[A.]

Boston 4th of December 1840

The Silk-worm.

We concluded, yesterday, all that we proposed to say, upon the almost inexhaustible subject of Insects. In treating of insects, we feel no small embarrasment from the multiplicity of its tribes, & the endless variety of their appearance. Amidst the host of facts, we hardly know what to select, & what to omit. And by endeavouring to relate as many facts, & to exhibit as many objects as possible, in the short space of a lecture, we run the risk of sacrificing the verbal description to that w.c only meets the eye; and to hurry over those specimens & drawings, in order to continue the thread of the oral description. In order to do this part of our course justice, we ought to devote as much time to it, as to plants; We have been moreover fearful of sacrificing the useful to that w.c may possibly be thought to come under the head of amusement.

From what you have already seen & heard of insects, you will, I presume, cease to wonder that many people are more enamoured with this branch of Nat. History yn. any other. The form & habits of insects make them appear more like the inhabitants of another world yn. any thing w.c we see among larger animals. Some have undervalued this branch of natural history, because it treats of minute objects. But it is judging Nature by our own narrow prejudices, when we annex contempt with littleness.

We might here give you the Natl history of the Bee; and of its wondrous workings in the hive; but it w. require four Lectures at least to do the subject credit. We w. make the same remark of the Silkworm. We know where to begin, but we should not know where to stop. We have given you the principles of the transformation of this precious insect, when speaking of the 3 states, or stages in the progress of the caterpillar from his grovelling state to his splendid existence, in the gaudy Butterfly.

The knowledge of the Silkworm was brought into Europe from Asia minor, by some of those religious warriors, who went to retake the Holy Land from the Infidels, w.c fanatical expedition was dignified with the name of the holy crusade.

A Sicilian chief brought both manufactures, & the silkworm from Asia minor, & settled them in Sicily & Calabria, countries still famous for the culture of the insect & the manufactory of the silk it produces.

From Goldsmith

The silkworm is nothing more ysn a whitish caterpillar, with 12 feet, & produces, in the manner we have already related, a butterfly of the moth, or miller: kind. The chrysalis w.c this caterpillar makes, is a very fine silk w.c it spins for its own covering. The moth, or Parent of the silk-worm lays its eggs on some safe & proper part of the mulberry-tree, & w.c remains in that situation during the winter. But the insect does not come forth from the egg, until the young leaves of the mulberry are in sufficient abundance for the support of the caterpillar.

When

When the leaves are put forth, we see the silkworms bursting from their little eggs, & crawling upon the leaves, where they feed with the most voracious appetite. They grow rapidly, and after some months feeding, they deposit upon every leaf, small bundles, or cones of silk, wc says Goldf. appear like so many golden apples ~~upon~~ painted on a fine green ground. — Such is their natural progress in the open air of the warm & serene climates of some parts of Asia; but this is not the case in the rough, & unsteady climates of Europe & America, where the frequent changes of the weather, & the heavy dews of the evening render their exposure to the night air injurious & even destructive to the insect.

They are ∴ obliged to be sheltered in houses, & these made so close as neither bird, mouse, nor insect can enter them. They are placed in the middle of a large room on a kind of hanging shelves. They are placed, from time to time on beds of Mulberry leaves. Great care is taken to keep them free from all moisture & uncleanliness.

As these animals have but a short time to live, they, like all other caterpillars make a good use of their time, in eating, & in spinning, excepting at those intervals when they change their skins. Beside cleanliness, it is of great importance to give silkworms fresh air, especially, when the sun shines the warmest.

The worm at the time it bursts its skin is very small, & a

Goldf.

of a black colour; but the head is of a more shining black yn the rest of their body: some days after they begin to turn whitish. after awhile, the skin begins to grow too rigid; and the animal seems uneasy in it; then the Insect throws off his skin, & appears clothed in a new dress. It then becomes larger & whiter, but has withal a greenish cast: after some days, according to the heat of the climate, or to the quality of the food, it leaves off eating; and seems to sleep for two days together; then it begins to stir, and put itself into violent motions, & contortions, as if in pain, till the skin splits open & the skin falls off a second time, & is kicked ~~away~~ aside by the animal's feet. — — all these changes are made in three weeks, or perhaps four: after wc it begins to feed once more, still in its caterpillar form, but a good deal differing from itself before its change. In a few days time it seems to sleep again; and when it awakes, it again changes its old clothing for new, & continues feeding as before. When it is thus taken a sufficiency of food, & its parts are disposed to take is chrysalis form, the animal forsakes, for the last time, all food & society, & prepares itself a retreat to defend itself from external injuries, while it is seemingly deprived of life & motion. This retreat is no other yn its cone, or ball of silk, wc Nature has taught it to compose with great art; and within which it conceals itself till it assumes the form of a butterfly, or rather moth.

This Cone, or ball is spun from two little longish baggs

that lie above the intestines, & are filled with a gummy fluid, of a saffron, or marigold colour. This is the substance of w.c the silk threads are formed; and this little caterpillar is furnished with a very curious apparatus for spinning it to the degrees of fineness w.c its occasions may require. This instrument resembles a wire drawers machine, in w.c gold, or silver wire is drawn as fine as a hair, & through this the little animal draws its thread with great assiduity.

As every thread proceeds from two kind of gum-bags, it is probable that each supplies its own; w.c ∴, are united as they proceed from the animals body. — If we examine the thread w.th a microscope, it will be found that it is flatted on one side, & grooved a long its length: from whence we infer, that it is doubled just upon leaving the body of the caterpillar; and that the two threads stick to each other by that gummy quality of w.c they are possessed.

Good!

Previous to spinning its web, the silk-worm seeks out some convenient place to erect its cell, without any obstruction. When it has found a leaf, or a chink fitted to its purpose, it begins to wreathe its head in every direction, & fastens its thread on every side of its little cell or cabbin. There appears no order or design in its first threads; they seem to be thrown out at random, to serve merely as an external defence against rain.

for Nature

for Nature having appointed the silkworm to work upon trees in the open air, its habits remain, after it is brought into the house.

Malpighius observed six different layers in a single cone of silk. Its external part is composed of a rough cotton-like substance, wc is called "Flos"; but within the thread is more distinct & even. The whole thread when wound off will be found to measure about 900 feet long; & so very fine, that 8, or 10 of them are generally rolled off into one by the manufacturers. The cone when completed is shaped like a pigeon's egg; at the small end of wc the animal is generally found; and this is the place, that the insect, when converted into a moth, is generally seen to burst through.

No sooner is the winged insect completely formed, than having divested itself of its chrysalis skin, it prepares to burst through its cone, or outward covering; for this purpose it extends its head towards the point of the cone; butts with its eyes, wc are rough, against the lining of its cells, & wears it away; and at last, pushes forward through a passage wc is small at first, but wc enlarges as the animal encreases its efforts for emancipation, while its tattered remnants of its chrysalis-skin lie in confusion, says Goldf, within the cone, like a bundle of dirty linnen.

After all this trouble the poor thing has but a short time to fly about & live; for as soon as she lays her eggs she dies, and

In fact, she commonly dies first, & she soon follows him. and so does her husband, while the eggs are left to be hatched into worms the ensuing spring

But those who rear silkworms for sake of their silk do not allow these animals to come to a state of maturity; for as their bursting through the cone destroys the silk, they take care to kill the pupa, or chrysalis, before the moth comes to perfection. This is done by throwing the cones into warm water, & stirring them until the first thread offers a clue for winding off. As to the paper like substance wc. remains, it is suffered to remain in the water till the glutinous matter wc. cements it is dissolved: it is then carded like wool, & spun, & converted into a silk stuff of an inferior quality." Goldf. Vol. 8tr.

This is the sum & substance of what has been published of this precious little animal, as Epitomized by the elegant author of the History of Earth & Animated Nature. —

Having said all that we proposed to say, at present on the subject of Insects — Let us pass on to the next grade of animated nature viz Fishes, and 1st of the Amphibia; or such animals as live both on the land & in the water —