

receives by its approach to, entrance into, or passage by differently disposed surfaces, he reserves for a second part of this paper, to be hereafter communicated.

*On the Economy of Bees. In a Letter from Thomas Andrew Knight, Esq. F.R.S. to the Right Honourable Sir Joseph Banks, Bart. K.B. P.R.S. Read May 14, 1807. [Phil. Trans. 1807, p. 234.]*

During the progress of the various experiments on vegetation, of which Mr. Knight has communicated accounts to the Society, he has had opportunities of paying considerable attention to the economy of bees, and has observed many interesting circumstances, that appear to have been overlooked by former writers.

A general opinion prevails that every hive remains at all times unconnected with other colonies in the neighbourhood, and that strangers are always considered as enemies. Mr. Knight, on the contrary, has in several instances witnessed a friendly intercourse to take place between different colonies, and he imagines it to be productive of important consequences in their political economy.

Having observed several bees flying one evening at a later hour than they usually work, he endeavoured to discover how they were employed, and he found them to be passing in a direct line from one of his own hives to that of a cottager, about 100 yards distant. There was a considerable degree of bustle and agitation in each of these hives; every bee as it arrived seemed to be stopped and questioned at the mouth of each hive, but there was no appearance of hostility or resistance. This kind of intercourse continued, in a greater or less degree, during the eight following days, and appeared to be amicable for the whole of that time. But on the 10th their friendship terminated in a quarrel, and they fought desperately.

Mr. Knight has had other opportunities of observing a similar intercourse with the same result; but he has reason to think that it not unfrequently terminates in a junction of the two swarms; and he remembers to have observed, many years ago, circumstances perfectly similar in one hive followed by desertion of the labouring bees, who left the drones alone in possession of the hive, but without anything to live upon. He further thinks, that when a junction is determined upon, they remove immediately, and return only during the day for the purpose of carrying off the honey.

Mr. Knight has also remarked the manner in which colonies of bees, proposing to emigrate, fix upon their future habitation. He has frequently noticed an examination of certain hollow trees to take place for many days together by detachments of bees, from twenty to fifty in number. This examination was not confined to the mere cavity, but extended to the external parts of the tree above; as if they were apprehensive of injury from moisture by any perforation.

Their scouts must apparently have some means of communicating information of their success, without which it cannot be supposed that others would accidentally meet at a mile distance from their

hive. The search is, in general, continued for about a fortnight previous to their removal.

Mr. Knight has observed, that in this case also colonies will sometimes unite; for he has seen, in two instances, a swarm received into a cavity, of which another swarm had previous possession, without opposition. He infers, therefore, that some preceding intercourse must have taken place between the two swarms, although anything like an agreement between them be scarcely consistent with the limits generally supposed to be set to the instinctive powers of the brute creation.

When a young swarm issues from the parent hive, they generally soon settle on some neighbouring bush or tree, wholly unprotected from rain or cold; and their object apparently is merely to collect their numbers previous to removal to the place they have fixed upon for their future residence. Their readiness to accept a hive as a substitute, may appear to militate against any supposed predetermination; but Mr. Knight is disposed to consider this as an hereditary habit produced by domestication, and confirmed in the breed by the uniform practice of many succeeding generations as a secondary instinct. Accordingly, the original native propensity to migrate, remains more strong in some families of bees than in others.

Similar hereditary propensities are observable in the offspring of many other domesticated animals. In the dog, more especially, appear the passions and propensities of its parent. A young spaniel, brought up with terriers, showed no marks of emotion at the smell of a polecat, which instantly irritated the young terriers; but it pursued a woodcock with clamour and exultation at first sight; and the young pointer stands trembling with anxiety, with his eyes fixed and his muscles rigid, the very first time that he is conducted into the midst of a covey of partridges.

These peculiarities of character can be considered as nothing but hereditary propensities or acquired instincts; and are modifications, capable of endless variation, in adapting animals to different countries and different states of domestication.

Mr. Knight's further observations relate to the bee-bread and the bees' wax. Respecting the former, he agrees fully with Mr. Hunter, that the substance generally collected on the thighs of bees is the farina of plants for feeding their young; but he observes that they occasionally carry other substances, and for other purposes, in the same manner. With regard to the wax, he is not of Mr. Hunter's opinion, that it is a secretion exuding from between the scales of the abdomen, but thinks that it is of vegetable origin, collected by the bees, and deposited between the scales for facility of conveyance, and for giving the requisite temperature for being moulded into combs.