

go states, wholly detached from the body, and of their natural size, in Figures 442, 443, and 444.\*

This system in the larva (Fig. 442) has the same simple form as in the Annelida, or in the *Talitrus*, for it consists of

\* These figures were drawn by Mr. Newport, from original preparations made by himself. The same numbers in each refer to the same parts; so that by comparing the figures with one another, a judgment may be formed of the changes of size and situation which occur in the progress of the principal transformations of the insect. Numbers 1 to 11 indicate the series of ganglia which are situated along the under side of the body, and beneath the alimentary canal. Of these the first five are the thoracic, and the last six the abdominal ganglia; while the cephalic, or cerebral ganglion (17) is situated above the œsophagus and dorsal vessel, and communicates by two nervous chords with the first of the series, or sub-œsophageal ganglion (1,) which is, in every stage of the insect, contained within the head, and distributes nerves to the parts about the mouth. The next ganglion (2) becomes obliterated at a late period of the change from the pupa to the imago state: the third (3) remains, but the two next (4, 5) coalesce to form, in the imago, the large thoracic ganglion; while the two which follow (6 and 7,) become wholly obliterated before the insect attains the imago state, the intervening cords becoming shorter, and being, with the nerves they send out, carried forwards. The last four (8, 9, 10, 11) of the abdominal ganglia remain, with but little alteration, in all the stages of metamorphosis: in the larva, they supply nerves to the false feet. The nerves (12, 13) which supply the wings of the imago, are very small in the larva; and they arise by two roots, one derived from the cord, and one from the ganglion. The nerves sent to the three pairs of anterior, or true legs, are marked 14, 15, 16.

The nervous system of the larva is exhibited in Fig. 442, that of the pupa in Fig. 443, and that of the imago in Fig. 444. It will be seen that in the pupa the abdominal ganglia are but little changed; but those situated more forward (6, 7) are brought closer together by the shortening of the intervening cord, preparatory to their final obliteration in the imago; a change which those in front of them (4, 5) have already undergone. The progressive development of the optic (18) and antennal (19) nerves may also be traced. Mr. Newport has also traced a set of nerves (20) which arise from distinct roots, and which he found to be constantly distributed to the organs of respiration.

A detailed account of the anatomy of the nervous system of the *Sphinx ligustri*, and of the changes it undergoes up to a certain period, is given by Mr. Newport in a paper in the *Phil. Trans.* for 1832, p. 383. He has since completed the inquiry to the last transformation of this and other insects, and has lately presented to the Royal Society an account of his researches.