

before his death, that he obtained his C.B. and knight-hood. His memory has been perpetuated in that branch of the profession which he so adorned by the establishment, at Netley, of the Martin Memorial Gold Medal, which is presented to the surgeon on probation who takes the highest place in military medicine at the final competition. The biography is exceedingly pleasant reading, and the author has done well to incorporate in it letters from many interesting persons to Sir Ranald, and also some extracts from official documents, in the compilation of which he was concerned. F. W. T.

The Chemistry of the Garden: a Primer for Amateurs and Young Gardeners. By Herbert H. Cousins, M.A. Pp. xv + 141. (London: Macmillan and Co., Ltd., 1898.)

THIS little book is very clearly and pleasantly written. It contains much valuable practical information respecting garden soils, the use of artificial manures in horticulture, the preparation and application of effective fungicides and insecticides, and various other matters. The book is designed for the use of persons who have not received a scientific education, and we should think it will exactly meet their wants; there is, however, much in it that will repay the perusal of a higher class of readers. There are a few minor points which seem open to criticism. "Pod-plants" is not a good distinctive name for the *papilionaceae*, as the *cruciferae* are also podded. The popular use of the word "germ," as descriptive of certain races of living beings, should surely be discouraged as fundamentally incorrect. Nor is there any advantage gained by speaking of "muriate of potash," though the term still lingers in commerce. If a person who knows nothing is to be taught, it is surely needless to burden him with archaisms which he must unlearn if his education proceeds any further. Agricultural chemists will, we think, demur to the same valuation being applied to the nitrogen of ammonia and to the nitrogen of insoluble organic manures. R. W.

The Naturalist's Directory, 1898. Pp. 125. (London: Uppcott Gill, 1898.)

THE sub-title explains that this book is "for the use of students of natural history, and collectors of zoological, botanical, or geological specimens, giving the names and addresses of British and foreign naturalists, natural history agents, societies and field clubs, museums, magazines, &c." The volume is more remarkable for what it omits than for what it includes, and disappointment will be saved by not referring to it for the addresses of well-known naturalists.

The Teacher's Manual of Object-Lessons in Domestic Economy. By Vincent T. Murché. Vol. i. (Standards I. and II.) Pp. 250. (London: Macmillan and Co., 1898.)

THIS manual is, the preface informs us, "designed primarily to meet the requirements of the Education Department in the Class Subject of Domestic Economy, as laid down in the Code for 1897." It will be serviceable to the teacher in indicating what to show, do, and describe during object-lessons on materials used for food, and it contains a large amount of clearly explained and well-arranged facts about common things.

Storm and Sunshine in the Dales. By P. H. Lockwood; with a preface by H. G. Hart. Pp. 94. (London: Elliot Stock, 1898.)

A BOOK containing many personal observations on outdoor nature, expressed simply and sympathetically. The author is a fervent admirer of the natural beauties of Yorkshire dales, and his descriptions may lead others to share his enthusiasm, notwithstanding the fact that the scenes he depicts are mostly "glimpses of the obvious."

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LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

A Dust Shower.

PARAGRAPHS have recently appeared in several of the daily papers to the effect that a dust storm had been encountered off the west coast of Africa by the mail steamer *Roslyn Castle*, and that the dust had fallen on the deck for 900 miles. I was fortunate enough to secure a sample of this dust, which actually fell on the deck, with the following note affixed:—

"Ship covered with fine red dust off west coast of Africa. Lat. 22°5' N. Long. 17°25' W. February 15, 1898."

"Dust fog encountered with for 900 miles. February 18, 1898."

This dust is extremely fine, and consists chiefly of minute grains of quartz and flakes of brown mica, some of the former being well rounded.

I cannot find any trace of glass or other thing to suggest a volcanic origin to the dust; but it is undoubtedly a very fine sand, in all probability derived from the Sahara, although no mention is made of the direction of the wind when the dust fell.

Although cases of volcanic dust being transported for long distances are fairly frequent, those of sand appear to be less so.

Sir A. Geikie ("Text-Book of Geology," p. 337) mentions two cases of the transportation of sand from the Sahara; in the first instance it fell in the Canaries, in the second it was traced as far as Boulogne-sur-Mer. In the present case the distance of transport is probably greater than the one, and less than the other. C. ST. A. COLES.

The Solution of Quadratic Equations.

IN your issue of February 24 a review appears of "Chambers's Algebra for Schools." Your reviewer concludes with a lament of the probable uselessness of protesting against the method of solving quadratics by "completing the square."

Your reviewer might do something towards removing this "national fetish" if he would explain what method is taught elsewhere, to replace this out-of-date procedure. Before this vigorous onslaught, I feel ashamed to confess that I can recall no general elementary method, that does not depend on the completion of the square.

In my desire to free myself from a possibly antiquated "cult," I am, however, willing to undergo this humiliation, in the hopes that I and others may be brought more on a level with the times. E. CUTHBERT ATKINSON.

Rugby, March 6.

IN answer to Mr. Atkinson's letter, I will explain, as briefly as I can, what appears to me to be the proper way of discussing quadratic equations.

As soon as the pupil can easily factorise such an expression as $x^2 - 5x + 6$ into the product $(x - 2)(x - 3)$, it is not very difficult to make him see that 2 and 3 are the only values of x which make $x^2 - 5x + 6$ equal to zero; or, in other words, that the equation $x^2 - 5x + 6 = 0$ can be solved when the expression on the left hand has been factorised.

It is exceedingly important that the factorising of polynomials and the solution of equations should be treated as cognate, or rather equivalent problems. A quadratic equation should always be reduced to the form $ax^2 + bx + c = 0$: then the expression on the left-hand may be factorised by inspection, or else multiplied by such a quantity that the result can be conveniently expressed as the difference of two squares; $4a$ (that is, four times the coefficient of x^2) will always do, sometimes a smaller number. This should be illustrated by numerical examples: for instance, if the equation is $2x^2 + 3x - 7 = 0$, multiply by 8: then $16x^2 + 24x - 56 = 0$, that is $(4x + 3)^2 - 65 = 0$, and $x = \frac{1}{4}(-3 \pm \sqrt{65})$. When a boy is able to appreciate general formulæ, he may be led to see that

$$4a(ax^2 + bx + c) = (2ax + b)^2 - (b^2 - 4ac) = (2ax + b)^2 - (\sqrt{b^2 - 4ac})^2$$

and hence to use the "solution by formula" when he cannot find the roots by inspection.

Mr. Atkinson may perhaps say that this method "depends upon completing the square"; this is true in a sense, of course; but the point of view is really different from the "method of completing the square" usually found in text-books. Practically, the usual method is clumsy, and inferior to the solution by formula; and from the theoretical point of view it is objectionable, because it obscures the real nature of the problem. And I feel sure that many teachers and examiners will agree with me in saying that the educational value of the process is practically *nil*: bright boys go on to the general formula, dull ones follow the rule mechanically, and might just as well be drilled in the use of the general formula itself.

G. B. MATHEWS.

WEST INDIAN RESOURCES.¹

AS expert adviser in botanical and agricultural questions to the recent West India Commission, Dr. Morris undertook the preparation of a lengthy report dealing with the economic resources of those Colonies, the causes of whose distress were the subject of investigation. This paper formed Appendix A of the Report of the Commissioners which was issued last autumn, and the praise bestowed on it as an interesting and valuable survey by one who was specially qualified both by general and local knowledge to undertake the task, induced the Secretary of State for the Colonies to rescue it from the oblivion which is the fate of many important papers appearing in Blue Books. Mr. Chamberlain's desire to have it published in a form more accessible and convenient for the public here and in the Colonies, has resulted in its being converted into an independent volume, and now appears as the first number of an Additional Series of the *Kew Bulletin*. For this purpose the work has been revised and enlarged, a full account of the botanical organisation of each Colony, and lists of books and papers containing further information, being added.

After all that has been dinned into our ears for a long time past about the absolute necessity for the Mother Country to assist the sugar-planters by bounties or countervailing duties, it is refreshing to find a book, every page of which contains an unbiased statement of the natural resources of these unfortunate Colonies. As Mr. Thiselton-Dyer states in a prefatory note: "Dr. Morris's residence in the West Indies, his repeated visits to them, and his intimate knowledge of their conditions, have enabled him to produce an account as accurate as it is impartial of their natural and economic resources, which is certainly more complete than anything hitherto available. Why the West Indian Colonies have failed to reach success, and in what direction the path to it lies in the future, can be readily understood by any one who will take the trouble to read these pages."

The Colonies dealt with have an area about equal to that of Great Britain and Ireland, with the population of Wales. Out of the entire area little more than 2 per cent. is now under cultivation, and only 7 per cent. of the estimated cultivable area. In fact, while about a million and a half acres are being cultivated, over twenty million acres more are suitable for bearing crops. Guiana has an extent of country equal to two Ceylons quite untouched; Trinidad has the wealth of the Straits Settlements going to waste; and the unworked soils of Jamaica could be made to produce the prosperity of at least four Colonies the size of Mauritius. As is well known, the Colonies have long depended almost wholly on the sugar trade as the staple industry, everything else being unworthy of consideration by the planters. Minerals are of comparatively trifling value, being limited practically

to gold in Guiana and pitch in Trinidad. Essentially the true wealth of the colonists lies in the products and resources of the rich and fertile soil. In some of the islands it has of late years been recognised that it is as well to be prepared to cultivate more than one kind of produce; but, taken as a whole, we may regard the Colonies as given up to sugar growing, and, as Dr. Morris states:

"In most of the Colonies the situation is undoubtedly aggravated by their almost entire dependence on one industry. This is a source of grave danger in more ways than one. It is dangerous commercially, for any great depreciation of prices immediately affects the whole community. It is dangerous agriculturally, for adverse seasons or hostile tariffs may plunge at any moment the entire labouring population into great distress. Again, the growth of a single crop lends itself sooner or later to the spread of disease, and it rarely leads, owing to the neglect of other resources, to the production of the largest profit. To these may be added the narrowing effects produced on those engaged in the industry, and their inability or disinclination when a crisis comes to take up any other industry."

A dozen chapters are devoted to giving a full account of the past and present of each section of the Colonies—Guiana, Barbados, Trinidad, Tobago, Grenada, St. Lucia, St. Vincent, Dominica, Montserrat, Antigua, St. Kitts-Nevis, and Jamaica. As bearing upon the question of the mistake of relying upon a single industry, Guiana affords us some interesting facts. It is the largest and most valuable of our possessions in the neighbourhood, its capabilities of development are practically unlimited, and yet it is one of the most distressed of the Colonies. The region was ceded to us by the Dutch in 1815, it has an area of 109,000 square miles, a dozen large rivers flowing into the Atlantic, and a population of a little over a quarter of a million, or less than three persons to a square mile. The inland districts are practically uninhabited, nine-tenths of the population clinging to the coast. Under the Dutch sugar, coffee, and cotton were extensively cultivated, but with the transfer to the British Crown the planters gradually concentrated their energies more and more on one article and neglected the others. In 1829 the sugar yield was 46,026 tons, coffee 9,230,486 lb., and cotton 1,596,171 lb. By 1849 the coffee and cotton estates were rapidly disappearing, and in 1887 the returns showed 134,876 tons of sugar, while all other exports had practically ceased. It is this grasping at the most valuable prize, and utterly neglecting all opportunities in other directions, that has led to the downfall of this naturally wealthy country. "The whole activity of British Guiana during the last sixty years has been confined to the narrow strip of land along the coast. In spite of the vast extent of rich and fertile lands in the interior, with the exception of the gold industry, nothing has been done to develop them, and consequently the Colony is now in so critical a condition, owing to its entire dependence on a single industry, that its very existence as a civilised country is in jeopardy." With the knowledge that under another régime coffee and cotton were successfully grown in the district, it would be absurd to suppose, as some contend, that the soil can produce nothing else than sugar. The land devoted to sugar canes is a stiff clay, and fit for little else; but then it forms only the one-thousandth part of the total area of Guiana, and, as Dr. Morris remarks, there is nowhere such an extensive area of rich and fertile lands, with a comparatively healthy climate, and within easy reach of such good markets, as the Crown lands of this district. They can grow nearly every tropical product in demand, either in the New or the Old World.

Suggestions are made and particulars given as to increasing the resources of the country by adding profit-

¹ "A Report on the Agricultural Resources and Requirements of British Guiana and the West India Islands." By D. Morris, C.M.G., M.A., D.Sc., F.L.S., Assistant Director, Royal Gardens, Kew. *Kew Bulletin of Miscellaneous Information*, Additional Series I. Pp. viii + 165, and Map. (London: Eyre and Spottiswoode, Her Majesty's Stationery Office, 1898.)