

buried under a torrent or débâcle of mud and boulders, and half a mile of its course was damned up into a deep lake." Page 154, "I met my friend on the other side of the mud torrent." Page 184, "I descended obliquely down a very steep slope over upwards of a thousand feet of débris, the blocks on which were so loosely poised on one another that it was necessary to proceed with the utmost circumspection, for I was alone, and a false step would almost certainly have been followed by breaking a leg. The alternate freezing and thawing of rain amongst these masses must produce a constant downward motion on the whole pile of débris (which was upwards of 2000 feet high) and may account for the otherwise unexplained phenomenon of continuous shoots of angular rocks reposing on very gentle slopes in other places."

So far for the *present erosion* of rain and rivers. For the *present deposit* from them take Dr. Hooker's description of the Cosi (of which the Yangma is a tributary) where it runs out of the Himalaya and into the Ganges, page 86, vol. i., "Even at this season (April, the end of the dry season) the enormous expanses of sand, the numerous shifting islets, and the long spits of mud, indicate the proximity of some very restless and resistless power. During the rains the scene must, indeed, be extraordinary when the Cosi lays many miles of land under water and pours so vast a quantity of detritus into the bed of the Ganges, that long islets are heaped up and swept away in a few hours; and the latter river becomes all but unnavigable. Boats are caught in whirlpools formed without a moment's warning, and sunk ere they have spun round thrice in the eddies."

As I have said in "Rain and Rivers," what is everlastingly *ascending* through the air as vapour from the sea is everlastingly *descending* through the air as rain on the land. This continuous circle of causes is always washing the land into the sea. And it is fire only which keeps our heads above water. Fire is the quarryman that is ever raising the block, the entire land, above the sea. Rain (with atmospheric erosion) is the chisel, which in the hand of the Almighty artificer, is for ever sculpturing the block,—that is, shaping the entire surface of the land, even to the topmost pinnacle of the highest snowcapped mountain, for snow is frozen rain.

BROOKWOOD PARK, ALRESFORD,  
9th March, 1867.

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## NOTICES OF MEMOIRS.

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I.—A BRIEF ACCOUNT OF THE "THESAURUS SILURICUS," WITH A FEW FACTS AND INFERENCES. By J. J. BIGSBY, M.D., F.G.S., etc.

[Proc. Royal Society, February 21, 1867.]

THE "Thesaurus Siluricus" is a general view of Silurian life, as far as now known, in the form of a table. After mentioning the genus (taken alphabetically), its author, and the date of its establishment, the species are successively named, and treated of under four or more heads, along one and the same ruled line. First comes the

part of the stage in which it occurs, then, in a given order, its author and locality, or localities, in the column indicative of its proper stage. The "Thesaurus" contains 7553 species, and therefore gives abundant scope for profitable study; but probably it does not give the tithe of the whole Silurian life yet lying buried in the wilds of the Arctic Circle, of Hudson's Bay, Labrador, the two Americas, Scandinavia, Australia, India, etc.

The author acknowledges many valuable corrections and suggestions made by Messrs. J. W. Salter and Robert Etheridge, who have carefully gone over the manuscript: he has also received several unpublished contributions relating to the Silurian Fauna and Flora from foreign Palæontologists. In this brief account of the Thesaurus, the author gives numerous tables of the general results arrived at. One table shows the number of species common to regions very remote from each other, some of them being antipodal—a fact which tells the more forcibly from the tenacity with which a large part of Silurian life clings to locality as well as to horizon. Thus, 179 species are common to Europe and America; 5 species to Europe and Australia; 6 species to America and Australia, etc.

Another table gives a synoptical view of Silurian life, with special reference to vertical range or recurrence. The orders vary greatly in respect to recurrency. There is none among fossil fish. In *Cystidea* it is only 3 per cent., in *Gomophoeras*, 5 per cent., and is greatest in *Strophomena*, being 31 per cent. The author has prepared a number of inferences in regard to recurrence. Among which are the following: *Species do not often change their horizon, not even when placed in countries far apart; the same species may be typical of a single horizon in one country and recurrent in another; the number of recurrent species measures the amount of change in conditions.*

Respecting Extra-Epochal Recurrence, the author states that 133 Silurian species may be regarded as recurring above the Silurian beds; with the exception of *Chonetes sarciuolata*, they all stop within the Devonian period. The greater part of these recurrences are of low rank: 20 are Brachiopoda, 11 Zoophytes, 1 Amorphozoon, 7 Gasteropoda, 3 Cephelopoda; 1 Trilobite.

These species are very migratory—few being found in two epochs in the same country, but in different countries.

[The Royal Society having voted £200 in the aid of the printing of Dr. Bigby's Thesaurus, we understand the veteran author intends to incur the further expense (probably £300 additional) himself.]

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II.—OLIGOCENE DEPOSIT IN HUNGARY.—At a meeting of the Imp. Geol. Institute of Vienna, held on February 5th, 1867, M. DE HANTKEN read a paper on some Oligocene strata, exposed in a shaft recently sunk at Sarisap, near Gran, in Hungary. The strata, which are of brackish and marine origin, attain a thickness of 156 feet. The brackish beds, consist of sandy plastic clay, characterised by the presence of *Cerithium margaritaceum*, *Melanopsis ancillarioides*, *Cyrena semi-striata*, Desh., *Rosalina Viennensis*, d'Orb., and seeds of *Chara*.

The marine strata overlie those of brackish water origin; they are, however, separated by a well-marked bed of clay; one foot in thickness, containing, in great abundance, specimens of *Cingula*, closely allied to *C. sutura*, Fraueuf. A sandstone, 60 feet in thickness, of marine origin, covers this bed of clay; it contains no Molluscan remains, but portions of *Echinidæ* are met with.—H.B.W.

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REVIEWS.

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I. — CATALOGUES OF THE SILURIAN FOSSILS OF THE ISLAND OF ANTICOSTI, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES. By E. BILLINGS, F.G.S., Palæontologist to the Geological Survey of Canada. 8vo., 93 pages. Montreal, Nov, 1866.

THIS brochure is the continuation of the "Palæozoic Fossils," of 426 pages, by the same author; of which the last sheets appeared in 1865. It contains descriptions of two new genera and 104 new species of mollusca, crustacea, etc., from the Hudson River, Anticosti, Clinton, and Niagara groups of Canada, in connection with general remarks of a novel character upon the synonymy of the American and English older Palæozoic rocks. Mr. Billings, though very modest and rarely appearing in public, has within the past ten years been greatly instrumental in advancing our knowledge of American Palæozoic geology. It was almost universally believed that the enormous thickness of strata called locally the "Quebec Group," and extending from the Gulf of St. Lawrence to Alabama, was of Middle Silurian age; but Mr. Billings's descriptions of fossils, fortified by the opinion of M. Barrande, have convinced the whole world that the series is not Middle Silurian, nor even the equivalent of the Lingula flags (Potsdam), but that it forms a new group not before recognized, of about the epoch of the Lower Llandeilo. An idea of Mr. Billings's ability and industry may be gathered from the fact that he has described not less than 43 new genera and 870 species of new Paleozoic fossils; and there are many others in his hands awaiting description. It is very creditable to the executive capacity of Sir W. E. Logan that the Survey under his charge has collected so many rare fossils, and arranged them in their proper stratigraphical horizons, or rather intercalated new epochs in the Silurian almanac. We trust these preliminary notices will be speedily followed by such accurate engravings and elaborate descriptions of the new forms as their importance demands, and such as will reflect honor upon the liberality of the Canadian Government.

We will now present a table of the revised nomenclature of the North American older strata, and their synonymy with the English formations, as enunciated in this pamphlet.

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|---|---------------|
| 1. Clinton, or divisions three and four of the Anticosti groups ... | U. Llandovery |
| 2. Anticosti, divisions one and two ... ..                          | L. Llandovery |
| 3. Oneida conglomerate, and Medina S.                               |               |
| 4. Hudson River and Utica slates ... ..                             | Caradoc       |
| 5. Trenton limestone  |               |
| 6. Birds-eye and Black River  |               |