

one or two "coaches" give also, but on a slip he has corrected his printed answer.

Again, in Ex. 27, p. 55: "A balloon has been ascending vertically at a uniform rate for 4.5 secs., and a stone let fall from it reaches the ground in 7 secs.; find the velocity of the balloon and the height from which the stone is let fall." Both Mr. Magnus and Dr. Wormell ("Natural Philosophy," p. 129, Ex. 45) work this question as if the balloon were at rest when the stone is let fall; we see no reason for their doing so in the wording of the question. They give the same height for the balloon, but differ in the velocity.

OUR BOOK SHELF

Game Preservers and Bird Preservers. By Capt. J. F. Morant. (Longmans, Green, and Co., 1875.)

To increase the annual rental of Scotch moorland, and to feel certain that at least thirty brace of grouse will fall to each gun after a whole day's sport, are the greatest delights of a certain few, according to whom every other consideration must be put in abeyance. Capt. Morant is one of these. "The red grouse is about the best game bird in the whole world, and deserves all the care we can bestow upon him." This care involves the annihilation of every creature that shows the least disposition to destroy and feed upon the eggs, young, or adult of *Lagopus scoticus*; and the death-list is no small one, including eagles, buzzards, hen harriers, all other Raptores, ravens, crows, magpies, wild foxes, polecats, stoats, and weasels. The stomachs of hawks are often found to contain the remains of weasels and rats; why kill them if they destroy those vermin? "If an alderman were shipwrecked on an uninhabited island, he would probably live upon the contents of a cask of biscuits which might be washed ashore. But the scientific gentleman among a party of savages who might examine him after his friends who happened to land on that island had killed him for their supper, would, we know, arrive at an erroneous conclusion if he entered it in his note-book as a fact that the animal *alderman* lived entirely on dry biscuit." This running analogy is the argument employed throughout the book, and it is this which makes it a particularly amusing one to glance through; whether it carries conviction with it is a different thing. The grouse disease is explained as depending on the fact that these birds, unlike others, eat only one food, heather, and when this is injured by cold or otherwise, they have no other to fall back on. That many shot-damaged birds survive and afterwards produce unhealthy offspring is considered unlikely. "Can we fancy a grouse telling his mate on a spring morning, My dear, I feel very poorly to-day; that No. 5 in my spine is troubling me dreadfully?" The author's raid against all the Raptores is very severe; he in this, as in other points, being much opposed to the general tenour of the report of the evidence given before the Parliamentary Select Committee appointed in 1873. His considerable experience adds great weight to the aspect of the question which he espouses.

The Handy-Book of Bees, being a Practical Treatise on their Profitable Management. By A. Pettigrew. Second Edition, revised and improved. (Edinburgh and London: Blackwood and Sons, 1875.)

A Manual of Bee-keeping. By John Hunter, Honorary Secretary of the British Bee-keepers' Association. (London: Hardwicke, 1875.)

THESE two volumes have different objects and will serve different purposes. The first edition of Mr. Pettigrew's book was favourably noticed in our columns five years ago (NATURE, vol. ii. p. 82), and we are glad to see that a second edition has been called for. Still more pleased are we to find that the author is open to conviction, and

that he has acknowledged and corrected a few theoretical errors in the first edition. For the economical management of bees with a view to profit, there is no better guide than Mr. Pettigrew.

Mr. Hunter's volume, on the other hand, is essentially a book for the amateur, to whom profit is of less importance than the amusement and interest of bee-keeping. He gives an account of all the appliances of the modern apiarian, and of the most recent improvements in the treatment and study of bees. The various kinds of honey-extractors, feeders, guide-combs, and queen-cages; the methods of artificial swarming, queen-breeding, and ligurianising; the diseases and enemies of bees; and the various methods of preparing and preserving the honey and wax, are all briefly discussed. Some of the most recent observations on the habits and instincts of bees are given, including Sir John Lubbock's interesting proof that they distinguish colours. The book is illustrated with a number of useful woodcuts, chiefly of hives and apparatus; and it will be indispensable to amateurs who wish to acquaint themselves with the most recent improvements in the art of bee-keeping, and the latest discoveries as to the habits, instincts, and general natural history of the honey-bee.

A. R. W.

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. No notice is taken of anonymous communications.]

Personal Equation in the Tabulation of Thermograms, &c.

IN a late number of NATURE (vol. xii. p. 101) you have commented upon the work performed by the Meteorological Office. Although in no way interested in the defence of that department, I think objection may fairly be taken to the style of criticism adopted. Not only would it, in most cases, be necessary to refer to the original thermograms satisfactorily to detect the many small errors pointed out, but it is well known to practical men that owing to certain idiosyncrasies of individuals some of the numbers 1, 2, 3 . . . 8, 9, 0 do occur in estimations more often than others, and of course more often than they should do theoretically. In no case are such personal peculiarities likely to show themselves more than in the determination of the position of a hazy photographic trace of sensible breadth, as between two sharply defined lines. As an example of my meaning, I may refer to somewhat similar estimations of tenths of seconds, as tabulated by the highly-trained and experienced observers of Greenwich, only premising for the information of the uninitiated, that the tenth part of a second is far too large a measure of time to be trifled with by astronomers, and that practically the estimation is simply that of the position of one sharply marked puncture or dot as referred to two others equally well defined on either side of it, indicating the beginning and end of the second, and separated by about one-third of an inch. Referring to the Greenwich Observations of 1864 (the only volume I have at hand), and taking three days' observations at random for the experiment, I have determined the percentage of times that each of the numbers 1, 2, 3 . . . 8, 9, 0 occur as the tenth at which transits of stars took place. As there is no theoretical reason why one number should predominate over another, we may expect that the percentage for each figure will be accurately 10, or each a tenth of the entire number.

The following are the percentages founded upon 511 estimations on April 21, upon 379 on April 19, and upon 393 on Nov. 5, 1864, respectively:—

	1.	2.	3.	4.	5.	6.	7.	8.	9.	0.
Per- centages	5.7	6.5	9.0	21.1	11.7	11.0	6.3	8.4	5.9	14.3
	6.9	9.2	10.0	13.7	10.8	12.4	7.4	8.7	5.3	15.6
	8.4	8.1	7.6	13.7	10.9	9.4	8.1	9.7	8.9	15.0
Mean of 3 days	7.0	7.9	8.9	16.2	11.1	10.9	7.3	8.9	6.7	15.0