

not how rubbishy a book of Natural History may be, for, provided that it be of such a kind as to command a large sale, it must foster a taste for the subject among the million. This is a most pestilent doctrine. If the tares occupy the ground, how can the wheat grow? and the publication of every book of spurious science precludes the publication of a really scientific book on the same subject.

OUR BOOK SHELF

The Arts in the Middle Ages, and at the Period of the Renaissance. By Paul Lacroix, Curator of the Imperial Library of the Arsenal, Paris. (London: Chapman and Hall, 1870.)

A TASTE for art usually comes to us somewhat late in life, because, in nine cases out of ten, the taste is not cultivated or developed till long after school life. We have, in fact, no regular art education in this country, although endeavours are being made at South Kensington to form Art Schools, and to accumulate art students. A love for high art is certainly more common in France and Italy than in England, and this is partly accounted for by the fact that some education in the first principles of the arts is given in all the government schools and colleges. The work before us is well calculated to foster such tastes. It discusses not alone the principal arts:—"We pass in review," says M. Lacroix, "all the Arts, starting from the fourth century to the second half of the sixteenth. Architecture raising churches and abbeys, palaces and public memorials, strong fortresses, and the ramparts of cities; sculpture adorning and perfecting other arts by its works in stone, marble, bronze, wood, and ivory; painting, commencing with mosaic and enamels, contributing to the decoration of buildings jointly with stained glass and frescoes, embellishing and illuminating manuscripts before it arrived at its highest point of perfection, with the art of Giotto and Raphael, of Hemling and Albert Dürer; engraving on wood and metal, with which is associated the work of the medallist and the goldsmith; and after attempting to touch upon playing cards and niello-work, we suddenly evoke that sublime invention destined to change the face of the world—Printing." Although M. Lacroix speaks above of passing in review *all the arts*, we notice at once that he has mixed up the fine and the useful arts, and omitted some of each of them. Moreover, he has chiefly discussed what we call the "decorative arts." Poetry is omitted altogether, and the only account of music is given under the heading "Musical Instruments."

The book itself is gorgeous. It is well printed, and is full of good engravings and woodcuts. Moreover it contains nineteen excellent chromo-lithographs, by Kellerhoven, the most notable of which are the sixth ("Biberon of Henri Deux Faience") and the thirteenth ("The Dream of Life," a fresco by Orcagna). We have no book in our own language which satisfies the want, which must so often have been felt, of a work of this nature. It is a positive art-educator, and what with the appointment of Professors of the Fine Arts at Oxford and Cambridge, and the appearance of a few works of this kind, we may hope before long really to possess in this country some critical taste for all that is beautiful in art.

G. F. R.

Descriptive Travel and Adventures; or Hubert Preston Abroad. By Catharine Morell. Edited by J. R. Morell, formerly one of Her Majesty's Inspectors of Schools. (London: T. Murby.)

WE hope this is not a sample of "The Consecutive Narrative Series of Reading Books," of which it appears to be the 6th volume, for the sake of the unfortunate youths

in whose hands they may be placed. We scarcely know a book which we should take greater pains to keep out of the hands of young people eager for knowledge. It is full of the grossest and most palpable blunders. We will quote the three first we came across, giving chapter and verse, as we hardly expect to be believed without affording our readers the opportunity of verifying our quotations for themselves, if they wish to. When we read (Chemistry, p. 83) that "quicklime is simple carbonate of lime taken from the limestone of your mountains!" we thought we had pitched upon a curious slip of the pen; when we found that "marsupials," (which, by the bye, are known as being animals that jump instead of run) "are peculiar to Australia," and "*the tiger peculiar to the New World!!*" (Growth of Plants, p. 173) we opened our eyes with astonishment; and when we were told that *the elephant chews the cud!!!* (The Elephant, p. 197), we closed the book in disgust. Surely any boy on the lowest form of any school which the gentleman who edits the book "formerly inspected," would have set him right on all these points. Seriously, it is very sad that at this time of day it should be found possible to circulate such rubbish under the name of instruction in science. If this is what is to come of inspecting schools, the less we have of it the better, till we have trained up a staff of inspectors acquainted with at least the rudiments of science. B.

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 Teaching of Science

I AM the principal of a private school. I have long taken an interest in science, and have, by proceeding very gradually and cautiously, succeeded in making Scientific Teaching for a limited time in the week a part of the regular school course. There are many more difficulties, however, in the way of this than some of your off-hand devotees of science seem to be aware of.

Not the least of these is the decided opposition of some parents, who object altogether to any portion of their sons' time being devoted to that, the direct practical use of which they do not see. My school may be divided into three classes; those who are preparing for one or other of the public schools; those who are preparing for special examinations at Woolwich, and those who will complete their education with me. The first two classes cannot afford to lose any time upon any subject that will not tell directly upon the examinations to which they are respectively looking forward, otherwise the result might be the loss of a scholarship in the one case, and in the other the loss of a place altogether. And how utterly void of all chance Science is, in the former case at least, you can well judge. So that until our Public Schools set us the example, it is very little scientific teaching that we can give to this class of pupils at all events. While with regard to the last class, all that parents wish is that their sons should receive a classical and general education; but any meddling with Science I can assure you some of them look upon as simply an amusement of the master's, obtained at the expense of their sons' time. Nevertheless, as I have already said, I have made Scientific Teaching a regular part of the school course for a short time every week, and am only prevented from extending it much further by the causes named above. The subjects we have taken up hitherto have been elementary physiology and chemistry. For the former we have used Dr. Mapother's "The Body and its Health," while one or two of the elder pupils have gone on to Huxley's "Elementary Lessons in Physiology." And when it is considered that the average age of our pupils is only about twelve or thirteen years, I think this is as much as could be expected. For chemistry, we have been very much puzzled to find a suitable text-book; for though there is no want of really first-class books, we have not been able to obtain what we wish. Both Wilson's (published by Chambers) and Roscoe's "Elementary Lessons" are too long, and (considering the objections of parents named above) too high in price for school boys. What we want is something about half the size

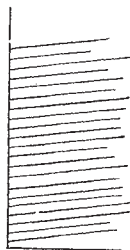
and price of either of these, which might be made the groundwork for lectures. As it is, we have been compelled to depend upon lectures alone, illustrated by experiments, in which the pupils themselves are allowed to have as much share as possible. I should be much obliged to any of your readers who could direct me to any text-book likely to meet the want I have indicated. We are now intending to combine with the subject named above a little Natural Philosophy; and I may add, that we have already had, some time ago, a twelve months' course on electricity, with experiments.

I think, however, that the whole subject of Science Teaching in schools wants treating by some master hand; and if some such man as Prof. Tyndall, for instance, who, in addition to the highest scientific attainments, knows something about the practical difficulties of the matter, would enter into the whole subject in your columns, advising what to teach, how to teach it, and what books to use, he would, I am sure, confer a real benefit upon Science. We have heard enough about the *want* of it; we want now to be told by competent authority how the want may be best supplied. And I am able to say from my own personal knowledge that there are heads of schools quite convinced of the importance of the subject, but utterly ignorant how to set about remedying it. Upon this point I wish to be very emphatic, and indeed it was chiefly for the purpose of urging this that I began this letter, knowing as I do well, both from observation and experience, the practical difficulties of the subject; difficulties which are much, very much, greater than your enthusiastic philosophers have any idea of. I hope, however, that if the subject be taken up at all, it will be by some one practically conversant with it, who can give advice which will be worth taking.

M. A.

Forms of Clouds

CLOUDY formations worthy of being noticed have been observed by me during the week. On the 8th I chanced to take a walk with M. Gustave Flourens, who has since been sentenced to death by court-martial. At five o'clock we witnessed many ribboned clouds parallel to each other, and so long that they appeared to radiate from a common focus. These ribboned clouds terminated abruptly just over our heads, and their extremities were *noalescent*, so that the appearance was one of a feather with the vanes of the quill emanating from one side. The wind was blowing



perpendicularly to the vanes and parallel to the quill. This accumulation of matter was evidently owing to the purity of the air on the other side of the singular cloud-edge.

I witnessed again these phenomena on the 9th and on the 10th of March, but not so well. On the 9th and 10th I also observed two solar halos well defined. The halo had a peculiarity of its own. The clouds adjoining the edge were tinged most delicately with violet on the south-easterly side. The evening was stormy and rainy, which is consistent with the theory I have advocated that halos are a prognostic of bad weather.

W. DE FONVIELLE

The Limits of Numerical Discrimination

THE solution of the Problem "how many objects can a man count at once?" is not general, but depends especially on the grouping, position, angular distance, similarity and nature of the objects counted, as well as on the experience and health of the person who counts them.

(This is written under the supposition that the word "count" means "tell the number of," not "begin, one, two, three," which of course cannot be done simultaneously.)

As an example of the operations performed in counting, take the card "ten of diamonds." The player passes his eyes up and down it, recognises it to be the ten, discriminating it from the other cards, calls it by its name "ten," and then, if he likes, can count separately the pips on the card.

This is a case in which the number of the card is recognised as its name, and many others could be adduced in which much higher numbers arranged symmetrically could be recognised at a glance without counting.

A person habituated to counting would divide the objects into groups with which he was best acquainted, in a way depending on their position.

To show that running the eye over the object is not necessarily conscious, or the very operation of counting—If anyone on a fine sunny day looks through a latticed window for some time and then shuts his eyes, he will be able to count a great number of panes in the impression on his retina, or wherever it is. (Compare with this operation that of recognising a person after he has passed out of sight.)

Looking at a collection of objects in counting by groups is governed by the same laws as looking at a single complex object, and naming follows after the object has been properly discriminated. I can imagine that a person naturally gifted with a memory for form or a certain kind, could by practice at once recognise the number of a large quantity of coins scattered at random, inasmuch as the number would be sharply discriminated from the one higher and the one lower, just as a shepherd discriminates sheep, which to other eyes are alike, and if he can discriminate 36 from 35 and 37, there is no necessity for him to count 36 to say that 36 are there. That can be done afterwards. There should be no astonishment that anyone should possess this power, for after all what is it in comparison to the marvellous faculty we have of seeing highly complex objects at once, which we can analyse to a certain extent; but in no way resolve into the elements of the synthesis. The discrimination between red and yellow, between one note and the next, seems to demand much finer powers of the memory; but we are not astonished at it.

The explanation of many wonderful mental and manual feats depends on the same marvellous faculty of apprehending and considering as one that which formerly could be only considered as very many. Reading words, playing a musical instrument (whether with or without notes), writing, tying knots, doing needlework, the manufacture of every useful thing, all are acquired through the same faculty of changing several simple movements into one complex movement, which is treated as one, and can be named as one, even before it is analysed. It is only fair to infer that counting by groups is an art which may be learned, and, if worth the while, carried to a high degree of practical excellence.

Your correspondent "J. B." (March 9) illustrates Dugald Stewart's view by the examples of two beans and two eyes; these do not prove anything in regard to mental attention, but only that they were not both opposite the parts of the retina with which the observer could see most comfortably. If they had only a small but perceptible angular distance, and did not dazzle so as to tire the eyes, what he mentions would probably not have occurred. He could remember them both together and then count them as well as if he were actually looking at them.

Eccles, March 14

R. V.

Books Wanted

COULD you kindly inform me where I could obtain the following works mentioned by Sir John Herschel in his "Discourse on Natural Philosophy," viz.—Braconnot, "Annales de Chimie," and "Dr. Prout's Account of the Experiments of Professor Autenrieth, of Tubingen," Phil. Trans. 1827. My efforts to obtain these books have hitherto been in vain; if you could assist me, I should feel much obliged.

Newbridge, March 12

H. J. WATSON

Quinary Music

YOUR correspondent, Beacon Lough, will find a very effective specimen of this division in the concluding Allegro to the glee "The Gipsy," written by Wm. Reeve.

W. R. M.

The Earthquake

THE earthquake, which caused considerable alarm throughout the North of England on the night of the 17th, was felt severely here between 11.5 and 11.10 P.M. The sky, which had been