

stricto infra apice, elytris subrugatis, corpore subtus punctatissimo.

Long. corp. circiter lin. 1, lat. $\frac{1}{4}$ lin.

Ex museo Dom. Saunders.

Habitat Insulâ S^{ta} Helenâ.

Ce genre de *Coléoptère*, qui a quelques rapports avec certains *Bariidius*, me paraît devoir appartenir plutôt à la famille des *Cossones* : *trompe* deux fois aussi longue que la tête, un peu gibbeuse au dessus de l'insertion des antennes ; *tête* très gonflée dessous, un peu aplatie sur le front ; *corselet* deux fois et demi aussi long que large ; *elytres* de la largeur du corselet, allant en s'élargissant jusqu'à la marge extérieure, finement ridées en travers et marquées de quelques stries interrompues, la marge de la base est élevée ainsi que la suture : le dessous paraît plus fortement ponctué que le trompe et la tête ; le corselet en dessous a une impression cintrée en avant des pattes ; les *cuisse*s sont très épaisses et arquées ; la *couleur* générale de cet insecte est d'un noir bronzé.

Mr. Westwood, qui a figuré avec grand soin, le petit Curculionite dont il s'agit, a souhaité, ainsi que le plupart des entomologistes de Londres, que j'établisse les caractères de ce genre. Je leur en témoigne ici toute ma reconnaissance. J'ai pensé faire plaisir au savant et zélé naturaliste leur compatriote en lui dédiant cette espèce.

DESCRIPTION OF THE FIGURES.

PLATE X. Fig. 6.

Microxylobius Westwoodii magnified. 6 a. Ditto, natural size. 6 b. Antenna.
6 c. Rostrum seen sideways. 6 d. Extremity of tibia and tarsus.

XXII. *Descriptions of new Species of Indian Ants.* By Lieut.-Colonel W. H. SYKES, F.R.S., &c.

[Read August 6, 1834.]

I DEEM it necessary to preface my paper by stating that my friend Mr. Hope has been good enough to draw up the Latin specific characters of the following insects.

MYRMICA KIRBII, Sykes.

Plate XIII. Fig. 1.

♀ Aptera, ferruginea, antennis pedibusque rufis, squama petiolari,
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2?-nodosa, abdomine fuscanti. Caput parvum; oculis nigris; antennis extrorsum increscentibus. Mandibulæ sublatæ intus 4-dentatæ. Labrum superius membranaceum, ciliatum. Thorax subquadratus, elevatus, postice spina brevi acutâ utrinque armatus. Abdomen antice latum, postice acutissimum, piceum. ♂ magnitudine præcedenti æqualis at pallidior et alata. Caput parvum, tribus stemmatis ornatum. Thorax niger et inflatus. Squama petiolaris brevissima. Abdomen parvum. Alæ corpore longiores.

Long. corp. $\frac{1}{8}$ unc.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

Neuter: Wingless, ferruginous. *Abdomen* of a darker colour, approaching to mahogany. *Head* half the size of the abdomen. *Eyes* two, large, black, consisting of a multitude of lenses: no false eyes. *Mouth* armed with two strong jaws, somewhat broad, nearly square at their ends, and each furnished with four minute teeth. No *palpi* discoverable with the highest power of a double French microscope. *Upper lip* membranaceous, fringed with a few hairs. *Antennæ* forming an elbow; lower joint the longest; upper joints setaceous, but obscurely club-shaped. *Thorax* of two segments, somewhat square, armed with a short, sharp-pointed brown spine on each side posteriorly. The insect when irritated carries the abdomen turned up and overshadowing the thorax, and the petiole lies as in a groove between these spines. *Petiole* of two joints or nodes. *Abdomen* broad at the petiole, terminating in a very sharp point, armed with a minute sting.

Length of insect $\frac{1}{8}$ ths of an inch.

Male, size of neuter: winged. *Head* small; jaws smaller than in neuter; *thorax* larger, and inflated. No lateral spines. *Petiole* very short. *Abdomen* smaller than in neuter. *Wings* a little longer than the whole insect. *Antennæ* setaceous; lower joint shorter than the remainder. *Head* with three stemmata or false eyes. Insect of lighter colour than the neuter.

Queen: wingless, about half an inch long, of the size of a crow-quill, white, the swollen abdomen having the appearance of five or six ligatures like the queen of the white ants. *Head* small. *Legs* little more than rudiments. The whole insect has the appearance of a diminutive queen of white ants.

Eggs very minute, white, oblong, nearly transparent, having a longitudinal brown streak, which corresponds to the thorax of the future insect. The *larvæ* as they increase in bulk would

appear to be removed from the neighbourhood of the centre of the nest to apartments nearer to the exterior, *pupæ* only being found in the latter.

This species of ant is remarkable for forming its nest on the branches of trees and shrubs. The construction is not only singular, but indicative of considerable ingenuity and foresight. The first I met with was near to Pahtun, a Kohlee village on the Goreh river, in the mountain districts of the Poona Collectorate. It was attached to the branches of a large Kurwund* shrub, and was somewhat globular in form; a second, subsequently met with, was balloon-shaped. They consisted of a multitude of thin folia of *cowdung*, imbricated like tiles upon a house; the folium above all covering the summit in an unbroken sheet, like a skull-cap on a man's head. The folia were put upon one another in a wavy or scalloped manner, so that numerous little arched entrances were left, yet the interior was perfectly weather-proof. A vertical section presented a multitude of irregular cells, formed of the same material as the exterior: near the centre the cells appeared more capacious than near the surface, and a dried leaf or two had been taken advantage of in their formation. The nurseries were in different parts of the habitation; those cells nearest the centre being filled with very minute eggs; those more distant, with the larvæ enlarged; and the remote cells, with the pupæ coming into life: the last cells, indeed, had numerous winged ants in them, probably the males of the community. In the first nest examined I did not discover the queen, nor were there any stores of provisions; the insects, therefore, must have relied upon their daily exertions for subsistence. In a second nest, formed on the bough of a large Mango-tree† at Tullyghur, on the table-land of Bhima Shunkur, I was more fortunate in meeting with the queen. She was inclosed in a cell adapted to her size, and evidently could not move, as I was compelled to enlarge the entrance with my penknife to effect her liberation. She was very like a diminutive queen of white ants, and I have little doubt was the common parent of the community. Many of the eggs in this nest were not oblong, but plano-convex, the plane side being fixed to the branch of the tree; they had a gelatine character, and the rudiments of the future insect were observable in them. There was not any store of provisions, and in neither nest did I observe a distinct class of soldiers.

The inhabitants of the first nest occasioned ludicrous distress to the Europeans in my office, the draftsman and clerk. The nest had been obtained late in the evening, and was suspended from the tent-

* *Carissa Carandos*.

† *Mangifera Indica*.

pole of the tent in which they slept, preparatory to examination the following day. In the night the men were awakened by repeated punctures and general irritation of the skin, but the darkness prevented them from discovering their tormentors, and they continued to toss and tumble in their beds for some hours in no very complacent state of mind: at last they got up, dressed themselves, and abandoned the tent; but the evil was rather aggravated than abated, as parts of their persons which had previously escaped had now their share of suffering. At daylight they discovered to their consternation that they were covered with minute ants, which had filled their pantaloons, penetrated the sleeves of their coats, and every other part of their habiliments. On inspecting the tent, they found the interior teeming with multitudes of little angry beings, in busy progress, seeking to resent the outrage which had been committed on the community by the removal of their abode.

My account of the natural history of this insect differs from that of the genus in which it is *provisionally* placed. I simply describe what I saw, and may have fallen into error in my deductions. I may have mistaken an extraneous insect for a queen; and I may have mistaken the winged ants for males only, while they really comprised both sexes: I may have made these mistakes; but up to the present moment my original impression remains unimpaired, that the tree ant, in its natural history, approximates rather to the *Termites* and Bees than to the genus *Myrmica*, and ultimately it may be found to be the type of a new genus*.

I had preserved the Queen ant, together with specimens of the neuters and males, in a phial; but not being able at present to find it, after a diligent search, I have every reason to fear it was one of several broken in the voyage from India, and the contents must have been lost.

The drawings were executed under the microscope, from nature, with every possible care.

The specific characters have been chosen from the drawings, assisted by a detailed description of the insect made at the time the drawings were executed.

I need scarcely mention that it is to one of the most distinguished entomologists of modern times that I have taken the liberty to dedicate this insect.

* Smeathman gives four lines comprising a loose mention of *Termes arborum*; and in vol. vi. part 2, page 414, of Shaw, there is an engraving of the queen of this species, from what authority is not stated, resembling my queen of the *Myrmica Kirbii*. It would appear, therefore, as if Smeathman had an impression that the tree ants in their æconomy resembled *Termes bellicosus*.

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 1.

- 1 a. The nest of *Myrmica Kirbii* reduced in size according to the subjoined scale, with the ants of the natural size creeping upon it. 1 b. The male.
1 c. The neuter.

ATTA PROVIDENS, Sykes.

Plate XIII. Fig. 2.

♀ Nigra, capite magno, mandibulis et antennis nigris tarsisque flavescentibus. Caput maximum, oblongo-quadratum, postice emarginatum, piceo-nigrum. Mandibulæ latæ arcuatæ, apice truncatæ, dentibus duobus, anticè minutis. Antennæ nigræ, articulis tribus ultimis incrassatis. Thorax parvus, subbipartitus, antice convexus posticeque bispinosus. Squama anterior petiolaris parva, transversa, posterior transverso-elevata, lateribus acute productis. Abdomen rotundatum. Pedum femoribus et tibiis piceis, geniculis ferrugineis tarsisque pallidioribus.

Long. corp. lin. 2½, lat. corp. lin. 1.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

In illustration of the habits of this species of ant I shall give the following extract from my Diary.

"Poona, June 19, 1829.—In my morning walk I observed more than a score of little heaps of grass-seeds (*Panicum*) in several places on uncultivated land near the parade-ground; each heap contained about a handful. On examination I found they were raised by the above species of ant, hundreds of which were employed in bringing up the seeds to the surface from a store below: the grain had probably got wet at the setting in of the monsoon, and the ants had taken advantage of the first sunny day to bring it up to dry. The store must have been laid up from the time of the ripening of the grass-seeds in January and February. As I was aware this fact militated against the observations of entomologists in Europe, I was careful not to deceive myself by confounding the seeds of a panicum with the pupæ of the insect. Each ant was charged with a single seed; but as it was too weighty for many of them, and as the strongest had some difficulty in scaling the perpendicular sides of the cylindrical hole leading to the nest below, many were the falls of the weaker ants with their burthens from near the summit to the bottom. I observed they never relaxed their hold, and with a perseverance affording a useful lesson to humanity, steadily recommenced the ascent after each successive tumble, nor halted in their labour until they

had crowned the summit and lodged their burthen on the common heap."

On the 13th of October of the same year, after the closing thunder-storms of the monsoon, I found this species in various places similarly employed as they had been in June preceding: one heap contained a double-handful of grass-seeds.

It is probable that the *Atta providens*, is a field-species of ant, as I have not observed it in houses.

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 2.

- 2a. *Atta providens*, neuter, magnified. 2b. One of the mandibles. 2c. One of the maxillæ. 2d. The labium and its appendages.

FORMICA INDEFESSA, *Sykes*.

Plate XIII. Fig. 3.

♀ *Nigra*, capite magno, thorace compresso, antennis pedibusque ferrugineis. Caput maximum atrum. Antennæ ferrugineæ, articulo primo longissimo nigro. Mandibulæ porrectæ 6-dentatæ. Thorax antice rotundatus, medio constrictus continuus, posticeque attenuatus. Squama petiolaris transverse elevata, nigra. Abdomen ovatum concolor. Femora ferruginea. Tibiæ tarsæque fuscantes.

Long. lin. $6\frac{1}{2}$, lat. lin. 2.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

♀ capite multo minore, abdomine dilatato.

This insect approaches *F. compressa*, Fab., and infests houses.

(Among the insects collected from the same nest there are many specimens, of different sizes, having small heads, but they are uniformly much smaller than the individuals of both sexes above described. Can they be males which have lost their wings, or are they varieties of neuters?—F. W. H.)

The depths at which these ants have their nests under the foundations of houses and about the roots of trees, baffled my attempts to discover their internal œconomy; but I observed ants of three sizes, although not differing very much in form, and not at all in colour. The largest (of which a drawing is given) is the female, and I have a specimen $\frac{1}{3}$ ths of an inch long: the next size is probably the male; the head and thorax are much smaller than in the female, but the abdomen in proportion is larger. The third size is probably the neuter, and differs only from the male in being more slender.

The magnitude of these ants, their voracity, and remarkable tact in discovering saccharine matters, render them repulsive, troublesome, and costly insects in a house. I have had the greater part of a tub of sugar-candy, left in my store-room at Poona, and weighing nearly half a hundred weight, consumed by them during a few months' absence from home; and my friends have related to me instances of similar depredations carried to the extent of the consumption of a whole tub of sugar-candy. However incredible the fact may appear, I will not omit to notice an instance of their instinct literally bordering upon human intelligence. It was the practice in my family to leave the dessert, consisting of fruit, cakes, and particularly China preserved fruits, constantly standing upon a sideboard in an inclosed verandah off the dining-hall: a cloth was thrown over it, and to prevent the access of insects, the legs of the table were placed upon low pedestals in little stone pans filled with water. When I first took possession of the house, the inhabited part was not infested with this species of ant, but the attractions of the sideboard soon occasioned their introduction. The channel of water surrounding the pedestals did not prove a sufficient barrier; the pans were shallow, and the channel not wider than two lengths of medium sized ants: when the water was low they waded across, and when the pans were full they boldly pushed over, and succeeded in catching hold of the opposite bank with their fore-legs ere they sunk, and once over, they soon reached their rich repast by the legs of the table, and in the morning I found hundreds congregated on the China sweets: they were put to death, but each succeeding day presented similar hordes of equally bold and successful adventurers. I now had the legs of the table surrounded daily with a belt of turpentine, just above the level of the water, and this proved effectual, either from its nauseous and deleterious scent, or from its clamminess holding them by the feet. For some days the sweets were unmolested, but eventually the ants found their way back to them, although not in such numbers as before, and I did not readily discover by what means. The edge of the table was about an inch distant from the wall, and with greater facilities of access, they did not risk the danger of passing the gulf between the table and the wall, but reduced to extremities by my precautions, the largest ants now essayed to pass it, holding on the wall by the hind legs, whilst the front legs were stretched out to touch the edge of the table, and the contact enabled very many to cross. The table was now removed from the wall beyond the maximum stretch of the largest ants, and I flattered myself I had triumphed over their perseverance and ingenuity; but, to my infinite surprise, in a few days the sweets

teemed as usual with the intruders, and I was puzzled in no small degree to account for their re-appearance. Accidentally passing the table, I observed an ant upon the wall, about a foot above the level of the sweets: it fell, and instead of passing between the wall and the table and alighting upon the ground, the insect fell upon the table. Can it be possible, I said to myself, that this fall is designed? I stood to observe with the most intense curiosity: another ant ascended, and dropped with similar success; another and another followed; and there was no longer doubt that instinct (if instinct I must call it) had made them in this instance a match for reason. But what is this "instinct," or "impulse of nature," which enables an animal to do that which, in those things that man can do, results from a chain of reasoning, and in things which men cannot do, is not to be explained by any efforts of the intellectual faculties; by which the captive and expatriated pigeon on its release flies directly and unhesitatingly through the pathless air to its distant home; by which the far-removed dog returns to his master by previously untravelling and unknown routes; by which the bed-bug, it is said, if cut off from access to the bed by the feet or draperies, ascends to the ceiling and falls upon the canopy; and by which the *Formica indefessa* was enabled to defeat all my precautions?

I could multiply instances of similar mysterious power in the animal world from personal observation, but am debarred from indulging in further details by the specific object of this paper and the nature of our Transactions. Let it suffice to remark, that the reflective mind finds new causes of wonder and admiration, and new lessons of humility, in almost every new inquiry into the œconomy, relations, and structure of the animate or inanimate world.

In concluding this paper, I may add, as a suitable accompaniment, two extracts from my Diary respecting the swarming of ants.

"Poona, October 6, 1829.—At ten o'clock in the morning, during a hot sun, but after a continued fall of rain on the preceding night, a nest of white ants in my garden sent forth a winged colony in myriads; the small wingless labouring white ants were busily employed about the orifice whence the swarm issued, apparently superintending the emigration. Scarcely had they appeared, than the domestic poultry were on the alert; Sparrows, Grackles, and Crows collected in numbers, and within a quarter of an hour there were *some scores* of Kites (*Milvus Cheel*) making short circles within a few feet of the ground, and catching the ants as they rose upon the wing. The dexterity with which these large birds avoided coming into contact with each other, in rapid and whirling pursuit of their prey within a very limited space, excited my surprise and admiration."

"Poona, June 10 to 12, 1830.—A good deal of rain fell between the 10th and 11th of June, the first of the year, being, in fact, the setting in of the S.W. monsoon. After the 12th, the moisture, combined with the great heat, (heat alone being insufficient,) brought into life myriads of insects of all kinds, which for months previously had been lying in the pupa state: colonies of ants, white, black, and red, large and small, poured from their retreats in dense columns, taking wing, and literally darkening the air. As in the preceding year, birds of every description were in eager pursuit. In an hour or two the volant power of the ants terminated, their wings dropped off, and lay in such profusion on the ground around their nests as to form a carpet, and the insects themselves were seen hurrying away in every direction into concealment, or lying dead upon the grass, having completed the term of their ephemeral existence. It would appear from the above dates that ants swarm at different periods of the year, but whether or not the same nest sends forth two colonies, or different nests swarm at different seasons of the year, I did not determine."

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 3.

3 a. *Formica indefessa*, neuter magnified. 3 b. One of the mandibles. 3 c. One of the maxillæ. 3 d. The lower lip and its appendages.

Supplementary Note, read January 5th, 1835.

I take the present opportunity of exhibiting to the Society a gigantic specimen of the *Formica indefessa*, an account of which was read some months since, measuring $\frac{1}{3}$ ths of an inch in length. It is no doubt a female, and very many of them are seen amongst the workers. I may here say with respect to the *Termes bellicosus*, *Formica indefessa*, and *Atta providens*, that I never saw winged ants amongst them, excepting at the time of swarming; I believe, nevertheless, their communities to consist of queens, neuters, and males, the latter being wingless, unless at the period mentioned. In an examination of very many nests of the *Termites*, I never found a king shut up in the same chamber with the queen, as described by Smeathman, and I fully believe that a complete, patient, and philosophical investigation into their œconomy is still a *desideratum*.