

vances and Divine art it may be again diversified into flesh and bones, nerves and membranes. How conspicuous, and yet how admirable are the operations of Divine Wisdom in this single instance of nourishment! But it is no wonder that a God who could create such astonishing and exquisite pieces of machinery as plants and animals, could proscribe such laws to matter and motion as to nourish and preserve the individuals, as well as to propagate the species through all ages to the end of time.

### THE BOOK OF NATURE LAID OPEN.

#### INSECTS. Concluded.

Instead therefore of having the presumption to stigmatize in the most remote degree, this particular order of the creatures of the Almighty as affording evidences of imperfection, let us rather, from similar considerations, adopt the words of the more judicious SWAMMERDAM: "After an attentive examination" says he "of the nature and anatomy of the smallest as well as the largest animals, I cannot help allowing the least an equal, or perhaps a superior degree of dignity. If while we dissect with care the larger animals, we are filled with wonder at the elegant disposition of their parts, to what a height is our astonishment raised, when we discover all these parts arranged in the least in the same regular manner." And sum up the dispute in the words of another naturalist. "Of this dispute it is only necessary to observe, that the wisdom of the Creator is so conspicuous in all his works, and such surprising art is discovered in the mechanism of the body of every creature, that it is very difficult, if not impossible, to say where it is most, and where it is least to be observed."

It is impossible in the compass of a few pages to do any thing like justice to a subject, which can never be sufficiently investigated. I would however, consistent with my general plan, notice a few facts and striking peculiarities in this mysterious and numerous order of beings by which it is most distinguished from the others, and in which it will be sufficiently evident that insects are also the children of the same common parent, whose wisdom and goodness are so conspicuous in his other works.

In the head of an insect no organization of the brain is said to be discovered, but the want of this is abundantly made up by that medullary thread which communicates the vital principle to the other parts of their bodies, and endows them with that tenacity of life, which, as has been already observed, is so useful to the species. Neither are they apparently furnished with the usual organs of smelling and hearing, but whether the olfactory nerves communicate with the feelers, and the auricular organs are situated in the antennæ, as Mr. BARBERT supposes, or not, there can be no doubt from the readiness of Wasps, Flies, &c. to betake themselves to their wings and fly to dainties at a distance, and the alertness of Bees in sallying out to the relief of a brother in distress, when he alarms them by his noise outside the hive, that insects are not deficient in the senses of seeing and hearing, wherever the organs may be situated. The manner of respiration is different in insects from other animals; they breathe through pores placed in the sides of their bodies, and this also fits them for that remarkable peculiarity of living in separate parts. In the composition of insects no

bones are made use of, but this defect is supplied in some by a membranaceous or muscular skin, and in others by a crustaceous or horny covering. Their eyes are fixed, and they have no eyebrows, but to prevent them from injury the latter want is supplied by the external tunic of their eyes being hard and transparent, and to remedy the former some insects have four, some six, others eight, while the number of lenses in some of those who have only two is amazing indeed.

The eyes of insects are admirably adapted for seeing minute objects nigh at hand, but from the smallness and convexity of their lenses, it is apparent that they can neither see far nor take in the larger objects, and to remedy any inconvenience that might arise from this, may have been the principal reason why Nature has furnished them with those projecting horns or feelers with which they seem to grope as they advance. Insects are also distinguished by the number of their legs and wings; of the latter most insects have four wings, while no other species of animals have more than two; and although the greater part have six legs, others, as Mites and Spiders, have eight, and some ten, fourteen, sixteen, and even a great many more. The palpi are those little instruments fixed to the mouth of some insects, which seem to be intended to serve the purpose of arms, for they employ them to bring food to their mouths, and keep it steady when eating. Some insects are furnished with stings for defence, or to assist them in procuring their food, others with a tube for injecting their eggs into the most convenient situations for hatching; and the greater part of winged insects have a proboscis or trunk, which although not so large, is as wonderfully contrived as that of the Elephant, and serves the purposes of a mouth, a nose, and a windpipe!

The degree of strength and agility which many of the insect tribe possess is amazing.—A flea will draw a chain 100 times heavier than itself; and the velocity of a mite, in proportion to its size, is said to outstrip that of a race horse!—With regard to sex there is one thing very remarkable in this order, viz. that the Bees, the Wasps, and Ants furnish an example of a species that belong to neither sex; and so are called neuters;—these, however, are not without their uses; and the affection they evince for the helpless little creatures left to their care, might serve as a lesson to those who are intrusted with the tender charge of infants not their own.

The last thing I shall mention in this general survey of the insect tribes, is the wonderful transformation many of them undergo in the different stages of an egg, a grub or worm, a chrysalis, till they arrive at their most perfect or fly state; in each of which changes not only their form and structure, but their very nature and appetite undergo a complete revolution.—Take for example yonder Butterfly, which in gaudy attire, and with a sprightly air, roves and flutters in quest of its balmy juices from flower to flower: how wonderful the change from that dead and inanimate state in which its beauties lately lay concealed, or from the grovelling reptile which on the cabbage-leaf partook voraciously of its coarser fare, nor evinced any relish for other dainties!

If any thing were wanting to prove the wise disposition of the parts and appetites of animals to their various situations and habits, here we

have it in the instance of the Butterfly, whose structure and taste both undergo an alteration when its sphere of action and propensities become different.

In regard to some peculiarities of a few of the different species of insects, I would briefly observe, that in the mouth of the Gnat we have an admirable specimen of the instrument necessary for such a blood thirsty animal; the nails or crotchets of the Horse-fly, as well as its tenacity of life, evince that it is apt to be disturbed in its banquets; whoever attentively considers the form of a Louse, need not be told that it is a blood-sucker. The legs of the Locust and of the Grasshopper at once show their propensity to leaping.—The Bee, in danger of being robbed of its precious stores, is armed with its well-known weapon.—The female wasp is larger and stronger than the male, to enable her to survive the rigour of winter,—and the strong hairy legs of the Ant are no less well contrived to assist her in the indefatigable labours of the hill, than the two claws with which they are armed are for the purpose of climbing.

It is surprising the instinct by which these little creatures are taught uniformly to deposit their eggs on such animal or vegetable substances, as furnish a proper and plentiful supply of food for the worms or caterpillars, as soon as they are hatched. That those who pass into the Chrysalis or inactive state, select the most proper situations and modes of concealment; and that others, whose only metamorphosis consists in the addition of wings, surround themselves while undergoing the change by an envelope of spume or muck proceeding from their body.

"The Locusts have no king, yet go they forth all of them in bands;" while the solitary spider having no wings to go in pursuit of her prey weaveth to herself a web, and watches with patience the entanglement of the fly.—Time will not permit me to dwell on the geometrical precision and mathematical exactness, which Bees form their combs; the wonderful ingenuity and contrivance of the Wasp's nest, and the order and regularity observed in the construction of the Ant-hill, as well as the prudence and foresight which the whole of these evince in their labours and pursuits; these, and the singular but convenient attitude which the Water-bug assumes in swimming on his back, to enable him the better to lay hold of his food, the underside of plants which grow on the water, I can only mention, and must proceed to consider a few of the

#### USES OF INSECTS.

From the number of animals in the different elements and regions of existence, which prey upon insects, there can be no doubt but the principal object the Creator had in view in the formation of these, was for the subsistence of many of the larger orders of creatures; but the following specimens serve to shew that some of these also contribute in no small degree, in their respective spheres, to the service of man. By the labours and exertions of the Bee we are provided with stores of honey and wax;—the seemingly contemptible little SILK-WORM presents us, in its passage from the Caterpillar to the sleeping state, with materials for constituting our most costly raiment.—From the Cantharis come the Spanish Flies, so useful in blisters—the Kermet is also valuable for medicinal purposes.—and the