

tance from our track was 0'0031, or 286,000 miles, but the earth at the time was in another part of her orbit and far away from the comet, which indeed never approached our globe within 0'42 of the earth's mean distance from the sun. To have brought the two bodies into their closest possible proximity in 1680, it would have been necessary that the comet should have arrived at perihelion at midnight on the 18th of January, 1681, in which case they would have met on the night of December 22.

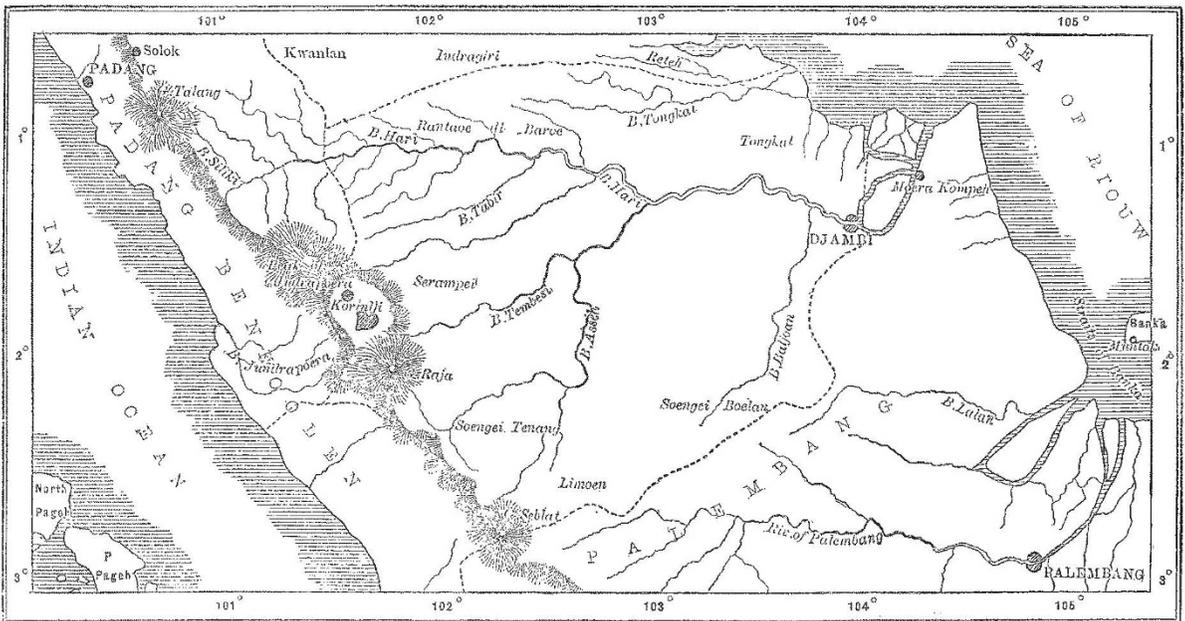
No comet is yet certainly known to have been situated nearer to the earth than 1,390,000 miles, which was the distance of Lexell's comet of 1770, on July 1, at 5 P.M. G.M.T.

AN EXPLORING EXPEDITION TO THE INTERIOR OF SUMATRA

ONLY a short time ago the Geographical Society of Amsterdam took the first preliminary steps towards the realisation of a long-cherished idea,—the exploration of those parts of Sumatra which have hitherto been indicated by white patches on our maps of that island, even

though they form part of the colonial territory. These regions are bounded to the south by the residencies of Palembang and Bencoolen, to the east by the Straits of Banka and the Sea of Riouw, and to the west by the highlands of Padang and the chain of volcanic mountains which traverses the island in its whole length, running parallel to the coast. All the above-named districts are tolerably well known, the native kingdoms of Reteh, Indragiri, and Kwantan, situated farther north, perhaps excepted. It is this white patch, better known under the name of the Djambi territory, which the expedition will choose for the special object of its researches.

For more than one reason this and no other part of the interesting island has been chosen. In the north the war with Atchin is for the present an impediment to a peaceful party of explorers, although a better acquaintance with those tribes of the Malayan race known as the Battaks would be highly interesting from a linguistic and ethnological point of view. This having to be given up, the question of the navigability of the Djambi River, which might, moreover, prove of so much importance on commercial grounds, induced the Geo-



graphical Society definitely to fix its choice on the indicated parts, rather than on Indragiri, Reteh, or any of the above-named districts.

The only European who has ever visited the domains of the Sultan of Djambi, and has left any official documents about the state of things as he found them, was the Palembang resident van Ophuysen, who, in 1869, travelled a good way up the Djambi River, with the Government steamer *Boni*. Unfortunately, he was obliged to return sooner than he wished, for reasons dictated neither by the hostility of the population, nor by the barrenness of the country; on the contrary, he has reported very favourably on both these points. He had, moreover, occasion to notice the existence of several important tributary rivers, and as far as his survey extended he found the Djambi itself everywhere navigable. His reports to the Government at Batavia have formed a valuable basis upon which the Geographical Society has drawn up its projects for the present expedition.

The body of explorers will begin by separating into two parties, one of which will ascend the river in a steamer which it is expected Government will place at their disposal, the other party starting from Padang and passing the

mountain chain above-mentioned somewhere between the volcanoes of Talang and Indrapoora, will try to follow the course of one or more of the Djambi tributaries—more especially the Batang Hari—from its source up to the point where they will meet the steamer with the rest of the explorers, who will have in the meantime ascended the river as far as possible.

This junction having been effected, the next task will be the detailed survey of the different courses of the Sangit, the Teboo, the Tabir, and the Tembesi, the party all the while slowly advancing towards those mysterious valleys in the interior of Korintji, Assei, &c., which have afforded so much matter for speculation, and about the beauty and fertility of which most wonderful accounts have long been circulated. For the only reliable data we possess, we are indebted to natives who have travelled to the coast for commercial purposes, information which cannot but be very imperfect. Unacquainted with the disposition of the inhabitants towards European intruders, our travellers will have to feel their way, using the utmost circumspection not to rouse the distrust of the population, which would undoubtedly be the case if Government was directly associated with the expedition. The natives would not fail to

look upon this as a warlike demonstration, and their love of independence would then prevent the exploring party from accomplishing its task.

Not only from a geographical and ethnological point of view is this expedition expected to be a brilliant success, but also in the several departments of natural history the results are likely to be of high scientific value. A naturalist is to be appointed, who will accompany the explorers and enrich the zoological and geological departments of the national museum of Holland with interesting specimens from regions hitherto so superficially known.

There is some probability of a botanist being appointed by a committee of botanists and horticulturists, who will pay his expenses, and thus make the expedition profitable for this department of natural science as well.

The staff of the expedition will further consist of an able geographer, to whom the topographical department is to be confided, and of a linguist, who will study the languages of the tribes met with. It is a curious fact that in Sumatra the languages spoken by contiguous populations show very considerable differences. He will at the same time be able to serve as an interpreter, where this may prove necessary, and will no doubt have occasion to gather some interesting ethnological data. An artist will complete the party of explorers, which is to leave Holland in the beginning of next summer.

It is expected that one or more able naval officers will be appointed by the Indian Government to the command of the vessel in which a great part of the surveying work is to be done. They will of course bring a most welcome support to the geographer, to whom assistance of this kind may prove almost indispensable.

As to the financial side of the question, the expenses required to carry out the scheme when reduced to its most simple dimensions, have been evaluated at 2,000 guineas. The Geographical Society, having been founded only a couple of years ago, has no funds at all at its disposal, and so an appeal has been made to the public, scientific and commercial, with a view of obtaining the required money by private efforts only. Government will not be applied to before the subscriptions have surpassed the above sum, and when the possibility of realisation will thus have been assured. A Governmental subsidy will then not be a *conditio sine quâ non* for the expedition, but only a means of giving it a wider extension, of bringing within its range a larger field than the original 2,000 guineas would admit of. As the national interest in the expedition is increasing every day, it is expected that this sum will be raised within a very short time.

The Colonial Office at the Hague strongly supports the efforts of the Society, and the Government at Batavia has promised its earnest co-operation. Another favourable circumstance is to be found in the willingness of the Sultan of Djambi, now on the best terms with the Dutch colonial authorities, first, to permit of this scientific invasion into his domains, and secondly, to lend his assistance wherever this might be of any use. As a palpable proof he has already put his son-in-law at the disposal of the exploring party, for the purpose of accompanying them on their tours. Policy seems to play a part in the unexpected magnanimity of this potentate.

Let us hope the best for the realisation of all those promising plans, and may I, ere long, have the opportunity of bringing under your notice some results of an expedition by which science in general cannot but profit.

A. A. W. HUBRECHT

## FERTILISATION OF FLOWERS BY INSECTS\*

### XII.—Further Observations on Alpine Flowers.

LAST year, after having spent my vacation in the observation of Alpine flowers and their fertilisation by insects, I published some articles in this journal, in

Continued from vol. xii p. 191.

order to show that, in the Alpine region, Lepidoptera are far more frequent visitors of flowers than in the plain and in the lower mountainous region, while the frequency of Apidæ, not only absolutely but to a still greater extent relatively, greatly diminishes towards the snow line (see NATURE, vol. xi. pp. 32, 110, and 169). Further, in these articles I attempted to demonstrate that some Alpine species (*Daphne striata*, *Primula villosa*, *Rhinanthus alpinus*) are adapted to cross-fertilisation by butterflies, whilst the most nearly-allied species which inhabit the plain or lower mountain region (*Daphne Mezereum*, *Primula officinalis*, *Rhinanthus crista-galli*) are cross-

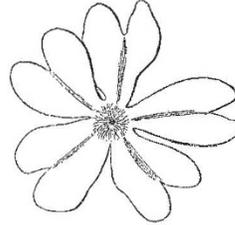


FIG. 71.

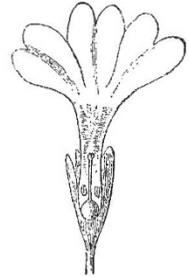


FIG. 72.

fertilised by bees; and that among the family of Orchids, by far the majority of species growing in Alpine regions are likewise adapted to Lepidoptera.

Last summer having revisited the Alps, in this and following articles I intend to show how far the results arrived at by my first excursion are confirmed, completed, or modified by my new observations.

Firstly, I will give some additional notes concerning the species treated of in my previous articles.

1. With regard to the fertilisation of *Daphne Mezereum* and *striata*, I concluded, solely from the length and width of the corolla-tubes, and from their colour and scent, that the former were adapted to cross-fertilisation by bees and some flies, the latter by Sphingidæ and moths; but direct observation of the fertilisers was wanting. Last spring, April 14th, in the valley of Poepfelsche, near Lippstadt, watching the flowers of *D. Mezereum* in calm and sunny weather, I succeeded in confirming my previous conclusions, so far as *D. Mezereum* is concerned, by

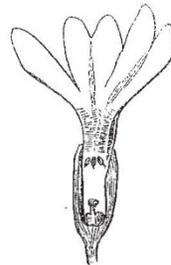


FIG. 73.



FIG. 74.



FIG. 75.

direct observation. Some humble-bees which escaped to my net, several specimens of the hive-bee, and single specimens of *Anthophora pilipes*, F., ♂, *Osmia fusca*, Chr., ♂, and *Osmia rufa*, L., ♂, were perseveringly occupied in inserting their proboscides into the base of the corolla, apparently sucking its honey, whilst many smaller bees (*Halictus cyllinarius*, F., ♀, *H. leucopus*, K., ♀, *H. nitidus*, Schenck, ♀, and *H. minutissimus*, K., ♀) were crawling with their whole bodies into the corollas, partly in order to suck the honey, partly collecting the pollen. Some Muscidæ also visited the flowers, touching stigma, anthers, and different other parts, with the flaps of their fleshy mouth, and sucking the honey. Besides these Apidæ and Diptera, only one butterfly