

about the Canadian flora is how extremely few species enter into it that are not found in the United States. The general question of the characteristics of the North American flora was fully discussed by Dr. Asa Gray in an address to the biological section of the British Association at Montreal, which was published in the issue for November, 1884, of the *American Journal of Science*. Two of its leading characteristics as compared with Europe are the abundant development of peculiar types of Compositæ and Ericaceæ. It is to this present catalogue that we must turn for full details on such matters as these in application to the northern area. One of the most curious instances of a locality for a well-marked plant widely distant from its main area is furnished by the occurrence of *Calluna vulgaris* in very small quantity in Newfoundland, Cape Breton Island, and Nova Scotia. It is not known on the American continent, and the genus *Erica* is entirely absent. A large number of common European plants, such as *Bellis perennis*, *Chrysanthemum Leucanthemum*, *Tussilago Farfara*, *Hyoscyamus niger*, and *Anagallis arvensis* are fully naturalised in Canada. Some British species, such as *Gentiana Amarella* and *Hieracium umbellatum* are represented in Canada by varieties mostly readily distinguishable from the European type. Of plants alpine in their European range which are widely spread in British North America we have instances in *Loiseleuria procumbens*, *Arctostaphylos alpina*, *Linnaea borealis*, *Lobelia Dortmanna*, *Vaccinium uliginosum*, and *V. Vitis-idea*; and of plants of wide European and British dispersion at a lower level in *Campanula rotundifolia*, *Achillea Millefolium*, *Viburnum Opulus*, *Pyrola minor*, and *Andromeda polifolia*. Mr. Macoun has consulted Dr. Asa Gray and Dr. Sereno Watson on all points of doubtful identification, and used the same nomenclature and standard of specific limitation.

J. G. B.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

The Zoology of Dr. Riebeck's "Chittagong Hill Tribes."
—The Gayal and Gaur

IN NATURE for June 25 (*ante*, p. 169) there appeared a review of the late Dr. Emil Riebeck's "Chittagong Hill Tribes." The contributions of the specialists who are entitled "the foremost naturalists of Germany" are mentioned as "separate monographs of great value."

This is no stinted praise, and as one of the separate monographs, that on the zoology, by Dr. Julius Kuhn, is especially noticed, I took the earliest opportunity of reading what I anticipated would prove a very interesting essay on the fauna of a rather imperfectly-known region.

I will only say that I was disappointed. The zoological "monograph" consists of four pages, two and a half of which are taken up by Dr. Kuhn's remarks on the gayal and gaur. These are the only portions deserving notice; the remaining page and a half contain notes, all trivial, and some seriously incorrect, on skulls of a rhinoceros, a bear, and a monkey, of only one of which a specific determination is attempted, and in that instance the name given is, I believe, wrong. Perhaps these notes are not by Dr. Kuhn, for his observations on the gayal (*Bos frontalis* v. *gavæus*) and the gaur (*B. gaurus* v.

cavifrons) show some acquaintance, though an imperfect one, with the literature of the subject. Your reviewer credits Dr. Kuhn with the discovery that "the gayal or wild ox of Bengal, Assam, and Further India does not differ specifically from the gaur of India proper," and Dr. Kuhn writes apparently under the impression that the occurrence of the gaur east of the Bay of Bengal is not known. The range of the gaur throughout Assam, Tipperah, Chittagong, Burmah, and the Malay peninsula has, however, been well known for thirty years at least, and has been repeatedly described by Cantor, Blyth, Jerdon, and other naturalists, whilst the head of a Tenasserim gaur was well figured nearly fifty years ago in the *Journal of the Royal Asiatic Society* (vol. iii., 1836, p. 50). The fact that the wild gaur is called gayal by the natives of some parts of India is also not new. The name by which the tame gayal, *Bos frontalis*, is generally known in the country is not *gayal*, but *mīthan*.

Dr. Kuhn's principal object is to show that the gayal may be a domesticated race of the gaur. It would be impossible to do justice to the subject without going into considerable detail, but the first stage in the inquiry is one to which no reference is made by Dr. Kuhn. This is the question whether *Bos frontalis*, the gayal, exists as a distinct species in the wild state, as stated by Lambert, Colebrooke, Horsfield, Blyth, and others, or whether, as lately urged by Mr. J. Sarbo (*Proc. Z. S.*, 1883, p. 142), there is no such thing as a wild gayal. A very valuable contribution to the history of these animals was published twenty-five years ago by Blyth in the *Journal of the Asiatic Society of Bengal*, vol. xxix. p. 282, in a paper "On the Flat-horned Taurine Cattle of South-East Asia." This paper was, I think, subsequently republished in either *Land and Water* or the *Field*, but I am not certain. One most important circumstance mentioned by Blyth on apparently excellent authority is that the gaur is kept tame in the interior of the Chittagong hills, and, as a tame animal, is quite distinct from *Bos frontalis*. If this is the case hybrids are very likely to occur, for the gayal breeds freely with the much less nearly allied zebu, and such hybrids may account for the occurrence of forms intermediate between the gayal and gaur. An indication that such forms exist is, so far as I can see, the only evidence brought forward by Dr. Kuhn in favour of the gayal being a domesticated race of the gaur, his main argument; his supposed discovery that the tame gayal and wild gaur inhabit the same country being a singularly fine example of a *nidus equeus*.

It will, I hope, be understood that these observations apply solely to the zoological portion of Dr. Riebeck's work; though, in connection with this, in another part of the book, I remark that Plate 14, Fig. 2, which represents a rodent's—probably a squirrel's—skull, is called in the explanation of the plate "the skull of a musk-deer"! Your reviewer's opinion of the work is doubtless founded on the anthropological and ethnological portions; I only dissent from the views expressed as to the zoological monograph.

W. T. BLANFORD

July 11

"The Fauna of the Seashore"

IN the abstract of Prof. Moseley's interesting lecture on "The Fauna of the Seashore," published in the current number of NATURE (p. 212) several agents are referred to as competent to call into play the tendencies to vary which are embodied in each species. These, whether suggested by Prof. Lovén or the author of the lecture, include—light and shade, temperature, currents, food, enemies, favourable condition of water for respiration, and the variation of conditions produced by tides. I venture to think that one very important factor in the variation of the marine fauna, if not the most important, has been left out of the list: I refer to marine waves.

The action of waves on the littoral fauna is not only extremely severe, but it is of constant recurrence; and failure to resist it does not merely involve some minor disadvantage or inconvenience to the object attacked, but its very existence.

A point commonly overlooked by naturalists is the severity of the wave-action arising from the reciprocal character of the wave-currents. Human bipeds occasionally experience the inconvenience of a shifting current when encountering opposing blasts of wind at some street corner during a gale. The marine littoral fauna, living in a much denser medium, encounter two analogous currents for every passing wave heavy enough to affect the bottom, and have to encounter these currents without cessation for the days or weeks the storm may last. Any failure to