

Both of these ranges are totally distinct from the Rocky Mountains, which are hundreds of miles further inland. The only drawback to travel among them is the "poor Indian," who watches travellers from a distance, and signals by smokes. We can well understand the enthusiasm of Mr. Whitney for the mountains of California, and we heartily hope with him, that neither the Yosemite valley nor the grove of Sequoias which—by a unique act of Congress—were ceded to the State for public use, resort, and recreation, for all time, will be suffered to fall into the hands of the acute but unpatriotic speculators who are endeavouring to use them for their own purposes; and who will, if they are not "sat upon," undoubtedly turn them into "gigantic institutions for fleecing the public."

W.

## OUR BOOK SHELF

*The Science and Art of Arithmetic: Part II. Vulgar Fractions; Part III. Approximate Calculations.* By A. Sonnenschein and H. A. Nesbitt, M.A. 260 pp. (London: Whittaker & Co. 1870.)

THE authors of this excellent school arithmetic are to be congratulated on having brought their work to a successful termination. In our notice of Part I., which appeared in a former number of NATURE,\* we pointed out the principles by which the authors had been guided, and as we believed those principles to be sound, and the authors to have carried them out successfully, we had no hesitation in commending the work as we did. The same good arrangement, ample store of illustration, and copious examples for practice, are to be found in this volume as had place in the first. The fulness with which the elementary portions were treated appeared to us to be a merit rather than a defect. From such wealth of illustration each teacher could select what was most suited to his purpose. In this volume we have more advanced subjects treated in like manner. But an analysis of the contents will give a good idea of the work. Under Part II. we have the subject of Vulgar Fractions clearly treated, with applications to Practice, and a chapter which treats of Proportion, the Chain Rule, Compound Proportion, and Proportional Parts. In Part III. are chapters on Converging Fractions, Decimals with their properties, and several applications to Money, Weights, Measures, &c., the Metric System, Progressions, Interest, Discount, Stocks, Evolution, and a good chapter on Arithmetical Complements. There is also a chapter in which we have Continued Product to a given limit, Compound Interest, Equation of Payments, Complex Decimals, Duodecimals, and International Calculations. At the end of the work are given 250 Miscellaneous Exercises. There is enough here to satisfy any youthful arithmetician, and the methods employed are the "latest out." The complete work gives ample evidence that it is the composition of men who have given much time and thought to the subject, and have had much tuitional experience.

R. T.

*Die Schmetterlinge Deutschlands und der Schweiz, systematisch bearbeitet.* Von H. von Heinemann. Zweite Abtheilung, Kleinschmetterlinge. Band II. Die Motten und Federmotten, Heft 1. 8vo. (Brunswick: C. A. Schwetschke and Son, 1870.)

M. HEINEMANN'S work on the Lepidoptera of Germany and Switzerland is well known to entomologists, by whom it is highly valued. It contains an admirable systematic description of the species of butterflies and moths inhabiting the above-mentioned countries, and has been carried out by the author in so conscientious a manner that the students of European Lepidoptera can hardly

wish for a better handbook. The author is now approaching the conclusion of his labours. The first section, including the larger forms of Lepidoptera, was completed some years ago; of the second section, the first volume, published in 1863 and 1864, contained the descriptions of the Tortrices and Pyralides, and the part now before us commences the true Microlepidoptera, the Tineæ and Pterophori. The former are exceedingly numerous, and the present portion contains descriptions of the species of only five out of the thirteen families into which the author divides the group.

W. S. D.

## LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.]

## The Teachings of Tribulation—"The Captain"

THE technical questions suggested by the loss of Her Majesty's ship *Captain* have received their full share of attention—indeed, more than their share, for able leaders and letters in the newspapers will not teach us how to build war ships. I do not intend to trouble you with freeboards, turrets, and metacentres. Nor do I propose to dive into all the published evidence and statements, in order to discover some delinquent on whom to saddle the blame of the terrible disaster.

The case of the *Captain* is an example, on a scale sufficiently startling to attract the notice of the whole nation, of a want in our administrative arrangements which has hitherto escaped the notice of the many. The few who have long deplored this want did not require that a quarter of a million of money and 500 gallant lives should be sacrificed in order to prove its existence. Employing, then, the loss of the *Captain* as merely one very striking instance out of thousands of others that pass unheeded every day, permit me to suggest what is the administrative lesson taught by it. The facts must first be briefly stated. This cannot be better done than by quoting a portion of the judgment of the court-martial, who tell us that they "find it their duty to record the conviction they entertain that the *Captain* was built in deference to public opinion as expressed in Parliament and through other channels, in opposition to the views and opinions of the Controller of the Navy and his department, and that the evidence all tends [*sic in Times' report*]—that the Controller of the Navy and his department generally disapproved her construction."

Now let us analyse the system the working of which justified the above reiterated condemnation. Beginning at the top, we have a Minister of State, a gentleman usually of high character and great general attainments, but not necessarily conversant with naval architecture. Being a party politician, he may at any moment vacate his post on some question totally unconnected with his department. In order to provide him with the knowledge which he does not pretend to possess, and to supply the element of permanence in which he is also deficient, he has under him secretaries, superintendents of works, and scientific advisers. These persons are in the strictest sense of the terms also subordinates of the Minister, bound to obey his orders. Outside this department are two bodies, independent of the Minister, and capable of bringing enormous pressure to bear upon him, namely, inventors and the public—the first interested, the second ignorant of science and owing no responsibility to any one. I disclaim any personal allusions in this analysis. Well, here we have two forces pulling the Minister different ways. The whole question is, whether the departmental, or, as we may call it, the home, force is strong enough to enable the Minister to resist, when necessary, the foreign invader; whether reiterated adjurations, noisy clamour, and threatened loss of popularity will silence and overbear official counsels. The question is already answered. The official counsels were overborne. It may be argued, however, that the official counsels may be wrong and the public right. But the official counsels in the case before us were right and the public wrong. Here we are landed in a difficulty. How is the Minister, who by our hypothesis has no knowledge of the question at issue, to tell when his advisers are right and when the public? He cannot tell. But he exercises his discretion. Now, it must be remembered that his advisers are his subordinates, and therefore, taking men as we find them on an average, not in a

\* See NATURE, Vol. II., p. 186.

position calculated to prompt them to oppose very strenuously a policy on which they see that their superior is set. Moreover, the advisers, who in the case before us are but two or three individuals, may be, as it was believed they were, prejudiced against the contrivance under consideration. It would be natural that the Minister should make a considerable deduction from the weight of their remonstrances on account of the departmental jealousy by which he might imagine them to be more or less tainted. Thus he is at sea, as deficient in the elements of stability as the *Captain* herself.

An obvious remedy for such a state of things might be to appoint as permanent heads to our great technical departments men thoroughly acquainted with their duties who could act on their own independent judgment. But this would subvert that perfect and inviolable edifice, the British Constitution. Far be it from a humble unit like myself to attempt such sacrilege!

What remains, then, as we cannot repress inventors and silence public clamour if we would, than to give the Minister stronger and more independent scientific support than that which was found in the case of the *Captain* too weak to prevent the most humiliating and disastrous blunder of modern times?

The suggestion I now venture to make is not new, nor do I make it now, on the pinch of the moment, for the first time. I brought it more than a year ago before a committee of the British Association, of which I was chairman. My proposal was, and is, that a powerful body of the most eminent men in every branch of science should be constituted a permanent paid Council for consultative, as distinguished from executive, purposes. Space does not admit of my detailing the constitution, mode of electing, and functions of this body. But, having long had the matter in my mind, I may say that I see no difficulty in securing the main conditions of varied and profound acquirements, and of due official relation to, yet thorough independence of, the Ministry and politics of the day. I need hardly say that such a consultative Council should comprise not only men distinguished in abstract science, but also men representing all branches of the sea and land forces, all technical departments, the public works, and the principal arts and manufactures of the country.

No mistake can be greater than to consider this proposal revolutionary, as some at first sight have done. It is in fact only a consolidation and systematisation of agencies actually in existence. The principle of supplying the country gentlemen who become Ministers of State with scientific advice through permanent secretaries and other subordinates, and through temporary committees entrusted with specific inquiries, has long been in force. It is certain that these individuals and bodies are often selected capriciously, and it is not saying too much to assert that the results of their labours would have been more valuable if their functions had been less narrow and their existence less precarious. The great domain of physical science cannot be parcelled out in neat little squares like a chess-board; its varied districts, as Nature has planned them, run into and mix with each other so intimately that in order to trace the boundaries of one, some knowledge at least of the adjoining tracts is necessary. Special committees, however well chosen, are seldom even numerically strong enough to comply with these conditions.

The Council now advocated purposes to substitute for innumerable, scattered, temporary, incomplete, hand-to-mouth expedients a permanent, properly selected organisation. In one case, the work is done somehow—we see to our cost how; in the other it will be done as well as human intelligence can do it; but in both cases the very same work will be done—namely, that of bearing really the burden of responsibility which Ministers only bear nominally. The principle will be the same under the existing and the proposed régime, but whereas it is now only recognised, it would then be realised. The details of the proposed reform, which are present to my own mind, would occupy more space than you could spare on one occasion from other important subjects. Nor is it possible in the brief limits of one letter to meet all those objections, now so well known to me, which start up directly this subject is mooted. Should, however, the remarks I have ventured to offer prove of sufficient interest to provoke discussion, I will on a future occasion solicit your permission to extend them.—I am, Sir, obediently yours,

Oct. 22

ALEX. STRANGE, Lieut.-Colonel

#### The Earliest Mention of the Aurora Borealis

The first appearance of the Aurora Borealis noticed in Mr. E. J. Lowe's "Natural Phenomena and Chronology of the Seasons" is that on Jan. 30, 1560. Other appearances are mentioned under

the years 1564, 1574, and 1575. No further record of it appears until Nov. 10, 1707, when it was seen in Ireland. Five more displays are noticed between this and the memorable one of Feb. 23, 1716, which, happening to take place on the day of Lord Derwentwater's execution, obtained for the phenomenon in the north of England the appellation of "Lord Derwentwater's Lights." On March 6 of the same year occurred another grand display, which is referred to in the chronologies of remarkable occurrences published in the almanacks of last century as "The Great Amazing Light in the North," continuing to be seen (more or less) at several times since, yearly. Previous displays in this century had probably not been visible in London. The phenomenon is thus described, with an attempt at explanation, in the *Flying Post* of March 8:—

"Last Tuesday night, as soon as it was dark, a pale sort of a light broke out in the north-west part of our horizon, which looked like the dawn of day, or rather like the moon breaking through the clouds. It darted many streams towards all parts of the sky, which looked like smoke. It proceeded towards the S.E., and continued by several intervals till midnight, when it totally disappeared. Some ignorant people, whose ideas are on such occasions stronger than their senses, fancied they saw armies engaged, giants with flaming swords, fiery comets, dragons, and the like dreadful figures; and others fancied they heard the report of fire-arms, and smelt powder; whereas there was nothing but what may easily be accounted for from natural causes, the sun having been hot for two days past, and particularly that afternoon, by which vapours were exhaled both from the earth and water, and the sulphurous particles mixed with them taking fire might occasion that light, and some coruscations, as is very common over marshy and fenny places in spring and summer nights."

The writer goes on to observe that "the disaffected party have worked this up to a prodigy, and interpret it to favour their cause," which accounts for a very obvious design to write the phenomenon down. Another display, not in Mr. Lowe's list, was witnessed at Leominster, on Feb. 21, 1718, as appears by a letter in the *Weekly Journal* of March 1. The streamers are there compared to the tail of the great comet of 1681.

London, Nov. 7

R. G.

THE fallacy of trusting for scientific information to any other than a recognised scientific source, cannot be better illustrated than by Mr. Pocklington's letter in your issue of Nov. 3. He there seems to think that the statements of the editor of a volume of popular poems on a matter of science are worthy of notice, and therefore thinks it worth while to inquire whether or not it is true that no aurora borealis ever appeared before 1715. The absurdity of such a rash statement is so apparent that it seems almost superfluous to show it. In 1754 a book was published by M. de Mairan, entitled, "Traité Physique et Historique de l'Aurore Boréale," in which he collects from all the writers, ancient and modern up to that date, accounts of all the Aurora Boreales which had been seen. Their total number amounts to 1,441 between the years A.D. 583 and 1751.

These are divided as follows: From A.D. 583 to 1354, 26 were recorded; 1354 to 1560, 34; 1560 to 1592, 69; 1592 to 1633, 70; 1633 to 1684, 34; 1684 to 1721, 219; 1721 to 1745, 961; 1745 to 1751, 28. Of these, 972 occurred in the winter half year, and 469 in the summer half year, the greatest numbers occurring in March and October. Since that date the two most remarkable displays have been those of the 23rd of October, 1804, and the 24th of October, 1847. An account of the latter aurora was published at Cambridge in the same year, giving twelve large coloured lithographic views of the brilliant display which are, without doubt, the best views ever given of any Aurora.

J. P. EARWAKER

Merton College, Oxford, Nov. 5

THE quotation given by C. Pocklington in your last issue as the words of the Editor of Routledge's edition of Collins's Poems, is the very note given by Dr. Langhorne in the "Poetical Works of William Collins," published in the year 1808, in a small book entitled "The Laurel," and as it has not been reprinted word for word its sense is somewhat obscured. In the original it runs thus:—

"By 'Young Aurora' Collins undoubtedly meant the first appearance of the Northern Lights, which happened about the