

a doubt could occur to the mind of any intelligent reader, reduced heights being invariably employed in the chapter in which the passage occurs, and in the book generally.

The charge of inconsistency which the Reviewer urges with so much gusto, is based on the following passage in my Preface, at the beginning of Part I:—

“There is great danger in the present day lest science-teaching should degenerate into the accumulation of disconnected facts and unexplained formulæ, which burden the memory without cultivating the understanding. Prof. Deschanel has been eminently successful in exhibiting facts in their mutual connection; and his applications of algebra are always judicious.”

Which, the Reviewer thinks, justified the expectation that I would omit as many as possible of Deschanel's applications of Algebra. It is not surprising that a writer accustomed to this style of inference should have an aversion to exact reasoning, and should characterise the solution of problems by the application of a little algebra as “intricate formulæ, which burden the memory without cultivating the understanding.”

I may remark, with reference to my former discussion with W. M. W. in your pages, that the adoption of concrete units of mass, and derived units of force, has now received the official sanction of Sections A and G of the British Association, who have appointed a committee to frame a system of nomenclature on this basis.

J. D. EVERETT

#### Newspaper Science

KNOCKED up with work, I reluctantly followed the advice of my medical man, and crossing the Channel so as to be more out of the way, resolved to eschew everything scientific for the next few weeks at least, in order to recruit before the winter's labours commenced. Even here, however, I soon found that the desired result was not so easily attainable as I had imagined, for the first thing this morning, on entering the reading room of the bathing saloon, a French acquaintance, placing the *Globe* (of Monday evening, September 11) before me, directed my attention to its leading article on Prussian Artillery, adding significantly—“*Viola, mon ami*, a specimen of English scientific opinion!”

I must confess that it was not without a feeling of shame that I read an article, of which the following extracts will suffice to give a correct idea.

“Although the unchequered course of the late war was due to many causes, still it is now admitted on all sides that when the Krupp guns were brought into the field the conclusion was practically foregone.” “The first public exhibition of what is now known as the Krupp gun was the gigantic specimen of a breech-loading steel gun sent to our Exhibition of 1851. The steel of which this gun was made differs entirely from our *Sheffield gun metal* or from Bessemer metal, and is a *composition invented by Krupp*, and the result of a special process. The iron is alloyed with *certain clays and also with a preparation of plumbago*. There are 100,000 ‘*creusets*’ of this metal always in active employment in the factory, and each ‘*creuset*’ contains from twenty to forty kilogrammes. The metal in a fluid state is poured into large cylindrical moulds, where it remains for two hours till it has completely hardened. But the chief difficulties of the process lie in subjecting it to the steam hammer. For years the hammer of greatest power in the factory had a force of 25,000 *kilometres*,” &c.!

The italics are mine, and any one conversant with such subjects will perceive that no further comments are required. It only remains for me to express my astonishment at seeing such rubbish appear in the leading article of any newspaper of standing, and I am sure your readers will agree with me that it is high time that journals specially devoted to science should protest energetically against such representations being conveyed to the public at home and abroad as expressions of English technical or scientific opinion.

DAVID FORBES

Boulogne-sur-Mer, September 13

#### THE NEW GANOID FISH (CERATODUS) RECENTLY DISCOVERED IN QUEENSLAND

AT the beginning of last year news reached Europe that a large “Amphibian resembling *Lepidosiren*” had been discovered in Australia, and the curiosity of naturalists was still more excited when it was stated that this creature was provided with teeth extremely similar to

the fossil teeth (from the Jurassic and Triassic formations) known under the name of *Ceratodus*.

The interest attached to such a discovery will be easily understood, if we review briefly the history of *Lepidosiren*, and show the advance made by zoology in consequence of our acquaintance with this animal.

The discovery is due to the well-known Austrian traveller, Natterer, who sent two examples from Villa Nova on the Amazon River and the Rio Madeira to the Vienna Museum in the year 1837. Fitzinger, then Curator of the Collection of Reptiles, gave a somewhat superficial description of it under the name of *Lepidosiren paradoxa*, referring it without hesitation to the class of Reptiles. Nearly at the same time a very similar animal was found by Mr. Th. C. B. Weir, in Senegambia; he presented two small examples to the Royal College of Surgeons; and Prof. Owen, then Curator of the Hunterian Museum, published a full description of them under the name of *Lepidosiren annectens*, in the year 1839, explaining the reasons which induced him to regard this creature as a Fish. This view elicited further examination of the internal structure of the American species by Profs. Bischoff and Hyrtl, the former inclining to the opinion expressed by Fitzinger, the latter confirming, to the satisfaction of nearly all zoologists, the correctness of the conclusion arrived at by Owen.

Before the discovery of *Lepidosiren*, zoologists distinguished the class of Reptilia from that of Fishes by the organ of respiration, the former being provided with membranous lungs extending into the abdominal cavity, the latter breathing by gills only. Although the Batrachian reptiles were known to breathe by external gills, as fishes, during the early stage of their metamorphosis, and although some of them retain those gills through the whole period of their life, yet the development of lungs in the adult state and the co-existence of these organs with gills in the Perennibranchiates, were considered to be sufficient indications of their class-distinctness from fishes, among which no air-breathing organ was known. It is true Harvey and Hunter had pointed out that the air-bladder of the fish was homologous with the lung of higher vertebrates; but functionally it could not be compared to it, as it receives arterial blood like any other abdominal organ, returning it in a deoxygenised condition.

Now *Lepidosiren* was found to be provided with gills, and a most perfect paired lung communicating by a ductus pneumaticus and glottis with the œsophagus, receiving venous blood by strong arteries, and sending it back directly to the heart in an oxygenised condition. Therefore, in this respect it did not differ from an Amphibian, and dogmatical believers in the stability of our zoological systems felt themselves quite justified in referring this creature to the Reptilians.

Nevertheless, the presence of certain other peculiarities of structure indicated rather an ichthyic than a reptilian affinity. The notochordal skeleton, and the apophyses arranged as in many fishes, and not as in Amphibians; the organ of hearing enclosed in the cartilaginous capsule of the skull; the dentition extremely similar to that of a *Chimæra*; the intestinal tract traversed by a spiral valve; peritoneal outlets near the vent; no nasal canal to conduct air; finally, the skin covered with scales, the fins supported by fin rays. All these are characters not found in Batrachians, and connect *Lepidosiren* with the class of Fishes; but it was admitted that it makes the nearest approach in that class to the Perennibranchiate Amphibians.

The question had next to be settled, what place in the class of Fishes should be assigned to *Lepidosiren*; and as the view entertained by Joh. Müller is that adopted by the majority of zoologists, we think it sufficient to refer to it alone. Having determined that all Ganoid Fishes agree with the Sharks and Rays in having an additional muscular division of the heart at the origin of the aorta, named *bulbus*