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# THE BEES OF RUGBY.

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## THE BEES OF RUGBY.

By the REV. F. D. MORICE, (H.M.)

I have been asked to supply the Report with something more than a record of captures and appearances—a sort of Essay or Excursus, I suppose, about the Bees of this neighbourhood.

I am afraid that the result of my attempt will seem ‘a tedious-brief’ production,—‘tedious’ to those who want to be amused, ‘brief’ to those who want to be informed. However I must begin, instead of apologising: so now to business!

### *Parasitic and Industrious Bees.*

Speaking generally, a bee begins life in the shape of a tiny egg, at the bottom of a dark hole, lying on a mass of flower-dust (called pollen) kneaded up with honey into a rounded pellet. The egg in time, produces a white, footless, and therefore stationary, grub. What does it do then? It ‘grubs’! It eats the pellet, and grows, in proportion to the amount consumed. As it grows, strange changes, which cannot be here discussed, take place in its structure. Ultimately it becomes a perfect ‘bee,’ and emerges into the sunlight. Generally the hole has been dug and the pollen-ball deposited by the parent-bee who laid the egg. But not always; for some bees, instead of making their own holes and collecting their own pollen, look out till another bee has performed these operations, and then lay eggs of their own on the stores she has provided. One would expect such behaviour to be resented by the rightful owner—but apparently it is not so. She seems either to be unaware of the intrusion, or to acquiesce in it as a part of the natural order of things. At any rate she allows the stranger’s egg to remain, and to take advantage of the arrangements she has made for rearing her own offspring.

The genera of bees, which thus rear their young at the expense and (as it were) on the premises of other more industrious kinds, are said to be ‘Parasitic’ upon them.

Hence arises a great division of Bees into Parasitic and Industrious Genera. The first question to be asked about any bee’s habits is this—“is it Parasitic or Industrious”?

Whether this distinction has always existed is another question. There are some reasons for thinking it has not. Some parasitic genera so closely resemble those they infest, as to suggest inevitably—whether rightly or wrongly—the hypothesis of a common origin. And always, I believe, however great be the superficial unlikeness, minute, yet very important correspondences of structure may be traced between a parasitic genus and the industrious genus to which it is attached.

### *Short-tongued and Long-tongued Bees.*

Another important point of distinction among the genera of bees lies in the structure of the so-called ‘tongue.’ It is important, because it affects their food. Some bees can project their tongues so far, as to be able to reach the honey contained in almost any flower. Others not having this power, or having it only to a slight extent, have to confine themselves to flowers where the honey lies (so to speak) not in a cup, but in a saucer. In early spring, our common native flowers are mostly of this kind. In summer, on the whole, the other kind prevail. But in autumn, the shallow flowers of the bramble and dandelion tribe again offer abundant food for

short-tongued bees. It is difficult, from the multitude of exceptions, to lay down an accurate rule as governing this matter. But, speaking roughly, long-tongued bees belong most to summer. There is a great outburst of short-tongued bees every spring, revelling on willows, fruit-tree blossoms, and other simple shallow flowers, while they last. And there is a second great birth of short-tongued bees every autumn, living (in our neighbourhood at least) almost entirely on the honey contained in the flowers of the blackberry and dandelion.

Of the genera hereafter described, the first five, *Colletes* to *Andrena*, are Short-tongued bees or *Andrenidae*. *Nomada*, the sixth of our genera, is long-tongued, yet with certain structural points that connect it with the *Andrenidae*. All the rest are strictly long-tongued bees, or *Apidae*.

#### *Solitary and Social Bees.*

Some bees live in actual communities, gathering a common stock of food, and working in concert on the construction of a home for the coming generation. These are called Social. They include only the genera called Humble-bees and Hive-bees.

All others are called Solitary, even when, as with *Halictus*, vast colonies of independent workers make their burrows side by side.

Among the Social bees, and among these only, are found two forms of female—a fertile and sterile type—differing so much in size, that they have sometimes been treated as distinct sexes, the sterile female being called a Neuter, or Worker—the fertile a Female or Queen.

Among the Solitary bees, all females are fertile.

#### *Situation of Cells.*

All Solitary bees, except Parasites, burrow, some in the earth, some in walls, some in wood, some in the pith of such plants as the rose and the bramble. An exception should perhaps be made as to the genus *Osmia*, which occasionally avails itself of existing tubes—*e.g.*, a reed, or a key-hole, or an empty snail-shell. On the whole, however, all lay their eggs in burrows, and nearly all make these burrows.

Among Social bees, this is not so. *Some only* of the Humble-bees burrow in the ground; others heap on the surface nests of light materials such as hay or hair. What Hive-bees would do, in a state of nature, can only be conjectured. *Now*, when left to themselves, they appear to hunt out some hollow space, a cave, an old tree, an empty attic, and gradually fill it with their combs. Actual burrowing they seem never to attempt.

#### *Food, &c.*

All mature bees live on the sweet juices of flowers—in a word, on honey. The pollen which they gather is to feed, not themselves, but their future offspring in its grub-stage. Industrious bees have, nearly always, some special arrangement of hairs on the legs or the abdomen, for sweeping up and retaining pollen grains from flowers visited by the bee. The absence of such an arrangement is at least *prima facie* evidence that a bee is parasitic; but the case of *Prosopis* (to which reference will be made further on) shews that the evidence is not absolutely conclusive. On warm and sunny days, especially in the morning, most bees are incessantly among the flowers. Rain, even clouds, a cold wind, or the approach of evening, sends them to their burrows,—at any rate they vanish somewhere. Hive-bees and Humble-bees seem not quite so sensitive as others on this point. Possibly a suspension of their labour would do more harm to their community, than a Solitary bee's offspring would suffer from a day's delay in its parent's operations.

From these preliminary remarks I pass to describe *seriatim* the genera of Bees known to me as inhabiting our own neighbourhood.

*Genera of Bees found at Rugby.*

Altogether twenty-eight genera of bees are known to exist in England; nine, however, of these contain but a single species each; and, as it happens, none of these nine are on my local list. Out of the nineteen remaining genera, I have found, at present, thirteen at or near Rugby. To these thirteen, then, henceforward I will confine myself. Their names, arranged according to the order generally adopted by Entomologists, are as follows:—

- |                      |                         |                        |                        |
|----------------------|-------------------------|------------------------|------------------------|
| 1. <i>Colletes</i> , | 2. <i>Prosopis</i> ,    | 3. <i>Sphecodes</i> ,  | 4. <i>Halictus</i> ,   |
| 5. <i>Andrena</i> ,  | 6. <i>Nomada</i> ,      | 7. <i>Megachile</i> ,  | 8. <i>Chelostoma</i> , |
| 9. <i>Osmia</i> ,    | 10. <i>Anthophora</i> , | 11. <i>Psithyrus</i> , | 12. <i>Bombus</i> ,    |
| 13. <i>Apis</i> .    |                         |                        |                        |

1. *Colletes daviesana*, the only representative of its genus I have yet found here, is a rather small and sturdy, but shapely little insect, the two sexes closely resembling each other. The thorax is clothed with thick brightish brown hair, the abdomen has a ground of shining black, but as each segment is fringed with a well-marked ring of close white hairs, it has the general appearance of being striped like a little zebra. But its most important characteristic can only be seen with a strong glass—the short, broad tongue, cloven at the end, which serves it to some extent as a trowel in its nest-building operations. For *Colletes* is a plasterer-bee. After excavating in some sand bank, or mud-wall, the burrow which is to contain its young, it lines this burrow with a delicate gluey substance (whence its name *Colletes* “the Gluer”), soft at first, so that it can be easily spread about, but hardening afterwards into a kind of transparent gold-beater-skin. When the sand in which the burrow is formed is soft enough, this gold-beater-skin lining can be drawn out unbroken, and looks then like a little gelatinous bag, containing the young grub and the little pellet of food collected for it by the parent bee. *Colletes daviesana* abounds from about the end of June till August, hovering about the mud-walls at Clifton and Hillmorton. It swarms also in the sand-pits at the latter village, and it seems to visit from time to time all the wild flowers it finds there, but to favour especially a kind of camomile.

2. The genus *Prosopis* somewhat resembles *Colletes* in the shape of its tongue; and, like *Colletes*, it lines its cells with transparent membrane. These cells, however, are placed, usually at least, not in mud or sand, but in the inside of rose or bramble-stems, after excavation of the pith to the depth (sometimes) of several inches. In general appearance, *Prosopis* is as unlike *Colletes* as possible. It is much smaller, and also narrower in proportion to its size. Its whole body, legs included, is practically quite smooth and hairless: the colour coal-black, except for certain yellow or cream-coloured patches on the face and legs. In the males this yellow nearly covers the entire face; but in the females it is reduced to a mere line or spot and occasionally is wanting altogether. I have taken *Prosopis* on many kinds of flower and shrub, those especially where the blossom is small and inconspicuous, but its prime favourite seems certainly to be the mignonette. Like *Colletes*, it is a summer bee, appearing from June to August. Two species (*communis* and *hyalinata*) abound in my garden. A larger kind (*signata*) also appears there, but rarely. These three are the only kinds I have yet found in this neighbourhood, but I live in hopes that others will occur.

3. *Sphecodes* is in many ways a remarkable and interesting genus. It embraces a good many species, so closely allied to and resembling each other that their classification has given the greatest trouble to Entomologists, and even now there are points of this question on which the best authorities are more or less in doubt. I have found near Rugby eight species certainly, and females only of (I think) a ninth. The following brief description would apply to any of them. Whole body almost hairless; head and

thorax deep jetty black; abdomen in the main bright red, but always tipped with black, and, in the males, broken more or less by black rings encircling each segment. Occasionally, especially in the smaller kinds, ill-coloured males are found, when the red looks as though it had faded to a dull pale brick-dust tint. These, however, are probably not faded, but imperfectly developed, owing to dull weather or some such cause. The colour of *Sphecodes* is quite distinct from that of any other bee. Some male *Halicti*, and one *Andrena*, might at first be confused with it, but these have not the peculiar nakedness of *Sphecodes*, nor is their red really *the same* red. There is a certain coral-like lustre about a fine *Sphecodes*, which, once realised, can hardly be mistaken.

Beautiful as this genus is, it is not its beauty which makes it interesting to Entomologists, so much as a certain still unsolved mystery in its habits. In structure (but for its hairlessness) and above all in structure of tongue, it comes very near the genus *Halictus*. Also, it has been observed that, wherever certain species of *Sphecodes* occur, there too—to a certainty—will particular species of *Halicti* be found abundantly. Also, as to the yearly appearance of *Halicti*, this singular phenomenon occurs—Every spring females come out in abundance, but not a single male! Gradually, as the year proceeds, this spring brood seems to die out—at any rate it has disappeared by July. Then in August, suddenly, male *Halicti* appear in multitudes, and some days later females also begin to swarm once more. Exactly the same phenomenon takes place with *Sphecodes*, and with *no other kind of Solitary bee*.

Observing this close connection, whatever it may be, appearing to exist between the two genera, and observing that *Halictus* has and *Sphecodes* has *not* legs specially adapted for conveying pollen, and that in other instances where this difference exists between two closely connected species (*e.g.*, *Andrena* and *Nomada*, *Psithyrus* and *Bombus*) the bee with unadapted legs is parasitic upon the other, we are naturally brought face to face with the question, 'Is *Sphecodes* parasitic upon *Halictus*?' The question has often been raised; and, strange to say, it is a question still!

At first, when parasitism among bees was a new discovery, it was thought that *all* naked bees must be parasites. Then, it was proved beyond doubt that *Prosopis*, though naked, was not parasitic. Then *Sphecodes* was carefully watched; and certain facts were observed, which convinced the then authorities that *Sphecodes* also had been unfairly suspected. Such is still the orthodox opinion, but within the last few years it has again begun to be shaken; and at this moment some of the greatest 'specialists' *in re* Hymenoptera believe that *Sphecodes* is parasitic after all.

As my own opinion on the point can carry no weight, I can do no harm by stating it. I expect to see it, yet, shown *and proved*, not only that *Sphecodes* as a genus is parasitic on the genus *Halictus*, but that each species of *Sphecodes* is attached in that capacity to a particular species of *Halictus*. However, we shall see!

The commonest *Sphecodes* (here) are, of the large species, *gibbus*, of the small, *affinis*. Hillmorton is the best locality for them that I know of; but the 'best' (*i.e.*, rarest) kind I have taken here is '*ferruginatus*,' which I found on the Barby Road near the Water-tower.

4. *Halictus* is what is called a 'long' genus, *i.e.*, one embracing many species. We have at least twelve near Rugby, and probably more. The species differ greatly in shape, size, and colour. Some points, however, are common to all. The males are apt to be decidedly slighter and longer-bodied in proportion to their breadth than the females, and to be distinguished also by very long antennæ, and whitish hairy faces. The females are peculiar by having, at the extreme tip of their abdomen, what *looks* like a longitudinal slit, as viewed from above, but is really only a naked space where the ground colour of the abdomen appears between two masses of pale down,

which spread over the two sides of the last segment and do not quite meet each other in the middle of it. By this apparent slit a female Halictus can be instantaneously recognised.

Some Halicti (e.g., *rubicundus*) have a ring of white hairs at the 'apex' (or outer edge) of each segment. Others (e.g., *albipes*) a similar ring at its 'base' (part nearest the thorax). This 'apical' or 'basal' position of the rings may seem a very simple means of distinguishing species. And so it really is, when one has had a certain amount of practice in applying it. But at first, it is quite curious how easily basal rings can be mistaken for apical, and *vice versa*. In time, if one perseveres, this difficulty completely vanishes. Some, generally smaller, kinds are quite black (*nitidiusculus*, *villosulus*, and our great local curiosity *atricornis*). A few, seen with a glass, have a pretty metallic tinge of green on the head and thorax (*morio*, *leucopus*, *tumulorum*); and in one (*smeathmanellus*) this brassy colour extends also to the abdomen.

They are generally very gregarious, whence their name (Halictus ἀλιζω), forming great colonies in banks of earth, or at the edges of roads and paths; but not always. Thus *rubicundus*, though common everywhere, seems to burrow in any convenient place, whether other *rubicundi* have settled there or not. The entrance to each hole is a beautifully exact circle, its size corresponding to that of the maker; the cells are not lined with any actual membrane, but smoothed so beautifully that I think the bee probably 'sizes' the crumbling earth with some exudation from her tongue as she levels it.

I have already described the curious phenomenon as to the time of Halictus's appearance. In spring, females only! At mid-summer, none! In autumn, males first, then, both together! The explanation seems to be, that the female (after impregnation by the male in autumn) sleeps through the winter underground, and waits to lay her eggs till the following spring. Meantime the males die. When spring returns, the hibernating females come out, make their cells busily for a month or so, store them with food, and lay their eggs—then, their work being done, they too, like the males last year, die off. Meantime, till the end of July, the eggs are rapidly passing through the grub-stage to that of the perfect insect. And in August this new brood appears, consisting of both sexes, but the males (as is usual among bees) appearing first. Then once more the story of last year is repeated. The impregnated females retire to winter-quarters; the males die. And so on, *ad infinitum*.

5. *Andrena* is a still longer genus than Halictus. We have at least eighteen species of them at Rugby. Like Halictus, they form simple burrows, often of great length, in grassy banks, or by ditches, or in sand banks—anywhere, in fact, where the soil is reasonably soft. Males and females appear almost together, some kinds very early in the spring (e.g., *Clarkella*), some well on in the summer (e.g., *coitana*), and some both early and late (e.g., *minutula*). In the last of these three cases, there is usually some slight difference of appearance between the spring and the autumn brood—so that the two have been treated by earlier naturalists as distinct species. Thus, to mention only Rugby bees, the second brood of *gwynana* was once known as *bicolor*; and what was once called *parvula* is now classed as 'the first brood of *minutula*.'

Some kinds of *Andrena* are found in late summer or autumn only, but I think none of these occur in this neighbourhood. Nor have we, as far as I know, any of the great rarities in this genus. Perhaps the least common *Andrenae* to be found here are *Clarkella*, *angustior* (which *was* a rarity, but can hardly be called so now), and *coitana*. Several kinds, usually very common, seem wanting here (*praecox*, *varians*, *fuscipes*, *fulvicrus*), but I do not despair of their yet turning up.

As to the appearance of *Andrena*, the species vary greatly. On the whole they are decidedly larger than Halicti, though some

(*minutula*, *nana*) are very diminutive creatures in their way. The males are smaller and slighter than the females, but the difference is far less striking than in *Halictus*. They have always a sort of fringe of longish hairs at the tip of the abdomen, and the females have a conspicuous and pretty curled tuft on the thighs of the hind-legs, which greatly assists them in conveying stores of pollen to their burrows. Besides this tuft, the whole of their legs are usually well-clothed with hair; and, in fact, the whole insect is generally at least as hairy as a Hive-bee, and sometimes much more so. The colour of the hair varies according to the species of the insect—one kind presents us with a 'harmony in red' (*fulva*), another with a 'monody in brown' (*nigroaenea*), another with a 'symphony in black and tan' (*Clarkella*), and so on. We do not find, in this genus, colours quite so showy as the crimsons and lemon-yellows of some Humble-bees; but within the limits of white, black, gold, tawny-red, and the like, there is room for a considerable variety of dress, and of this *Andrena* fully avails itself.

I have mentioned in previous numbers of the Report the colonies of *A. nigroaenea* and *Xanthura* (*Wilckella* is now the received name of this species), which have apparently well established themselves in the School Close. There is a similar colony of *Clarkella* on the Dunchurch Road, near Overslade. On the Barby Road *angustior* has, apparently, its head-quarters. *Gwynana* burrows in sand at Hillmorton. *Albicans* abounds everywhere, favouring all kinds of spring-blooming trees, willows, hollies, apples, &c., &c.

6. *Nomada* is the very type of a parasitic genus. It is quite naked; provided with no apparatus for pollen-carrying, and it is constantly seen running into and out of the cells of *Andrena* in a manner which can bear but one interpretation. Its body—not the hair, for there is none, but the actual surface—is gaily decorated with stripes or spots of yellow on a black or reddish ground. Sometimes the thorax is conspicuously marked with dots of crimson or yellow. Often the jaws and lip are pale. The antennae, too, are sometimes brightly coloured.

In two of our Rugby species (*succincta* and *alternata*) black and yellow in sharp contrast are the only colours. The others combine these colours with an admixture of red or russet brown. Three kinds (*ruficornis*, *bifida*, and *ochrostoma*) are so like as to be undistinguishable till their jaws are examined with a glass. *Ruficornis* in this neighbourhood runs into some very peculiar dark varieties. The rarest *Nomada* I have found at Rugby is *obtusifrons*, which I have twice taken near Overslade in company with *Andrena coitana*. Altogether I know of eight kinds of *Nomada* in this locality.

7. *Megachile*. This genus comprises the bees known as Leaf-cutters. They have long tongues, and very powerful jaws, which they use as scissors. We have three kinds, as far as I know, at Rugby (*maritima*, *circumcincta*, and *centuncularis*). *Maritima* is not frequent here, but I have taken it on larkspur and on sweet pea. *Circumcincta* I have seen cutting green leaves (sort unknown) at Hillmorton. *Centuncularis* abounds, and plays havoc with the petals of my scarlet geraniums every summer.

This, and the two next genera, carry pollen, not on their legs, but on a wonderful brush, or rather row of brushes, which clothes the underside of their abdomen. They seem to wallow in a flower, till these brushes are dusted and caked all over with a mass of pollen grains, and then fly off to unload themselves at home. Naturally only the females have this appendage.

As to the leaf-cutting. The object is, of course, to provide a lining for the nest. It is a curious spectacle to watch the bee at work. Always starting from the edge of the leaf, one jaw on each side of it, she cuts, quite cleanly and evenly, not a straight but a circular, or rather semi-circular, bite out of it. Then, holding this



piece spread out below her, apparently employing all her six legs as hands to hold it, she flies off, and presently returns for another slice.

8. *Chelostoma*. This genus contains two species, both occurring here, but neither (I think) commonly. *Campanularum* is a tiny little black creature, in many places found abundantly in harebells, where it is said to sleep. We have plenty of harebells here, but my only Rugby specimen of *campanularum* was caught on a stray patch of bryony in the private road at the north side of Caldecott's Piece. *Florisomne*, too, sleeps (as its name implies) in flowers, hanging on by its jaws (see plate in Staveley's 'British Insects,' p. 240), and curling its abdomen up under it. But I caught all my specimens wide awake and flying about, two in a lane at Hillmorton, one on the Dunchurch Road. These insects burrow into wooden posts, and there lay their eggs and provision them in the usual way. In form they are long-bodied, rather clumsy-looking creatures, the hair shaggy, and the colour dull.

9. *Osmia*—the Mason-bee—has a cousinly likeness to *Megachile*, but, to my eye, its 'contour' is somehow softer and more rounded. *Rufa* abounds at Hillmorton, where many old mud-walls are simply riddled with its burrows. Its body is of a rather metallic black, with a soft 'bloom' of bright red hairs all over it. The male, in particular, when young and fresh, is a beautiful creature. But, as the season advances, these red hairs gradually fade into a dull grey, and the insect becomes hardly recognizable. The females have a singular appendage on the face, a sort of projecting horn on each side, which distinguishes the species in an instant.

Another very common *Osmia* here is *fulventris*, so called from the bright orange colour of the abdominal pollen-brush. Like *rufa* it burrows in mud-walls at Hillmorton, but its proper home seems rather to be in wooden posts. All along the road from Hillmorton to Dunchurch, in the summer of 1889, there was scarcely a gate-post without a burrow of *fulventris* in it.

One other *Osmia* I have found at Rugby, but rarely: *caerulescens*, a very metallic-looking creature, usually steel blue, but sometimes (especially in the male) varying to a bronzy green.

10. *Anthophora*. We have two kinds at Rugby, *pilipes* and *furcata*. *Pilipes* is very abundant about the beginning of June, but appears much earlier: in fact, this year, *Anthophora pilipes* was the very first bee I saw (a male, in my own garden, on March 2). They are large hairy creatures, which a beginner might mistake for some sort of Humble-bee. They burrow in sand or mud, and make large rounded cells, which harden into what looks like a petrified nutshell or bird's-egg. The male is extraordinarily unlike his female. His fur is, at starting, of a very rich bright brown, which gradually fades into a dull grey. His face is cream coloured; and his middle pair of legs are abnormally long and adorned with most singular tufts or bunches of long hair, the purpose of which is entirely unknown. As to the female—she is entirely black, except her hind legs, which have a golden fringe. No one, seeing the two sexes side by side, could suppose that they were sexes of the same insect.

In *furcata* there is no such unlikeness between male and female. The male has, indeed, a yellow face, but no other marked peculiarity. I have never traced this species to its burrow. Indeed I have never seen it, except visiting one particular species of plant—*Stachys sylvatica*—in the months of June, July, and August. I have taken many males, but only two females.

*Anthophorae* fly very swiftly, with a loud humming or piping noise. All the kinds of Bee I have previously described are silent flyers, so far as I remember.

11. 12. The genera *Psithyrus* and *Bombus*, between them comprise the well-known Humble-bees. They are intimately connected in structure and general appearance, and they are always found associated with each other. *Psithyrus* is, in fact, parasitic upon

Bombus. The main difference between the two genera lies in the hind leg of the female, which in Bombus is flattened out and even hollowed to form a 'basket,' as it is called, for the collection of pollen, while in Psithyrus the corresponding joint, though broad, is convex and hairy, quite unsuited for any such purpose and never applied to it.

Five British species of *Psithyrus* are known and we have them all at Rugby. In one (*rupestris*) the tip of the abdomen is covered with bright red fur, and it seems to be parasitic on similarly red-tipped Bombi: *campestris* is tipped with yellow: the other kinds with white: and these distinctions fit in pretty well with what, on other grounds, is believed as to the association of species of *Psithyrus* with species of *Bombus*. But the subject requires further investigation. Even recent Entomologists have failed to distinguish the species correctly (e.g. Smith's *barbutellus* was not *barbutellus* but *quadricolor*), and this has led to great confusion in the records.

Of *Bombus* we have at Rugby ten real kinds, disregarding mere varieties which some writers have treated as distinct species. Those I have not found here are all extremely local or rare. It seems needless to describe the appearance of such well known insects; but it may be noticed that the genus cannot be classified accurately by colour alone, e.g., a red-tipped bumble-bee may be *lapidarius* or *derhamellus*, to say nothing of the chance that it may also be *Psithyrus rupestris*; and again, one brown all over may be *cognatus* though it will generally be *muscorum*; and a *hortorum*, or again a *terrestris*, may be white-tipped, or yellow-tipped, or may even be entirely black. So that, in studying this genus, it is absolutely necessary to examine minute points of structure, which, though minute, are found to be invariable, and to distrust mere distinctions of colour, however marked they may seem. This rule, in fact, applies to all long genera of Bees, and neglect of it caused even so great an Entomologist as the late F. Smith to introduce into many genera specific names which are now universally discarded, and on the other hand to group together under one name species now recognized as distinct.

13. But I must bring this paper—too long already—to a close. And having spoken now of all our Rugby genera but one, and that one *Apis*, containing one species only—the common Hive bee, *A. mellifica*—I need say little more. Still just this may be noticed, that though there are various more or less dissimilar breeds of Hive-bee to be met with in England, 'Ligurian' and so forth, some all black, some partly red-bodied, some well-conducted, some fierce and mischievous—yet, scientifically, they are all one species, all varieties of *Apis mellifica*, just as (*teste* Macbeth) "hounds, greyhounds, mongrels, spaniels, curs" etc. etc. etc. are "cleped all by the name of dogs," or (as modern Zoologists would tell us) "constitute mere varieties of the species *Canis familiaris*." The habits of the Hive bee entirely separate it from any other species. And, though in general appearance it closely resembles some species of other genera, especially of *Andrena*, it may be distinguished, even on the wing, by the character of its well-known 'hum,' and by its fashion of carrying its legs trailing, as it were, under it. When at rest, another difference may be readily observed in the form of its abdomen, which tapers *at one end only* (the apex) like a conical rifle-bullet: whereas in the genera most resembling it, the abdomen is egg-shaped, tapering at *both* ends. This is an easy distinction to grasp; and when once it is grasped, there can be no danger of mistaking *A. mellifica* for any other British insect. The same form of abdomen, no doubt, appears in some other genera; but in none sufficiently like *Apis* in general aspect to make confusion with it possible.





