a thin stiff plane caused to move at sixty miles an hour through it, in a direction inclined to the plane at a slope of about one in eight, was found to be about fifty-three times as great as the estimate given by the old "theoretical" (!) formula, and something like five or ten times that calculated from a formula written on the black-board by Lord Rayleigh, as from a previous communication to the British Association at its Glasgow meeting in 1876.

I had always felt that there was no validity, even for rough or probable estimates, in any of the "theoretical" investigations hitherto published : but how wildly they all fall short of the truth I did not know until I have had opportunity in the last few days, *procul negotiis*, to examine some of the observational results which Maxim gave us in the introduction to his paper. On the other hand, I have never doubted but that the true theory was to be found in what I was taught conversationally by William Froude twenty years ago, and which, though I do not know of its having been anywhere published hitherto, is clearly and tersely expressed in the following sentence which I quote from a type-written copy, kindly given me by Mr. Maxim, of his paper of last week :—

"The advantages arising from driving the aeroplanes on to new air, the inertia of which has not been disturbed, is clearly shown in these experiments."

Founding on this principle, I have at last, I believe, succeeded in calculating, with some approach to accuracy, the force required to keep a long, narrow, rectangular plane moving through the air with a given constant velocity, V, in a direction perpendicular to its length, l, and inclined at any small angle, i, to its breadth, a. In a paper, which I hope to be able to communicate to the *Philosophical Magazine* in time for publication in its next October number, I intend to give the investigation, including consideration of "skin-resistance" and proof that it is of comparatively small importance when i is not much less than 1/10, or 1/20, of a radian, and the "plane" is of some practicably smooth, real, solid material. In the meantime, here is the result, with skin-resistance neglected :—The resultant force (perpendicular, therefore, to the plane) is $2\pi V^2 \sin \theta \cos \theta \, la$; which is $\frac{4\pi \cos \theta}{\sin \theta}$ times (or for the case of $\sin \theta = 8$, one hundred times), the old miscalled "theoretical" result.   KELVIN.

Eastern Telegraph Company's Cable Steamer
Electra ; crossing the mouth of the Adriatic,
August 17.

Geological Maps of Baden.

IT may interest some of your readers likely to visit the Black Forest, that Herr Winter, of Heidelberg, has begun the issue of an official series of geological maps, each $19\frac{1}{2} \times 17\frac{1}{2}$ inches, with memoir. Two are already out, one east of Heidelberg, the other giving the Mooswald district, north-east of Gengenbach. The scale is 1 : 25000 ; *i.e.* 10 cm. to $2\frac{1}{2}$ km., or practically two and a half inches to the mile. Three sections are given on the sheet ; the memoir has about 100 pages. The price for the map and memoir is only two marks ; if the map is mounted, three marks. I had intended to comment on the contrast between this marvellous cheapness and our own Survey issues, as our inch ordnance cannot approach this for detail ; for instance, the contour lines are given for every ten metres. But a paragraph read to-day in the New York *Nation* of August 9, in a letter signed "W. M. D." will speak for me :—". . . unfortunately the publications of the British Surveys are rarely found complete at home outside of the Governmental bureaus in Washington. Very few copies of the British geological reports and maps are presented to libraries in foreign countries, and the prices at which they are sold practically forbids their purchase. The maps are, moreover, coloured by hand, so every copy is expensive ; while ours are lithographed, and 'additional copies' are of only nominal cost, perhaps three or four cents apiece. . . . The British practice almost seals up the costly results of the geological surveys. . . . It was a satisfaction to learn that this opinion, formed at home, was shared and emphatically expressed over here" (at Edinburgh).

The Baden State geology maps are also, of course, lithographed, and so are the equally cheap Imperial maps of all Germany, another series, now being published by Justus Perthes, and of which also the first two are just issued and cover the same region, South-west Germany. That the policy pays seems certain. Three other purchases, for instance, were the

immediate result of my own, whereas my friends have always been content to *borrow* my English maps, when I could see my way to lend them.   J. EDMUND CLARK.
York, August 21.

Variation of "Aurelia."

I SEE that you note (p. 413) the occurrence of an *Aurelia* with pentamerous symmetry. In an expedition of the Liverpool Biological Society to Hilbre Island, a few weeks ago, we found several such specimens, and remarked upon the frequency of the variation. I think the number was either four or five pentamerous forms out of twelve examined.
Port Erin, August 25.   W. A. HERDMAN.

CREATURES OF OTHER DAYS.[1]

"CREATURES of Other Days" is a work of literature rather than science, and is yet so full of reference to scientific facts and discoveries that it appears like a work of learning. It narrates the history of extinct animals laboriously discovered, and in many cases still undergoing laborious interpretation by palæontologists, in language which is free from technicality. There is no reference to the anatomical structure of the skeleton which necessitates technical language. There is no critical digest of the facts enumerated, or of the nomenclature under which the fossils are described. No attempt is made to state the osteological characters which distinguish these fossils from each other. Materials which any author has supplied are accepted impartially, and the same animal type is illustrated by dissimilar restorations. Thus Mr. Hulke made a quadrupedal restoration of *Hypsilophodon Foxi*, an animal which once was termed a young *Iguanodon*, out of which Mr. Smit has restored a vigorous-looking lizard. If these interpretations are correct, it is improbable that the vertical bipedal restoration of *Anchisaurus*, given by Prof. Marsh, and restored by Mr. Smit, can also be satisfactory. Many of the original restorations endeavour to convey an idea to the unlearned of the skin and aspect of the living animals. And as these are based upon published figures, or restorations, the author has no doubt gone to the best material which was available, even when the result is unsatisfactory. Sir William Flower, in his preface, fairly states the claim of the restorations to consideration. He says : "In the restoration of the external appearance of extinct animals, known only by bones and teeth, there is much of imagination, much indeed of mere guess-work, and I should therefore be sorry to guarantee the accuracy of any of the representations of animals in this book, the majority of which were never seen in the flesh by the eyes of mortal man. I think, however, I may safely say that Mr. Hutchinson and his accomplished artist, Mr. Smit, have done their work carefully and conscientiously, and given us, in most cases, a fair idea of the appearance of the creatures they have endeavoured to depict according to the best evidence at present available." Sir William commends the figures because they give a better idea of the animals than most persons who only saw their fossil remains would be able to carry away. This unscientific attitude of the book is its chief merit. It is only when the author becomes an expositor of science that scientific men are likely to disagree with him. More care was needed in some of the restorations. The old red sandstone fishes, for example, are drawn without any regard to their relative sizes, those of the upper and lower beds swimming together as though they were of the same geological age, while at the bottom of the water are Trilobites, Brachiopods, and Cephalopods, which no one ever saw in the old red sandstone.

[1] By Rev. H. N. Hutchinson, B.A., F.G.S., author of "Extinct Monsters." With numerous illustrations by J. Smit and others. (London : Chapman and Hall, Limited, 1894.)