and origin of mountain chains, English geologists were conspicuous not only by the clearness of their views but by the skilful manner in which they applied the new principles to the explanation of our own mountain masses, especially those of the Scottish Highlands. Daniel Sharpe demonstrated the essential points of resemblance between the structure of the mountains of Scotland and those of Southern Europe; while Scrope and Darwin went still further in insisting that the intimate structure or foliation of the rock-masses of our own and other mountain chains must be attributed to the mechanical effects of the great movements to which they have been subjected. Unfortunately the great influence of Murchison, backed as it was by the authority of the officers of the Geological Survey, threw back the advance of English geology in this direction for nearly a quarter of a century. The doctrines that the rocks of the Highlands were in an essentially undisturbed condition, and that in them the planes of stratification and foliation were coincident, were backed by such a weight of authority, that for a time they overbore all opposition. To the labours of Prof. Lapworth we are indebted for initiating the great reaction against the mischievous teachings of this school; while Messrs. Peach and Horne have more than atoned for the evil done by their predecessors, by the energy and zeal with which they have sought to neutralize the effects of those teachings. It is a fortunate circumstance that these patient researches have been carried on in the very districts which had been appealed to as affording the strongest support to the erroneous interpretations.

In the second section of the work before us the various terms employed by Rogers and the American geologists, by Lory, Baltzer, Heim, Suess, Brögger, Reusch, and other Continental writers, as well as by Lapworth, Geikie, Peach, and Horne, are all brought into clear relation with one another. Where necessary the complicated effects of great mountain movements are illustrated by sketches, and the most invaluable aid is thus afforded to the student who seeks to make himself acquainted with and to compare the remarkable results attained by the workers in distant areas. Especially interesting are the observations upon the intricate phenomena displayed in cases where rocks that have been sheared and foliated during one period of mountain-making are subjected to a second process of the same kind at a long subsequent period. We regret that the space at our command forbids us from following the authors into some of these interesting questions.

The important problems connected with the changes in the internal structure of rocks resulting from the movements to which they have been subjected occupy the authors only so far as is necessary to fix the terms that shall be employed in describing the effects produced. The relative merits of such terms as "pressure metamorphism," proposed by Prof. Bonney; of "pressure-fluxion," by the late Prof. Carvill Lewis; of "dislocations-metamorphism," by Prof. Lossen; of "mechanical metamorphism," by Baltzer; of "metamorphism by friction," by Gosselct; and finally, of "dynamo-metamorphism," recently suggested by Prof. Rosenbusch, are all impartially considered. Whatever be the term eventually chosen to express the important effects pro-

duced by the internal movements—the "flowing"—of rock-masses, we can only rejoice that the ideas so ably advocated long ago by Scrope and Darwin are now beginning to meet with such wide and general recognition. Problems which in the days of these pioneers of geological thought were absolutely insoluble are now brought within the range of practical research. Lehmann, Lossen, and a host of other workers are showing us how by the application of microscopic methods the paramorphic changes and the mutual chemical reactions of minerals in a rock subjected to external stresses and internal movements may be clearly followed step by step; while the physical investigations of Daubrée, Tresca, and Spring afford to us the promise that the actual causes of the phenomena so carefully observed will not long remain hidden from our view.

The numerous workers in all the great centres of thought, whose attention and study are now concentrated upon these grand and fascinating problems, will welcome the work before us as supplying a want that has been widely and deeply felt.

JOHN W. JUDD.

LETTERS TO THE EDITOR.

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Lamarckism *versus* Darwinism.

IN his first letter Dr. Romanes stated that I had accused him without evidence. In the second letter he repeats the statement in other words. The answer to both statements will be found in my last letter.

Dr. Romanes will not have replied to my first letter until he explains or expresses regret for his unfairness to Dr. Weismann. Oxford, September 3. EDWARD B. POULTON.

The Zodiacal Light and Meteors.

I HAVE had the opportunity of looking at Mr. Maxwell Hall's letter (*NATURE*, vol. vii. p. 204), referred to by Mr. Mattieu Williams (May 31, p. 102), and find that it will not in the least bear out the suggestion made by the latter. Hall's observation was evidently not of any "spurious zodiacal light," but of the ordinary zodiacal light in the form called by some writers the "zodiacal band," though perhaps especially bright. Its position, also, as observed by Hall, was quite different from that which could be occupied by a stream of meteors from Biela's comet.

As regards Hall's theory, which he there propounds for the form of the zodiacal light, it has not met with acceptance, as writers in general consider the ordinary theory of the zodiacal light, viz. that it consists of a continuous disk, whether of meteors or any other substance, in which the sun is central, is sufficient to account for the appearances described by Maxwell Hall and other observers.

T. W. BACKHOUSE.

Sunderland, August 31.

THE SERVICES OF CATHOLIC MISSIONARIES IN THE EAST TO NATURAL SCIENCE.

M. ARMAND DAVID, the well-known Lazarist missionary and man of science, has published a series of articles in the recent numbers of *Les Missions Catholiques* of Lyons on the services rendered to the natural sciences by the missionaries in the Far East. The following is a summary of these long and instructive articles.