

of the rock in a vertical, and to about sixteen inches away from the surface in a horizontal direction. At one point where the rock was almost entirely solid and without flaw or crevice, and where it was clear that the passages were entirely the work of the ants, we measured a tunnel by worming a straw down it, and found it to be ten inches in length. We subsequently traced this tunnel or rock-gallery down until it communicated with a chamber filled with winged ants and seeds of several kinds." He afterwards discovered a second nest of the same kind.

Though almost all ants construct their nests under ground or in decayed timber, a species has been found in India, called *Myrmica Kirbii*, that builds its nests on the branches of trees and shrubs out of a most extraordinary material, namely, cow-dung! The nests are round in shape and about the size of an ordinary foot-ball. Flakes of dry cow-dung are placed upon each other like the tiles of a roof, so that although the insects can creep beneath them into the nest, no water can penetrate them; on the top of the nest there is placed one very large flake that crowns the structure and protects the rest.

4. SLAVE-MAKING ANTS.

Among the many very curious and extraordinary proceedings of ants is the practice, prevalent amongst some species, of making slaves of their weaker brethren. Regular expeditions are made by the slave-makers, commonly called Amazon ants, for the purpose of obtaining fresh supplies from the nests of the inferior species; these captives they compel to do all the hard labour required in their own community. This might seem incredible were it not attested by numbers of independent observers in different countries, some of whose accounts we may now transcribe. There are two species which are known to reduce others to slavery, viz., the russet ant (*Formica rufescens*), and the red ant (*F. sanguinea*); of the latter species there is an American variety. The best known descriptions are those made by Huber, a European observer, who devoted the greater part of his life to the minute observation of the lives and actions of insects. The following account translated from his works, is taken from Kirby & Spence:—

"Their time of sallying forth is from two in the afternoon till five, but more generally a little before five; the weather, however, must be fine and warm. Previously to marching there is reason to think that they send out scouts to explore the vicinity; upon whose return they emerge from their subterranean city, directing their course to the quarter from which the scouts came. They have various preparatory signals, such as pushing each other with the mandibles or forehead, or playing with the antennæ, the object of which is probably to excite their martial ardour, to give the word for marching, or to indicate the route they are to take. The advanced guard usually consists of eight or ten ants, but no sooner do these get beyond the rest than they move back, wheeling round in a semicircle, and mixing with the main body, while others succeed to their station. They have "no captain, overseer, or ruler," as Solomon observes, their army being composed entirely of neuters, without a single female; thus all in their turns take their place at the head, and then, retreating towards the rear, make room for others. This is the usual order of their march, and the object of it may be to communicate intelligence more readily from one part of the column to another.

"When winding through the grass of a meadow they have proceeded to thirty feet or more from their own habitation, they disperse: and, like dogs with their noses, explore the ground with their antennæ to detect the traces of the game they are pursuing. The negro formicary, the object of their search, is soon discovered; some of the inhabitants are usually keeping guard at the avenues, which dart upon the foremost of their assailants with inconceivable fury. The alarm increasing, crowds of its swarthy inhabitants rush forth from every apartment; but [their valour is exerted in vain, for the besiegers, precipitating themselves upon them, by the ardour of their attack compel them to retreat within, and seek shelter in the lowest storey; great numbers entering with them at the gates, while others with their mandibles make a breach in the walls, through which the victorious army marches into the besieged city. In a few minutes, by the same passages, they as hastily evacuate it, each carrying off in its mouth a larva or pupa which it has seized in spite of its unhappy guardians. On their return home with their spoil, they

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