

XXIX. *Observations upon the Habits of Copris Midas.* By
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[Read January 5, 1835.]

IN submitting to the examination of the members of the Entomological Society two specimens of the *Copris Midas*, together with their receptacles in the pupa state, it may be acceptable to the Society to be made acquainted with the circumstances connected with their development under my observation.

At Poona, in the month of June, 1826, some of my palankeen-bearers were employed in loosening with pickaxes a friable and decomposing mica and greenstone, called *mohrum*, for the purpose of spreading it on my garden-walks instead of gravel. While thus employed, they turned up with their pickaxes, from some depth below the surface, four hard perfect balls. At first they considered them stone cannon-shot, the Poona cantonment and its immediate neighbourhood having been the site of two great battles; but observing that the pickaxe had injured one of the balls, and that it was hollow, they brought the whole to me. I immediately satisfied myself that they were of compact clay, well kneaded up with comminuted grass and very minute pebbles, forming, in fact, a well-digested mortar. They were two inches in diameter, and perfectly globular, and without hole, cicatrice or fissure. The injured ball contained an amorphous animal mass, which I immediately pronounced to be the pupa of an unknown species of insect,—at least unknown to me. On removing the pupa from the broken ball the crust was found to consist of two coats; the interior surface was quite smooth, and formed of finer clay, much more elaborated than than the external coat, which was somewhat rough. The diameter of the hollow within the ball was $1\frac{7}{8}$ ths of an inch; the thickness, therefore, of the crust was $\frac{3}{8}$ ths of an inch. Another of these balls had its chamber $1\frac{5}{8}$ ths of an inch, and the crust was $\frac{1}{8}$ th of an inch thick. To ascertain the insect proprietor of these curious domiciles, I placed two of the balls in a tin box, and continued for some months to watch them with attention; but my patience being wearied out, I abandoned further care of them, and put the box away. The third ball I gave to a lady, who, despairing of any change taking place, after many months' observation, broke it, but found the pupa inside quite fresh. Thirteen months had passed away, and I had forgotten the balls, when, on the night of the 19th of July 1827, being in my study, I heard a low scratching sound.

It was some time before my ear directed me to the tin box containing the balls, which stood upon a bookcase. It was clear an insect was endeavouring to liberate itself. This object not being effected at one o'clock in the morning, I retired to rest. The scratching continued the whole of the 20th, and until I went to bed. Previously to retiring for the night, to facilitate the exit of the creature, I dropped water upon the ball to soften the very hard and compact crust. At sunrise on the morning of the 21st, I found the fine *Copris* at liberty, $1\frac{1}{2}$ inch long, and $\frac{7}{8}$ ths of an inch wide, now exhibited to the Society. It must have been thirty-four hours at work; had been thirteen months in the pupa state, in my possession; and may have been thrice the time in the same state before it was found by my people. The second ball remained unaltered, nor were there any indications whatever of approaching development in the tenant. It was allowed to remain in the tin box, and looked at after very short intervals of time. It was, however, the 4th of October ere the second specimen of *Copris*, now before the Society, worked its way out from its prison, and its labour must have been infinitely more severe than that of its predecessor, as I did not give it any aid by softening the crust of the ball with water. It had been sixteen months in my possession in the pupa state. Having been found in the same locality with the preceding specimen, we may infer, with a probability of truth, that the larvæ enclosed themselves (or were enclosed) at the same period; and we nevertheless see that, under precisely similar circumstances, the perfect development of one specimen preceded that of the other by seventy-five days.

I will scarcely speculate upon the manner, the *modus operandi*, in which the grubs contrived to imprison themselves within perfect hollow balls of prepared mortar, of two different kinds in the different coats, for the subject is not satisfactorily explicable to me. Are we to understand that the larvæ prepared their balls with workman-like accuracy and perfect symmetry, leaving a hole to get in at, and that they took in with them only such a quantity of prepared clay as should suffice, and no more, for the exact sealing of the hole by which they entered? or are we to understand that a small family of the larvæ laboured to enclose individuals successively, until there remained but one, which, unable to enclose itself, became a sacrifice for the good of the community? The larvæ of the cockchaffer, stagchaffer, and other beetles, scoop out hollows in clods of earth, and the ball of the latter is described to be larger than a hen's egg; but I do not learn whether or not it be without hole or fissure. The larva itself is said to remain in that state for two or three years or more ere it buries itself in its ball: its pupa remains in that state

only three months. The larvæ of Lepidopterous insects either spin coverings for themselves out of the produce of their own body, or form canopies for concealment by connecting fragments of dried leaves or other matters together by running silk threads over them ; but the *Copris Midas* has to collect its own materials, elaborate them, and then bury itself in them in a ball in some mysterious manner.