3. Where Hopkins's results on the power of water to move materials?

4. How does Mr. Tylor arrive at a velocity of *three times* excess of present velocity in paragraph four? McJAMES.

INDIA.

FOSSILS ON CLEAVAGE PLANES.

SIR,—Until I read Mr. Carruthers' article in the January Number of the GEOL. MAG. I had never realized how completely fossil plant remains might be simulated by annelid trails. To me, moreover, there was a special interest in the concluding sentence, which recalled to my mind an inquiry which I had been pursuing some two years ago. I was not then aware that the subject had been touched upon by Dr. Sterry Hunt, nor have I seen the paper by him to which Mr. Carruthers refers. I feel however disposed to call attention once more to the subject as it then presented itself to me. I must not reproduce remarks which have occupied more than two pages, nor do I see how I can well abridge them. But I will ask leave to refer Mr. Carruthers and the readers of his interesting article to a letter by me in the September (1880) Number of your MAGAZINE, pp. 430–2. It was there pointed out that not only "fucoids" (which might very probably have been annelid borings), but that *Graptolites also* had been found upon cleavage planes.

KENTISBEARE, COLLUMPTON. W. DOWNES.

DR. HECTOR'S "NEW ZEALAND GEOLOGY."

SIR,—I see in the January Number of this MAGAZINE a notice of the above Memoir, in which Dr. Hector classifies the Coal-producing strata of New South Wales as Permian. There has long been a dispute amongst Australian geologists as to the age of these deposits, many supposing them to be Triassic, or even Oolitic, presumedly upon the presence of *Glossopteris*; but it would be of interest to know Dr. Hector's reason for placing them amongst the Permian. In the many conversations which I have had with the late Rev. W. B. Clarke, F.R.S., upon the subject, he has invariably upheld their true Carboniferous age, and, as a field geologist who has had much experience amongst the Coal Fields of South Wales, Somersetshire, and New South Wales, I certainly cannot see much doubt on the subject. The Wianamatta Shales, noticeably in the Parramatta District, bear a close lithographical resemblance to the shales, clods, and clifts of the Gilfach-fargoed, and Mynydd-yslwyn, Upper Carboniferous deposits of Glamorgan and Monmouthshire, and also contain obscure impressions, which certainly look like Stigmarian rootlets. The Hawkesbury Sandstone, which underlies the Wianamatta Shales, contains numerous cavities, especially at St. Leonard's, Sydney, which look very much as if they had been filled by Carpoliths, like the *Trigonocarpum* of the Pennant of South Wales and Somersetshire, and indeed bears a lithographical resemblance to that deposit. The Upper Marine Beds and Upper Coal-Measures of the Newcastle (N.S.W.) and Bulli Districts contain, besides *Glossopteris*, undoubted Sigillarian and

Stigmarian remains, and the Lower Marine Beds and Lower Coal-Measures of the Jamberoo and Saddleback Districts contain *Lepidodendron* and *Productus scabriculatus*. Specimens of the last-named Palliobranch, if I remember rightly, are in the Museum attached to the Mining Department, Sydney, to which institution I presented them in 1877. Locality, Jamberoo Mountains, Illawarra District, N.S.W. All these formations are conformable to each other, although in places unconformability exists, owing to unequal depositions in parts. My classification for the New South Wales Coal deposits is as follows:

α. Wianamatta Shales. (Mynyddyslwyn Series.)	Thin laminated shales, clods, and clifts. No workable coal. Obscure plant-remains. 600 ft. circum.
β. Hawkesbury Rocks. (Pennant Series.)	Fine whitish sandstones. No workable coal. Cavities of Carpoliths? 1300 ft. circ.
γ. Upper Marine Beds. (Wenallt Series.)	Sandstones, chocolate-coloured shales, rich beds of clay-band iron ore, thin beds of limestones with Palliobranch, undetermined. Conglomerates with jasper, and blue and purple shales. No workable coal. 550 ft. circ.
δ. Upper Coal-Measures. (Rhondda Series.)	Shales and sandstones, workable coal and fire-clay. *Stigmaria*, *Sigillaria*, etc. 1200 ft. circ.
ε. Lower Marine Beds. (Iron Ball Series of Merthyr, etc.)	Bands of limestones, clay-band iron ore. *Productus scabriculatus*, etc. No workable coal. 500 ft. circ.
ζ. Lower Coal-Measures. (Ras Las Series.)	Sandstones, shales, workable coal, fire-clay. *Lepidodendron*, etc. 1800 ft. circ.

Total thickness 5950 ft. circ.

The Devonian formation, I believe, is largely represented in South Australia by the Mount Lofty and Hummuck Ranges, as well as by the Murrumbidgee deposits of N.S.W.; whilst the great mass of auriferous slates and sandstones of New South Wales, as well as those of Victoria, are undoubtedly Silurian.

Alfred Cruttwell, F.G.S.

London, *Feb. 15th*, 1882.

MISCELLANEOUS.

Coal in South Africa.—We learn that various and prolific seams of anthracite and bituminous coal, some of them 10ft. or 12ft. in thickness, have been found in Natal, several being well adapted for locomotive and general steam purposes. That this coal is suitable for the former work has been proved by driving the locomotives of the existing railways for some hundreds of miles to and fro between Durban and Maritzburg. The possibility of using cheap local fuel instead of costly English coal in these distant colonies must give a great impetus to railway construction, and an extension beyond Ladysmith, in Natal, will provide a better and more expeditious highway to the Transvaal and Orange Free State. The Railway Bill for the expenditure of £5,000,000 upon railway construction in Cape Colony, which has just received the sanction of the Assembly at Cape Town, contemplates the intersection by a main line of the coal deposits of that colony. Therefore, after considerable delay, those coal-fields are now about to be placed in direct communication with both the coast and the Diamond Fields.—*English Mechanic*, etc.