

porated in the work before us. In this first volume of his work the discharge of water is very fully treated. Unfortunately, however, his so-called theoretical formulas belong to the same category as those which Prof. James Thomson of Glasgow showed in his paper, read before the last meeting of the British Association, to be founded on assumptions which are not in accordance with known hydrodynamic principles.

On page 851 of this translation there is a formula to which we would draw attention. It is taken from "The Lowell Hydraulic Experiments," by J. B. Francis, and is for the discharge of water over a weir. This formula is " $Q = 3.33 (l - 0.1 nh)h^{\frac{3}{2}}$ " English cubic feet, in which  $h$  denotes the head of water above the sill of the weir,  $l$  its length, and  $n$  either 0 or 1 or 2, according as the contraction of the vein is prevented upon both, one, or none of the sides." Prof. Thomson, in the above-mentioned paper, referred to this formula as identical, in its general form  $a(l - \beta nh)h^{\frac{3}{2}}$ , with the one which he had deduced from known principles as the true theoretical formula. Mr. Francis put it forward merely as an empirical formula which agreed with the results of his experiments, and it is curious that he should have made a guess which turned out to be more in accordance with the true theory, than all the previous so-called theoretical formulas, which had been advanced and sanctioned by the best authorities.

PATRICK EDWARD DOVE

#### OUR BOOK SHELF

*A General Dictionary of Geography, Descriptive, Physical, Statistical, Historical; forming a Complete Gazetteer of the World.* By A. Keith Johnston, F.R.S.E. New edition, thoroughly revised. (London: Longmans and Co., 1877.)

THE title of this work is somewhat misleading. The "physical" and "historical" elements are so meagre that they are scarcely worth mentioning as features of the work. To call this a "complete gazetteer of the world" is a misuse of the term "complete;" *incomplete* would have been more accurate. Even on the scale of the present work it would take a gazetteer at least three times its size to contain anything like a register of all the places one would naturally expect to find in a "complete" gazetteer. The work includes a selection of the more important places in the world, very few towns, for example, out of the United Kingdom being given, whose population is under 1,000. We find no fault with the publication of a selective gazetteer, but it should not pretend to be more than it is. When compared with Ritter's well-known work, *e.g.*, the proportion of places found in the latter as compared with "Johnston" is something like five to one. We believe a service would be done to the public by the issue of a gazetteer containing simply all the names omitted in "Johnston." It is not for well-known places we turn up a gazetteer, but for names that one seldom hears. During these Eastern troubles, how many names of places not to be found in "Johnston" have become of great importance, and during the war just begun how many more are likely to come prominently into notice? On the other hand, much valuable space is occupied with catalogues of streets and public buildings in the articles devoted to well-known places like London, Edinburgh, Paris, Vienna, &c. All that can be said about public buildings and similar features of a town in a gazetteer of this scale is practically useless; the space would be used to much better purpose by an enlargement of the list of names. In Russia, for example, nearly all "towns" and "villages" seem to be omitted.

many of them with thousands of inhabitants, only "district towns," as a rule, being given. Poland and Finland are also very unsatisfactory; in fact these countries have never been properly "gazetteered" even in Russia. In several instances the "latest" information has evidently not been obtained. To get it, indeed, would involve a vast amount of research among official publications and travellers' narratives, but in a standard work such research is demanded. In Switzerland, we are informed by a Swiss friend, much of the information is half a century behind date. Under *Chaux-de-Fonds, e.g.*, the statement with regard to the manufacture of chains for the movements of watches has not been true for at least thirty years; and there is no lace now made at St. Imier. To arrange the wealth of information published by the United States Survey alone would involve much time and labour; we fear that for the new edition this has not been thoroughly done. Nearly two years ago Mr. W. H. Dall, of the United States Coast Survey, published a Report on the mountains in the Alaska territory. Yet no use has been made of this Report though it is quite accessible. For Mount St. Elias the height in the English Admiralty Chart, 14,970 feet is given, instead of upwards of 19,000 feet, obtained by the careful measurement of the United States Survey in 1874. The height of Mount Fairweather is set down as 14,708 (1855) instead of 15,500 (1874); Mount Crillon 13,500 instead of 15,900; Mount Cook 16,000, Mount La Perouse 11,300, and Mount Vancouver 13,100 feet, are not given. Such imperfections make one doubt if this new edition has been "thoroughly revised." It is easy to give information contained in census tables and in other gazetteers and guide-books, but even a work on the limited scale of the present cannot be made throughout trustworthy without very considerable trouble being taken.

*Zoological Classification.* By F. C. Pascoe, F.L.S. (John Van Voorst, 1877.)

THIS small work will be found particularly serviceable to many working naturalists. It is a concise compilation of the sub-kingdoms, classes, and orders of the animal kingdom, with lists of the families and most important genera. Specialists will be able to find fault with some of the details in many cases, nevertheless we know no volume which, in the space, contains so much reliable information. The larger groups are all succinctly defined, with many of the most modern views incorporated; and these definitions extend to the orders. Taking the mammalia for criticism, we regret to find the Sirenia included with the Cetacea, the Musk Deer with the Chevrotains, the Peccaries with the true Swine, and the Camels between the Giraffe and the other typical ruminating animals. The caccum is not "enormous" in Hyrax. "Whatever gaps there may be at the present day" between the Perrissodactyla and Artiodactyla "are not nearly all filled in by numerous extinct forms." Such errors may be found in many places; they do not, however, much detract from the general value of the work, which will be found more valuable as a basis for annotation, than a book of reference. There is a very complete index we are glad to say.

*Tracts relating to the Modern Higher Mathematics.* Tract No. 2, *Trilinear Coordinates.* By Rev. W. Wright, Ph.D. 77 pp. (London: Messrs. C. F. Hodgson and Son, 1877.)

DR. WRIGHT is, or was until quite recently, Professor of Mathematics at Wilson College, Pennsylvania. His object is to make his countrymen acquainted with certain branches of modern mathematics, and we learn that his first venture (Tract No. 1, *Determinants*) has met with considerable acceptance in the American universities. M. Hermite, too, has expressed himself well pleased with the author's standpoint, "Une grande transformation s'est déjà faite et continue encore de se faire dans le domaine de l'analyse; des voies nouvelles plus fécondes, et