

DISCUSSION AND CORRESPONDENCE.

ISOLATION AND EVOLUTION.

It seems to the writer to be a cause for congratulation that a variety of possible factors of evolution are being discussed at the present time. Just as the factors associated with Darwin's name together with those of the Lamarckian school overshadowed all others in the discussions of the last forty-five years, so now we are in danger of having the 'mutation theory' of de Vries obscure the botanical eye to all other factors. Not that I would endeavor to throw any doubt upon de Vries's facts; they are well authenticated. But they do not, like the socialist's theory of political economy, exclude every other factor from the problem, and we should not, consciously or unconsciously, so consider them.

I have been greatly interested in President Jordan's article on the part played by isolation in evolution. While not disputing the efficacy of isolation as a factor, I would long hesitate to assign it the leading rôle to which President Jordan assigns it. Professor Lloyd's statement of the floral evidence against Jordan's dictum is well put and timely, and emphasizes a fact of distribution which is well known to botanists. If it were necessary to do so, the facts furnished by the distribution of the existing flora could be supplemented by paleobotanical evidence in so far as facts of this nature are available. For instance, during the mid-Cretaceous we have a remarkable series of synchronous or nearly synchronous¹ leaf-bearing strata outcropping from the west coast of Greenland on the north, through Marthas Vineyard, Long Island, Staten Island, New Jersey, Delaware, Maryland and Alabama. These plant-beds have yielded an abundant flora and each locality furnishes a number of closely related species which are largely identical throughout the series. The following genera might be mentioned: *Magnolia*, *Liriodendron*, *Laurus*, *Sassafras*, *Cinnamomum*, *Ficus*, *Aralia*, etc.

¹ The fact of correlation of the containing strata is of no importance for the argument when each outcrop furnishes several species which evidently lived in the same habitat.

Taking the genus *Magnolia* we have the following distribution of species in this region: Greenland, four; Marthas Vineyard and Alabama, five; Long Island, eight; Maryland, three; Raritan formation (N. J.), eight; Magothy formation (N. J.), three. In the genus *Ficus* Greenland furnishes three species and there are four species in each of the other localities, with the exception of Marthas Vineyard. While in many cases leaf species may be regarded as variations of a single actual species, in numerous other instances we can be sure that such was not the case.

It would seem that isolation has not been a primary factor to any large extent in specific differentiation, but that it has operated in a larger way in the development of generic or even larger groups in isolated, particularly in insular, regions. In other words, that it gives a facies to the flora of any region. This is implied in Professor Lloyd's article and is merely the statement of a well-known fact of observation. For instance, the Australian region has a peculiar flora comparable to its marsupial fauna, and it is difficult to imagine that the facts are not explained in one case as in the other by isolation. If we examine this flora we find a number of characteristic types of plant-life, the acacias, eucalypts, the many Rhamnaceæ, Proteaceæ, Santalaceæ, Leguminosæ, etc., the latest with over one thousand species. In all these groups we find numerous species, in many cases an excessive number, closely related, and many with largely identical habitats, so that Professor Lloyd's contention regarding distribution and specific differentiation receives a large measure of support.

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ON THE HUMAN ORIGIN OF THE SMALL MOUNDS
OF THE LOWER MISSISSIPPI VALLEY AND TEXAS.

THE following extracts bearing on the theory of the human origin of the small mounds of the lower Mississippi Valley and Texas, resuggested in a recent issue of SCIENCE by Mr. D. I. Bushnell, Jr.,¹ may be of interest at this time:

¹ Vol. 22, pp. 712-714.