O. Haliphron, *Bois.*, both sexes of which I took, and twice *in copulâ*; the female something resembles O. Amphimedon, which is the female of O. Helena. About the mud holes Hymenoptera were abundant and on the fallen palm stems; in dry gulleys, &c. were many very curious Diptera; Coleoptera, however, were not to be found: I searched dead trees, and bark and leaves, with no other reward than a very few species of minute Curculios and obscure Chrysomelidæ. After a few weeks of this work the mud holes got baked hard, the pools of water disappeared one after another, and with them the butterflies and other insects, and for some days I got almost nothing. I now set to turning over the stones and dead leaves in the sandy river-bed, and soon found that there were some minute Coleoptera under them, namely, Anthici and very small Carabidæ; to catch them I made my boy bring a basin of water and a spoon, and by shovelling in the sand I could pick off the insects which floated on the surface: in this way I got many Carabidæ, the largest not more than 1½ line; two or three species of Anthicus and some Steni and other Brachelytra. I now turned my attention to buffalo-dung, which, though very barren compared with genuine British cow-dung, would I found yield something to a persevering search,—I obtained Histers, Onthophagi, and a considerable number of minute Staphylinidæ. A few days, however, soon exhausted this collecting-ground, for, except in the river-bed, the dung was absolutely uninhabited, when chance showed me a new and very rich beetle station. My lad brought me one day a fine large Nitidula which he had found in an over-ripe jack fruit (*Artocarpus* sp.); this set me to searching these fruits, of which there were a number about in various stages of decay, and I soon found that I had made a discovery, — Staphylinidæ, large and small, Nitidulæ, Histers, Onthophagi, actually swarmed on them: every morning, for some weeks, I searched these rotten fruits, and always with more or less success; I placed ripe ones on the fruit here and there, which I visited once a day, and from some of them got even Carabidæ; in all I found not much short of one hundred species of Coleoptera on the fruit, including most that I had before found in dung, so that it seems probable that, in tropical countries, the large fleshy fruits in a state of decay and putrescence are the true stations of many of the Carpophagous and Necrophagous Coleoptera, a fact of some importance, as explaining the presence of Onthophagi, &c. in places where there are no ruminating animals: at length the rains began to fall almost every evening, and the fruits, soaked with water, ceased to be productive, but I was compensated by discovering that

the margins of the streams, which when dry were so rich in Lepidoptera, were now an excellent collecting-ground for small Coleoptera; under the moist dead leaves that lay on the rocks I found numbers of small and very interesting Carabidæ, with hosts of Anthici, and a good many Pselaphidæ and Hydrophili: with the rains the butterflies almost disappeared, while the Cicindelidæ came out in great abundance, four species being different from those I took last year; small Melolonthidæ also now became abundant on the foliage, and I took two or three species new to me, with several pretty Chrysomelas and Curculios. After a fortnight's close work at minute Coleoptera, the weather became so wet and cloudy, as to admonish my return to Macassar to pack my collections before the commencement of the continuous heavy rains.

To persons impressed with the idea of the prevalence of large insects in the tropics, my Macassar collections will appear most extraordinary; the average size is certainly less than that of our British species, and the colours not at all more brilliant. Of the Carabidæ (more than one hundred species), the greater part are under 4 lines and a very large number under 2 lines, whilst several under 1 line are perhaps the smallest of the family: the Brachelytra (eighty or ninety species) are, with the exception of about a dozen, very minute and obscure: the Rhynchophora are all small, and there are about one hundred species of minute Necrophaga, Xylophaga, &c., and about eighteen species of the elegant little Anthici, whilst the Longicornes, Buprestidæ and Cetoniæ, usually so abundant, are very scarce: if we were to take away some dozen purely tropical forms, the collection would have all the appearance of one from an extratropical and even northern locality, owing to the large proportion of Carabidæ, Staphylinidæ and Necrophaga, the small average size of the species and the obscurity of their colours.

Amboyna, where I am staying a month only, on my way to Ternate, offers a striking contrast to the country I have just quitted: it is eminently tropical; the number of large and handsome species in all orders of insects is perhaps greater than in any other place I have visited, and the forms far more closely resemble those of Aru than of Borneo or Macassar; a number of the common species of the surrounding island are represented at Amboyna by others very closely allied or by varieties, but in almost every instance they are of larger size and more brilliant colours,—Papilio Severus and Ulysses are larger here than at Aru, whilst Deiphobus is larger than the closely allied Memnon of the Sanda Island or Ascalaphus of Macassar. In

the Hymenoptera, the species of Vespidæ and Pompilidæ are gayer than the allied species I have found in other countries; a Laphria and an Anthrax are larger than any Diptera I have yet found of the same genera; while the Coleoptera include the gigantic Eucheirus longimanus and a number of large and handsome Longicornes, Buprestidæ and Anthribidæ: it may be easily imagined, therefore, that Amboyna is a tempting place, well worth a thorough exploration, and I shall probably return to it unless I shall be able to visit Ceram, which I expect will contain almost all the Amboyna species, and probably many more, as is known to be the case with the birds. Though everybody says this is the dry and hot season, yet the weather has been terribly wet and windy, and during the twelve days I have now resided in a little hut in the jungle I have not had a single hot sunny day; here, as everywhere in the East, there is no forest left for many miles round the town, and there was the usual difficulty in finding a locality and a home, and in conveying my baggage. In the town I reside with Dr. Mohinke, the chief physician of the Moluccas, a German, an entomologist, and a very learned and hospitable man; he has lived in Japan, made a voyage to Jeddo, ascended volcanoes, and made collections: my pleasure may be imagined in looking over his superb collection of Japanese Coleoptera, large and handsome Longicornes and Lucani, tropical Buprestidæ and northern Carabi: he has also an extensive collection of Coleoptera made during many years' residence in Sumatra, Java, Borneo and the Moluccas — a collection that makes me despair; such series of huge Prioni, Lamiæ and Lucani, Dynastidæ and Eucheirus! It is such collections that give, and have always given, such an erroneous idea of Tropical Entomology: these collections are made entirely by natives. Dr. Mohinke has resided here in Amboyna, for example, *two* years, and every native in the island knows that large and handsome beetles will be purchased by him; he has, therefore, hundreds of eyes spread over hundreds of square miles, and thus species which in ten years might never once occur to a single collector, are inevitably obtained by him in greater or less abundance, whilst the smaller, more active, and much more common species are never brought at all. The Eucheirus is evidently rare, yet Dr. Mohinke has a fine series, obtained at intervals from different localities; he also sends bottles and casks of arrack to the Dutch officers resident in different islands, and though he sometimes has them returned crammed full of a single species of common Calandra or Passalus, yet he occasionally gets some magnificent insects. I believe myself that, as a general rule, beetles are

rare exactly in proportion to their size, rare both in species and in individuals; in four years' almost daily search in the Eastern forests I have never found a large Prionus myself, and I have collected nearly four thousand species of Coleoptera: such collections as those of Mr. Bates and myself, made in such distant countries (both generally considered among the richest in large species), are what show the true nature of tropical insects, and I believe that a careful examination of these will lead to the conclusion that there is no superiority whatever in the average size of tropical Coleoptera over those of temperate climates, and that in many groups the latter have the decided advantage.

A. R. WALLACE.

Scent: an attempt to explain its Properties and Causes.

By the Rev. J. C. ATKINSON, M.A.

IT is my purpose in the following remarks to record a few observations on the subject of Scent, with the view of leading, if possible, to further observation and inquiry into a matter generally thought, I believe, to be involved in a good deal of obscurity and uncertainty.

By scent is implied what is assumed to be an odour emanating from any specified member or members of the animal kingdom; and is, in sporting language, so far restricted in its sense as to be applied almost exclusively in the case of such animals as are the objects of pursuit in the chase or by the shooter; and, almost as exclusively, with reference to the olfactory powers of some one or other of the varieties of the dog. However, in attempting to institute an inquiry into the nature or peculiarities of Scent, it will be certainly most convenient, and possibly quite necessary, to include under that term the odorous emanations proceeding from any animal whatever, and perceptible to the sense of smell in any other animal whatever.

It is probably true that there is no existing animal without its own peculiar scent. Thus, "in most Mammalia," says Dr. Carpenter, "an odoriferous secretion, characteristic of the particular species, is formed by glandulæ which pour out their product on some part of the surface, their situation however being extremely variable in the different tribes; this secretion is usually formed most abundantly at the period of sexual excitement, and appears to be concerned in the attraction of the sexes towards each other." (General and Comp.

dated two years subsequently to the introduction of gas, and its ravages have not yet extended beyond the reach of the gas influence: that gas has an injurious effect on elms is a self-evident fact, so probably have all gases evolved by combustion in factories, since we always see elms in manufacturing cities losing their leaves six or seven weeks earlier than in the country: in this weakened state trees are particularly obnoxious to the attacks of insects, and about London elm trees are generally infested with the larvæ of Scolytus destructor and Zeuzera Æsculi. I am well aware of the alleged fact of the trees in the Hartz forest and elsewhere in France and Germany being destroyed by Scolytus, still the coexistence of elm failure and gas-lights must remain an indisputable fact, although at present a fact from which no general conclusions can be safely drawn."

Mr. Westwood observed, with reference to the latter part of Mr. Newman's paper, that the Scolytus was abundant in Christ Church Meadows, Oxford, far away from gas-lights."

Proceedings of Natural-History Collectors in Foreign Countries.

Mr. A. R. Wallace.*—"Amboyna, December 20, 1857.—My collecting this year has been so peculiar and so different from anything I have yet done in the tropics that I must give you some little account of it; my locality was at the foot of the mountains about thirty miles north of Macassar, the whole country between this range and the sea is a dead level of paddy fields, flooded for half the year, and of course absolutely barren of insects; the mountains are of limestone or basalt, the former rising from the plain in immense perpendicular walls quite inaccessible, except where a few streams break through them; the basalt hills are more rounded, and at the foot of one of them is a forest of palms and jack fruit. I had a small bamboo house built; when I arrived in August there had not been rain for two months and it was fearfully hot and parched; dead leaves strewed the ground, and a beetle of any kind was sought for in vain. After some time I found a rocky river-bed issuing from a cleft in the mountains, and though dry it still contained a few pools and damp hollows; these were the resort of numerous butterflies,—Papilio Eurypilus, the new species near Sarpedon, P. Rhesus, P. Peranthus and the rare P. Encelades, *Bois.*, the beautiful Pieris Zaranda was rather abundant, and several interesting Nymphalidæ. Here, therefore, I made daily excursions and procured good series of many of these insects; the paths in the forest adjoining this stream were pretty abundant in Ornithoptera; of two species, O. Remus and the very rare

* Communicated by Mr. S. Stevens.