

cal products such as potashes, soap, gunpowder, bone-ash, superphosphates, metallic ores, alloys, &c.

We cannot close this notice of a book which is really a solid contribution to chemical literature without referring to a circumstance which greatly detracts from its value; indeed, we fear that in many cases it may prevent the recognition of its great merit. Dr. Fleischer, like the great apostle whose worthy disciple he is, praises the times which are past; he is of opinion that our modern system of notation is founded on the most daring hypotheses, and he believes that the distressing complexity which the formulæ erroneously styled "modern" have produced, and the phraseology which has accompanied them, far outweigh any slight advantage which they have bestowed upon science; he thinks that such formulæ, "even supposing that there is a 'shadow of a reason' for their existence as Mohr trenchantly remarks, are peculiarly unfitted for analytical chemistry and for mineralogy." *O tempora, O mores!* With such convictions we are not surprised that Dr. Fleischer should have insisted on the retention of the old formulæ, although he has not actually prohibited the introduction of the newer notation in the translation. Mr. Muir has something to say for himself on this point; we entirely agree with him that the objections raised by the author have been answered times without number. *Il sabio muda conscio.* We hope therefore that, should a second edition be called for, Dr. Fleischer may be persuaded to put the work more in harmony with the time; we feel bound to say that had he done so in the outset the appearance of this second edition might have been considerably accelerated. T.

HARTLAUB'S BIRDS OF MADAGASCAR

Die Vögel Madagascars und der benachbarten Inselgruppen. Ein Beitrag zur Zoologie der äthiopischen Region. Von G. Hartlaub. Pp. 425, 8vo. (Halle: Druck und Verlag von H. W. Schmidt, 1877.)

NOTHING can be more conducive to the progress of zoological science in any country than the issue of handbooks of the different branches of its fauna in a cheap and convenient form. Such publications bring home to a multitude of observers a *résumé* of the facts previously known only to a few, and such as are too often scattered over the pages of periodicals and other works which can only be consulted in an extensive library. Those who are acquainted with the vast advance made towards our knowledge of the Birds of India since the issue of Dr. Jerdon's Handbook will readily admit the truth of what we say and many other examples might be adduced of the beneficial effects of similar publications.

Dr. Hartlaub's "Birds of Madagascar," although an excellent and original scientific work, is quite of the "Handbook" character—that is it gives us a *résumé* of all that is yet known concerning the Avifauna of Madagascar and the appendent islands in a cheap and portable volume—such as may be conveniently carried in the hand of any naturalist visiting those regions. Fifteen years ago Dr. Hartlaub issued a volume of similar character,¹ but much smaller in dimensions. To understand how great has been the advance lately made in our knowledge of the

birds of these regions, we have only to compare the "Ornithologischer Beitrag" of 1861 with the "Vögel Madagascars" of 1877. Since the publication of the former work Holland has sent forth Pollen and Van Dam, France Grandidier, and England Crossley and Newton, into that rich and still imperfectly explored field, from which every one of them has reaped an abundant harvest.

The "Lemurian Avifauna,"² according to Dr. Hartlaub, is now known to contain 284 species of birds. Of these 220 are found in Madagascar itself, and 104 out of these 220 are absolutely restricted to that island. Moreover, of these 104 birds not less than ninety are so abnormal in structure that it has been found necessary to refer them to peculiar genera. Compared with Madagascar itself the appendent island groups are poor in species, although in every case there are many interesting forms amongst their winged inhabitants. The Comoro Islands muster only some forty-four species³ of birds, Mauritius about sixty, of which fifteen or sixteen have been introduced by man's agency, and Bourbon about the same number, while Rodriguez appears to have only about twenty-five species now existing in it, of which four or five are certainly recent introductions. But we cannot speak of the recent ornithology of these islands without a passing allusion to the singular forms—now mostly known to us by their fossil remains—which have become but very recently extinct, and the gradual rediscovery of which must ever rank among the most interesting scientific achievements of the present epoch. Besides the Dodo of Mauritius and its brother, the *Pezophaps*, of Rodriguez, we now know that divers curious parrots (*Necropsittacus* and *Lophopsittacus*) and extraordinary rails (*Miserythrus* and *Aphanopteryx*) lived in those islands not long ago, and that other strange fowls were found in the same company. Two of the remarkable forms of the Mascarene Islands (*Coracopsis mascarina* and *Fregilupus varius*) have indeed become exterminated so recently that examples of their skins are still to be found in some of our older museums.

Let us now see what Dr. Hartlaub's conclusions as to the general facies of the avifauna of Madagascar and its appendent islands point to.

"Many years ago," he tells us, "the late distinguished naturalist, Isidore Geoffroy St. Hilaire, remarked that, if one had to classify the island of Madagascar exclusively on zoological considerations, and without reference to its geographical situation, it could be shown to be neither Asiatic nor African, but quite different from either, and almost a fourth continent. And this fourth continent could be further proved to be, as regards its fauna, much more different from Africa, which lies so near to it, than from India, which is so far away. With these words, the correctness and pregnancy of which later investigations tend to bring into their full light, the French naturalist first stated the interesting problem for the solution of which an hypothesis based on scientific knowledge has recently been propounded.

"For this fourth continent of Isidore Geoffroy is Sciater's 'LEMURIA'—that sunken land which, containing parts of Africa, must have extended far eastwards over

¹ Madagascar and its islands were proposed to be called Lemuria, in 1864, by Sciater, as being supposed remnants of the old "Terra Lemurum," where in this peculiar form of mammalian life had its origin. The name has been adopted by Haeckel and other writers on Distribution.

² Since Dr. Hartlaub's work was published, an important addition has been made to the Avifauna of the Comoros by Mr. Edward Newton, in his memoir of the birds of the Island of Anjuian. (P.Z.S. 1877, p. 295 et. seqg.)

³ "Ornithologischer Beitrag zur Fauna Madagascars. Mit Berücksichtigung der Inseln Mayotte, Nossi-Bé und St. Marie, sowie der Mascarenen und Seychellen." 8vo. Bremen: 1861.

Southern India and Ceylon, and the highest points of which we recognise in the volcanic peaks of Bourbon and Mauritius, and in the central range of Madagascar itself—the last resorts of the mostly extinct Lemurine race which formerly peopled it. When Wallace, whose utterances on this subject everyone must read with the greatest interest, puts forward a former junction of Madagascar with Africa as beyond doubt—a junction which, however, must have terminated before the inroad into Africa of the more highly organised mammals—everyone will allow this opinion to be at all events well founded. But when he proceeds to state that the fauna of Madagascar is manifestly of African origin, his assurances are based upon very slender grounds. In truth the individuality of the fauna of Madagascar is so unique that even that of New Zealand can hardly be compared with it. Wallace's attempted parallel between Madagascar and Africa, and the Antilles and South America is, in our eyes, sufficiently disproved by the occurrence in the Antilles of *Trochilidae*, one of the most characteristic forms of South America. But in Madagascar not one single one of the genera most characteristic of Africa occurs. This originality of the fauna is much too pronounced to allow Madagascar to be treated of only as a 'sub-region' or as an 'aberrant part' of the *Æthiopian region*."

To prove this position, Dr. Hartlaub in his interesting introduction to the present work, recapitulates the points in which the avifauna of "Lemuria" approximates to that of India and diverges from that of Africa."

"But the negative evidence," he adds, "is still stronger in the same direction. The groups of *Musophagidae*, *Coliidae*, *Lamprotornithinae*, *Buphagidae*, *Capitonidae*, *Indicatoridae*, *Bucerotidae*, and *Otidinae*, so eminently characteristic of Africa, are entirely absent in Madagascar, besides the genera *Gypogeryon*, *Helotarsus*, *Coracias*, *Crateropus*, *Irrisor*, *Bradyornis*, *Dryoscopus*, *Laniarius*, *Telephonus*, *Prionops*, *Platystira*, *Saxicola*, *Picathartes*, *Balaniceps*, and others, which are remarkably rich in individuals and species in Africa. Besides this, Larks and Chats, which in the African fauna are specially prominent on account of their numerous forms as well as regards their individual and specific abundance, are only represented by a single species in Madagascar itself, and in the rest of the sub-region not at all.

"In conclusion," Dr. Hartlaub adds, "if we take a glance at the families of the Madagascar sub-region as compared with those of Africa, four of these (*Mesitidae*, *Paictidae*, *Eurycerotidae*, and *Leptosomidae*) are peculiar, whilst the Diurnal Accipitres, Pigeons, Honeyeaters, and Cuckoos, are richest in species. In a considerable degree this is also the case with the orders *Grallae* and *Anseres*. As contrasted with Africa the *Fringillidae*, *Meropidae*, and *Sturnidae* (represented by only one genus), are extraordinarily poor. On the other hand, the *Coraciidae*, *Laniidae*, *Artamidae*, *Turdidae*, *Muscicapidae*, *Pycnonotidae*, and *Luscinidae*, are remarkable for their peculiarly modified types, and the *Sittidae*, which are quite unrepresented in Africa, for the anomalous form *Hypherpes*."

Such are Dr. Hartlaub's matured views on a subject which he has long had before him, and is, above all persons, qualified to speak.

In concluding our notice we have only to thank him on the part of ornithologists for his convenient and useful volume, and to wish that the Avifauna of many other countries were treated of in a similar manner.

OUR BOOK SHELF

Pollen. By M. P. Edgeworth, F.L.S. Illustrated with 446 figures. (London: Hardwicke and Bogue, 1877.)

MR. EDGEWORTH informs us in the preface that this work is a considerably altered edition of a paper laid

before the Linnean Society last year, but withdrawn by the author, on account of his omitting to notice the work of other botanists, British and foreign, on the same subject. The work chiefly consists of plates with the explanations and a list of forms of pollen figured by other authors, as well as some general remarks on the forms of pollen in different families. The figures are all drawn to scale, are fairly done, and there can be little doubt that the microscopist who loves pretty objects will promptly avail himself of Mr. Edgeworth's assistance in following up the subject. Very much valuable information is given in this book and it cannot fail to be useful to the scientific botanist. We feel, however, that Mr. Edgeworth does not wholly command our confidence on account of certain blunders he makes. Most of the German botanists have their names misspelt. Thus he always calls Purkinje "Purjinke," Naegeli "Nagili," Rosanoff "Romanoff," Pollender "Pollenden," Luerssen "Leursen." Surely if Mr. Edgeworth had been familiar with the writings of these men, he from merely seeing their names on their papers, would not have blundered so strangely. Then we feel rather doubtful about his references as we have failed to find any paper by "Nagili" in Pringsheim's "Jahrbücher," vol. iii. Naegeli's name does not occur at all in the index to the first ten volumes of Pringsheim's "Jahrbücher." The third volume of the "Jahrbücher" was published in 1863, while Naegeli's paper on the development of the pollen was published at Zurich in 1842. We think the student would hardly find the papers of "Purjinke in Latin," "Fritsche in German," "Pollenden Bonn." Why not refer to the proper title of the book or paper? Pollender has published two papers on pollen, at Bonn, one in 1867, in quarto; another in 1868, in folio. To which does Mr. Edgeworth refer? Then surely it is too late in the day to describe the pollen of the pine as consisting of "2 grains of pollen connected as it were by a broad band" (p. 8); or the pollen of some *Acanthaceae* as existing "in a peculiar coil, which can be unwound," in both cases the peculiar development of the extine being overlooked. Altogether, then, the work has slightly disappointed us, but perhaps we should not judge so much by the blemishes we notice in it, as by the undoubted worth both to the amateur and scientific botanist of the figures and references.

Die Auster und die Austerwirtschaft. Von Karl Moebius. (Berlin: Wiegandt, Hempel, and Parey, 1877.)

MUCH has been said and more has been written about oysters and their culture. Astonished by large figures many writers wished to astonish their readers in a similar way, and to induce the coast population of all civilised countries to undertake the culture of enormous masses of this most costly of all molluscs. Thus a belief has been widely spread that wherever there was a coast and seawater, oyster-beds could be established and quantities of oysters could annually be obtained without much trouble. The little book we have under notice is therefore well timed. It reduces to their proper and reasonable measure all ideas on this subject in speculative heads, and, as the author owns himself, it will for that reason be hardly welcome to these would-be oyster cultivators. But it will be all the more so to biologists, proprietors of oyster-beds, and the educated public generally, since it contains valuable details of the biology, the peculiarities, and the life-conditions of oysters. It will, we have no doubt, also find a favourable reception amongst those government departments of the various states of Europe and America, whose duty it is to superintend the oyster-fisheries and the natural oyster-beds, since it will offer them a reliable basis for their judgment in adopting or rejecting measures relating thereto. Prof. Moebius gives a very able account of the artificial oyster culture in France, and of the attempts made in this country to introduce the French