

Practical Proofs of Chemical Laws: a Course of Experiments upon the Combining Proportions of the Chemical Elements. By Vaughan Cornish, M.Sc. (London: Longmans, Green, and Co., 1895.)

This small work is essentially a product of the modern efforts to teach science by a scientific method.

The author has endeavoured to give, in some ninety-two pages, clear and sufficient instructions for the experimental verification of the great quantitative laws upon which chemistry is based, and he has fully succeeded.

Nothing could be better calculated to lend interest to the work than the author's plan of quoting the results which were considered sufficient to establish these laws in the early days of our science; and the comparison of experimental data, obtained by the student, with the classical results of the great pioneers of chemistry, must lend a reality and zest to his efforts.

Used in its proper place, with students who have been well trained in general experimental science, and under the supervision of a capable teacher, there is no reason to suppose that the somewhat dogmatic statement of chemical laws will have any ill result.

The statement of the law of constant proportion given on p. 3—"this proportion remains constant in compounds which contain also other elements"—is so worded as to convey a wrong impression. It might be thought, for instance, that the proportion obtaining between potassium and chlorine in potassium chloride would remain the same in potassium chloroplatinate, which contains also another element platinum, and a reference to chapter v. would confirm this impression. It is evident that this statement requires remodelling.

Certain slips of a different type have found their way into the text. Thus, "*hollow glass-rod*" is mentioned on p. 52; and on p. 62, it is advised to treat silver with "pure strong hydrochloric acid" in order to convert it into silver chloride. Notwithstanding these minor defects, the book may be safely commended as embodying a well-thought-out and feasible plan of work. T.

Great Astronomers. By Sir Robert S. Ball, F.R.S. Pp. 372. (London: Isbister and Co., 1895.)

THE greater part of this book consists of *réchauffés* articles from *Good Words* and other publications. At the present day there is a large public curious to know biographical details, so no doubt the book will find many appreciative readers. The astronomers whose lives are portrayed are Ptolemy, Copernicus, Tycho Brahe, Galileo, Kepler, Newton, Flamsteed, Halley, Bradley, William and John Herschel, Laplace, Brinkley, the Earl of Rosse, Airy, Hamilton, Le Verrier, and Adams. It need hardly be said that the serious student of astronomy will find little in this book not already familiar to him; the volume is intended for the popular mind, and therefore much of it is small talk of the kind in which the general public revels. When the lives of eighteen astronomers are described in a volume of less than four hundred pages, as they are in this book, it is needless to say that only a few of the features characteristic of each can be presented. Sir Robert Ball has, however, selected the chief features in the lives and works of the great men who form his subjects, and his sketches, though verbose in parts, bring to light a few new facts in which astronomers generally will be interested. The book contains numerous illustrations, many of them new. The illustrations chiefly represent the astronomers described, and their houses, observatories, and instruments. We cannot understand, however, why some of them are in the book at all; for instance, with the sketch of the Earl of Rosse we find pictures of Birr Castle; The Mall, Parsonstown; and the Roman Catholic Church at Parsonstown. The connection of these views with "Great Astronomers" is much less reasonable than that between cats and clover.

NO. 1359, VOL. 53]

LETTERS TO THE EDITOR.

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Sir Robert Ball and "The Cause of an Ice Age."

I SHOULD like to correct one statement in my long letter in NATURE of October 17. I there said that Sir Robert Ball had not withdrawn his claim to the discovery of the law of distribution of summer and winter temperature in each hemisphere, which had in fact been previously published by Wiener. I am reminded by Mr. Kendall that I had overlooked a second edition of the book in which credit is duly assigned to Wiener. Thereby hangs a tale. I have looked in vain through Low's well-known list for any trace of a second edition. I also looked through the British Museum Catalogue without any result, and inquired in the Copyright Office in that establishment, and was told that no such book had reached the Museum. Lastly, the Museum people tell me they have applied to the publisher for the book, and have received the reply that it is only a re-issue, and not a new edition with new matter in it.

I am further told by the Museum officials, that he has thereby incurred a penalty of £5 for non-compliance with the Copyright Act. It was by an oversight of his, therefore, that this second edition has been overlooked by myself and, probably, by others.

In this second edition, Sir R. Ball, after unwittingly wearing the nimbus for six years, gives up his oft-repeated claim to be the discoverer of the law in question, and attributes it to Wiener. As the publication of his discovery was the alleged reason for writing the book, he had now to find another excuse, and did so by reiterating the unjust accusation he had made against Croll of having ignored the disparity between the sun-heat of summer and winter, and thus necessitating the writing of a work to set the world right on the matter.

As long ago as 1891, Mr. Noble had called attention to this injustice, and shown that Croll had nowhere made the mistake attributed to him, and quoted passages from pages 55 and 86-7 of "Climate and Time," to show that he was perfectly aware of the real conditions. Although Croll nowhere cites the actual numbers 63 and 37, or 3'93768 and 2'34550 as Wiener gives them, it is odd that in calculating the amount of sunshine received at Edinburgh in summer and winter respectively, he does give the numbers 7 to 4, that is, 63:36, and "Climate and Time" was published four years before Wiener's "Memoir."

It is quite true that Croll does not use these figures in his calculations as Dr. Ball does. For him they would be mere academic numbers, since he knew, as we know, that the problem to be solved depends much on the proportions of the differential temperature of different latitudes at different seasons, and little or nothing on the proportions of the temperatures at different seasons of a whole hemisphere lumped together.

Since the above was written, Mr. Hobson has replied to my previous note, complaining that I have converged attention upon the now famous law, which was supposed to be Sir R. Ball's own child, and have not referred to the effects of varying eccentricity, which were everybody's property. He forgets that I was criticising Dr. Ball, who habitually claims the law in question as the *causa causans* of an Ice age, and especially refers to this invariable and constant factor as "the following theorem which constitutes the *essence* of the astronomical theory of an Ice age."

The value of this essential factor of the problem being the matter in dispute, I presume Mr. Hobson wrote his letter to illuminate your readers, and not merely to engage in a profitless polemic. If so, perhaps he will do me the favour of meeting the following case.

(1) Wiener's law is not disputed. It represents the proportions between the *sum* of all the sun-heat received in either hemisphere in summer and winter respectively.

(2) Sir R. Ball makes it apply not only to the whole hemisphere, but to different zones in the hemisphere, and notably to Britain (see "A Cause for an Ice Age," new edition, pp. 127-131). Will Mr. Hobson support this astounding conclusion?

(3) In the zone between the tropics there is perpetual summer, and it absorbs one-half of the sun's heat received on the earth in equal proportions in the two seasons. Here, therefore, the proportions of sun-heat are not 63:37, but 50:50. There-