

The Migrations of the Lemmings.

ALTHOUGH I have dwelt among the Lemmings for many years, and paid great attention to their migrations, I have thought it might be more satisfactory to my readers to record the result of an interview with a captive member of the tribe, as recorded by the aid of a phonograph, assisted by a certain legitimate amount of amplification which the poverty of the language necessitates. This, however, I am convinced is what my little prisoner intended to say. "I am amused by the reasons men give for our sudden appearances and inexplicable migrations. But, although I do not see why I should enlighten you on either of these points, especially as you would probably only stick the harder to your own opinion, I will venture to ask whether you think we cross wide lakes, the opposite shores of which are quite invisible to us, in order to find the food which we thus abandon; indeed, though I fear I am somewhat letting what you call the cat out of the bag by saying it, I have often wondered why I myself did not wander along the green shores of Heimdalsvand and down the valley amid sweet grasses and clover, instead of swimming across to barren Valdels, and getting caught by you for my pains. But, after all, it is no worse than when my friends the swallows leave their flies, and even their families, and start on their travels, when the impulse seizes them, whilst the former are still plentiful, and the latter not yet ungrateful. So I feel indignant at the suggestion that we travel because we are overcrowded and underfed at home. I admit that our temper as a race is somewhat short; it has been impaired by incessant bullying. Dogs, wolves, and lynxes eat us wholesale; and the reindeer disgustingly declare that we are a mere bag of succulent *saur-kraut*. Shadows annoy us, and you men have even invoked spiritual weapons to aid your carnal implements of destruction. But let me seriously advise you not to fling about inappropriate epithets; our customs are at least as good as your own, and probably somewhat older, for we too have had an ancestry, and *noblesse oblige*. Enough; let me out; I want to get on."

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Boltzmann's Minimum Theorem.

THERE is a point of great interest, in connection with Mr. Burbury's letter in your issue of May 30, on which he has not touched.

The expression obtained in the Boltzmann theorem for the value of $\frac{dH}{dt}$ depends on the assumption that the actual distribution is at every instant absolutely identical with the most probable distribution. This we know cannot be exactly true. Therefore the value of $\frac{dH}{dt}$ in Boltzmann's theorem is not identified with the *most probable* value of $\frac{dH}{dt}$. It is, for instance, quite possible, in the absence of proof to the contrary, that no matter in what way the actual distribution differs from the most probable one, the actual $\frac{dH}{dt}$ may be numerically smaller than the value corresponding to the most probable distribution.

In that case Boltzmann's theorem would give the maximum rate of subsidence instead of the most probable rate. Can Mr. Burbury or Dr. Boltzmann throw any light on this question?

EDWD. P. CULVERWELL.

Trinity College, Dublin, June 1.

THE CAMBRIDGE NATURAL HISTORY.¹

ALTHOUGH the third in the series, this volume is the first of the long-promised "Cambridge Natural History" to appear, and as such excites additional interest because it affords some clue to the probable style of the remainder—probable, since "complete uniformity of treatment has not," we are told, "been aimed at." It is worthy of remark that, contrary to what obtains in most popular works on natural history, the Invertebrates are to receive their fair share of attention, and to extend

¹ "The Cambridge Natural History." Edited by S. F. Harmer, M.A., and A. E. Shipley, M.A. Vol. iii. "Molluscs." By the Rev. A. H. Cooke, M.A. "Brachiopods" (Recent). By A. E. Shipley, M.A. "Brachiopods" (Fossil). By F. R. C. Reed, M.A. Pp. xii. 535; 334 Figures in text, and 3 Maps. 8vo. (London: Macmillan and Co., 1895.)

over nearly seven of the ten volumes projected. It is almost a Cambridge work in a double sense, for with the exception of Prof. Herdman, who is to write on the "Ascidians and *Amphioxus*," and Mr. F. E. Beddard, who will undertake two such widely separated subjects as "Earthworms and Leeches" and "Mammals," all the contributors are connected with that University.

"The Cambridge Natural History' is intended," the publishers announce, "in the first instance for those who have not had any special scientific training, and who are not necessarily acquainted with scientific language. At the same time an attempt is made not only to combine popular treatment with the latest results of modern scientific research, but to make the volumes useful to those who may be regarded as serious students in the various subjects. Certain parts have the character of a work of reference."

By this standard, then, the present volume must be judged; and on opening its leaves and turning over its pages, with their abundance of new and beautiful illus-

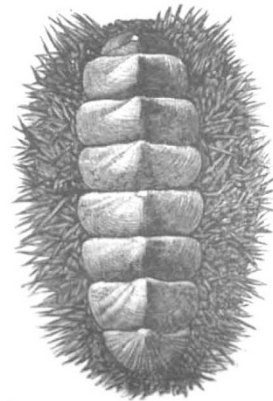


FIG. 1.—*Chiton spinosus*, Brug.

trations, it is at once manifest that artist and engraver, printer and publisher, have vied with each other to produce a work worthy of the conception.

The major portion, or, to be precise, 459 pages of the whole, is devoted to the Mollusca. It is no fault of the author's if it has to be admitted that a treatise on this branch of natural history, at once popular and scientific, still remains to be written. Mr. Cooke, who is responsible for this section, save for a casual passage or phrase here and there, has produced a most readable work; but the burden laid on his shoulders is greater than one man can bear nowadays, for no single individual can be a specialist in all the numerous branches of the subject; and yet nothing short of special knowledge in every ramification is adequate for the production of a textbook. The co-operation of specialists is yearly becoming more and more of a necessity in compiling manuals if good work is to be achieved, and in our opinion the system of minute subdivision, adopted for example in the "Standard Natural History," which was published some years ago in America, is the only wise one.

It is not, therefore, any matter for wonder that Mr. Cooke has had to resort largely to compilation, with the inevitable result that facts here presented in one form of phraseology, would, with a more intimate personal knowledge, have been differently expressed. Thus, for example, when speaking of barriers to distribution, we are told that "ranges of inferior altitude, such as the Pyrenees, the Carpathians, and the Alleghanies, may be turned in flank as well as scaled," and when he wrote, "The Mediterranean offers no effectual barrier"—the author evidently did not take into consideration the altered distribution of sea and land in the Mediterranean region during Pleistocene