

other than retard science? Would it not be better for all parties, including the museum and people of Thurso, if this priceless specimen were sent to Mexico, or to Washington, or to the Godman-Salvin collection in London, or even to Berlin, in exchange for a good teaching set of zoological specimens intelligible to the Thurso fisher-people?

This is a strong, though by no means an impossible case. Every specialist knows similar instances. Of what advantage was it to science that, when Dr. Otto Jaekel was writing his admirable memoir on the Devonian crinoids of Germany, all the type-specimens described by Schultze in his 'Echinodermen des Eifler Kalkes' were locked up in dusty boxes in a store room at Harvard? As things are, the type-specimens of any group of animals or plants, whether a zoological group, a geographical group, or a stratigraphical group, will be found by the specialist scattered all over the world without reference to country or to facilities for study. And we museum curators go on adding to this confusion as hard as ever we can, with the aid of preliminary notices, and stretch miserly hands over specimens that are wanted most in some center of research 8,000 miles away. We advance our museums, but we retard science.

And yet there are some of us who are also students and lovers of science. We wish to use our powers for her advancement. This we think might be done partly by the collection of the type-specimens of a single group in a single museum, partly by the restoration of type-specimens to the country of their origin, provided that it possessed a museum capable of preserving them unharmed, partly by the withdrawal of type-specimens from small local museums where they 'waste their sweetness, etc.,' and are far from safe, to the larger museums with permanent endowment. We do not wish any museum to suffer; exchange is no robbery, and in this case might be as much gain to each contracting party as it would be to scientific investigators.

Another small point in Mr. Lucas' notice provokes an explanation. "On the question of loaning specimens," says he, "Mr. Bather dwells lightly, owing to his connection with the

British Museum, whose policy in this respect is well known." This is Mr. Lucas' reason, not mine. My view is that type-specimens should not be lent (they should, if necessary, be exchanged); but other material should be lent freely to responsible workers. There is always a danger of loss; but, while the lost type-specimen can never be replaced, the gain to the museum and to science through the study and description of ordinary specimens more than counterbalance the occasional loss of one. This is not the policy of the British Museum, and no remarks of mine are likely to make it so. Similarly my opinions will not prevent me from borrowing type-specimens of crinoids from any museum rash enough to lend them to me.

F. A. BATHER.

BRITISH MUSEUM (NAT. HIST.), April 15, 1897.

THE QUATERNARY OF MISSOURI.

TO THE EDITOR OF SCIENCE: After reading the quite satisfactory review of my report on the Quaternary of Missouri, in your issue of April 9th, some unanswered questions were left in my mind. As the answers may be of interest to others I venture to offer them through your columns. Mr. Hershey suggests that the idea that the loess 'area deposited by broad semilacustrine stream floods,' 'would not have originated upon certain other areas, for instance, the upper Mississippi region.' Is not this virtually the origin conceived the most probable for the loess of the 'Driftless Area' by Chamberlin and Salisbury in the 6th Annual Report, U. S. Geol. Survey?

Mr. Hershey, if I understood rightly, suggests that the loess deposits of Missouri and of southern Illinois as well as of the upper Mississippi were formed in a vast lake or arm of the sea. If that be the case I would ask (1) why no traces of beach ridges have been preserved anywhere, and (2) how he would account for the absence of loess from surfaces along the Mississippi below the supposed 'barrier' much lower than the general level of the loess northwest of that 'barrier,' viz., the Osage Gasconade divide?

If I had been able to find beach ridges and been able to make the margin of the loess south of the Missouri river pass easily into that west

of the Mississippi I should have been only too ready to accept the lacustrine hypothesis.

J. E. TODD.

A 'DRIFTLESS' RIDGE.

TO THE EDITOR OF SCIENCE: In reviewing, in the April 9th number of your journal, Professor Todd's report on the quaternary geology of Missouri, I mentioned a certain 'driftless' ridge in Pike and Calhoun counties, in Illinois, and referred its study to Mr. Frank Leverett. My attention has been called to the fact that the driftless nature of this ridge was discovered by Professor R. D. Salisbury (see Proc. A. A. A. S., Washington meeting, 1891, pp. 251-253), and that its study was largely accomplished by him.

In reference to the sections of the old and new gorges of the Mississippi river, between Montrose and Keokuk, Iowa, I wish to add to what I have said previously, that they were published through the courtesy of the Iowa Geological Survey, to which institution their preparation should be credited.

O. H. HERSHEY.

SCIENTIFIC LITERATURE.

Diseases of Plants Induced by Cryptogamic Parasites. An Introduction to the Study of Pathogenic Fungi, Slime-Fungi, Bacteria and Algae. By DR. KARL FREIHERR VON TUBEUF. English edition by WILLIAM G. SMITH. Longmans, Green & Co., London, New York and Bombay. 1897.

The German edition of this work appeared in 1895 and was the first attempt at a comprehensive treatment of the diseases of plants caused by parasites of the class Thallophyta, chiefly parasitic fungi. Such a work has been long needed, but there have been many difficulties in the way of the successful preparation of it. The fact that many of the diseases were but little known, that the organism causing them had been but little studied, and that important contributions were constantly being made to our knowledge of these forms, made it exceedingly difficult to get a book of such dimensions through the press before important changes would be necessary in order that it should properly represent the then status of the subject. While the German edition when

it appeared was welcomed because of the mass of information which was here for the first time brought together in a single book, it was notable for some important omissions, especially of work done in the United States. This was probably due in part to the fact that some of the investigations had not come to the notice of the author, and partly to a failure on his part during the press of the work to consult the American journals like the *Botanical Gazette* and the *Bulletin of the Torrey Botanical Club*. While it is evident there was no intent on the part of the author to ignore American work, the edition would have been more valuable had a little more time been given to investigations of this portion of the literature of the subject. Since, however, the work was intended primarily for the German-speaking people there is here some partial defence of the omissions.

The chief difficulty, however, that of keeping the work up to date while going through the press, was, from the very nature of the state of our knowledge of these subjects, an insurmountable one. This is forcibly illustrated in the fact that in the English edition, which appears within two years after the first edition, it was necessary to recast and rewrite the whole portion of the book which treats of the family Exoasceæ and the genus *Gymnosporangium*, so rapidly have investigations in these groups followed each other, and so greatly have the limitations of species been changed by a study of the physiological effects on the hosts on the one hand and of biological studies on the other.

In the preparation of the English edition the author, Dr. von Tubeuf, privatdocent in the University of Munich, has added much that was omitted from the first edition and has rewritten the sections already alluded to above. The English translator, William G. Smith, lecturer on plant physiology in the University of Edinburgh, has also assisted in enhancing the value of the work in some additions for which he alone is responsible. It is not often that an author is so fortunate in the selection of his translator as Dr. v. Tubeuf has been. Dr. Smith was at one time a pupil of the author in the laboratory of the University of Munich, and at the very time when the book was being prepared for the first edition, so that he was