involves nothing new in principle, the form differs from anything I have seen, in that the governor balls have to lift a heavy weight, and that the leather rubbers or brushes are not carried by the revolving balls, but are fixed to the frame of the clock and rub against the disc which forms the extra weight lifted by the balls. The sketch shows the governor