















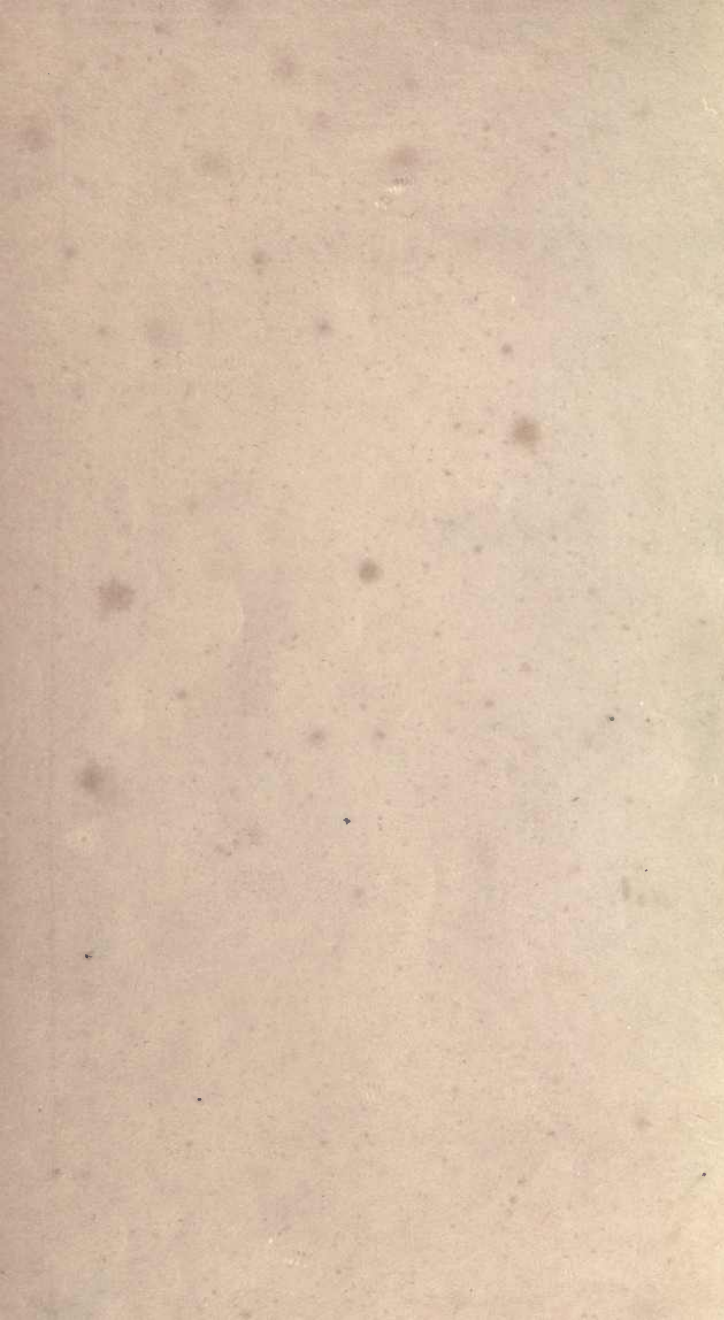


Mary and Amelia Lavery

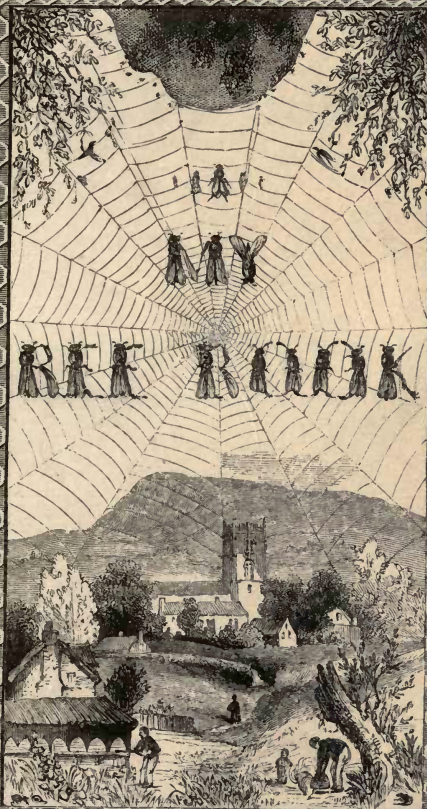
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April 20th 1854

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MY  
BEE BOOK.

BY  
WILLIAM CHARLES COTTON, M.A.  
STUDENT OF CHRIST CHURCH, OXON.

---

WITH NUMEROUS WOOD-CUTS.

---

LONDON :  
J. G. F. & J. RIVINGTON,  
ST. PAUL'S CHURCHYARD & WATERLOO PLACE, PALL MALL.  
1842.



LONDON:  
R. CLAY, PRINTER, BREAD STREET HILL.

TO ALL BEE-KEEPERS,

AND

To my dear Father,

WHO FIRST GAVE ME A LOVE FOR BEES, AND MADE ME

AN OBSERVER OF

THE WONDROUS WORKS OF GOD,

THIS BEE-BOOK IS PRESENTED,

BY

THE AUTHOR.





TO  
THE LIVING MEMBERS OF THE DEFUNCT

*Oxford Apianian Society,*

THIS RECORD OF EXPERIMENTS,

MANY OF THEM INSTITUTED BY THEIR SOMETIME SECRETARY

WHILST CONNECTED WITH THEM,

IS CONFIDENTLY INSCRIBED

BY

THE AUTHOR.

THE HISTORY OF THE CITY

OF NEW YORK

FROM THE FIRST SETTLEMENT

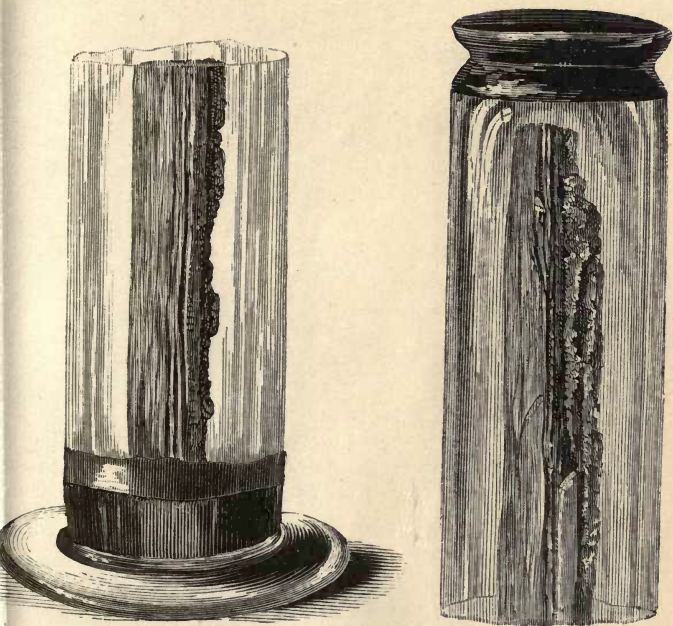
TO THE PRESENT TIME

BY J. C. CALVERT

IN TWO VOLUMES

1

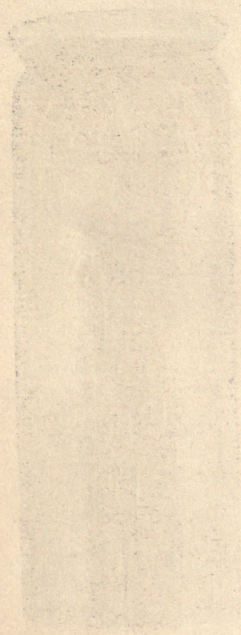
THE HISTORY



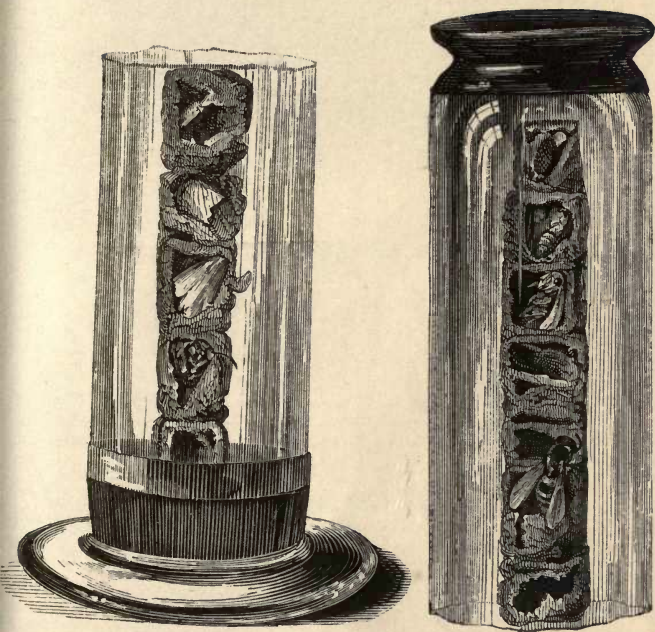
### WASP'S NEST IN A BOOK.

The Cut shows the edges of the leaves, and the side of the Nest.





THE UNIVERSITY OF CHICAGO  
LIBRARY



### THE INSIDE OF THE SAME WASP'S NEST.

The Cut shows the Young Wasps and their Cocoons, as found, when the margin of the Book was cut off.



THE TEMPLE OF CERES AND TRAIANUS

DESIGNED BY J. J. JOHNSON, ARCHT. & CIVIL ENGINEER

NEW YORK





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## ERRATUM.

Page 88, line 4 from bottom, for "fingers," read "fungus."



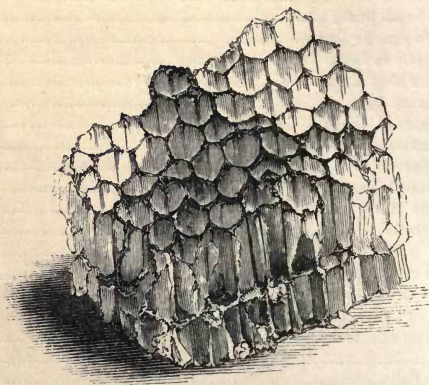


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Albrecht, J. F. E. A Treatise of Bees ; entitled Zootomische und Physikalische entdeckungen von der innern einrichtung der Bienen, besonders der art ihrer begattung. . . . . 8vo. Gotha: 1775.

Allen, Benj. On the Gall Bee. Phil. Trans. Abridg. ii. 769.

Bagster, S. The management of Bees. 12mo. London: 1838.

Bazin, N. Histoire Naturelle des Abeilles. 12mo.

Paris: 1784.

————— Gouvernement admirable, ou la République des Abeilles. . . . . 8vo. Haye: 1746.

————— Abrégé de l'Histoire des Insectes, pour servir de suite à l'Histoire naturelle des Abeilles. 12mo. Paris: 1747.



Beaunier, S. Sur l'Education des Abeilles.

8vo. Vendôme: 1806.

Bee, a numerous Genus of Insects, which have attracted  
an uncommon share of Attention in all Countries, and in  
every Age, on account of their Industry, Art, and Utility.  
1539.

Bee Friends, Almanack for . 12mo. without place: 1792.

Bee Master and Bee Friend, Drops of Gold for. Nutte's System.  
8vo. Ulm: 1839.

Bertin, M. Instruction sur la Culture des Abeilles.

8vo. Paris: 1836.

Bevan, E. The Honey Bee. . . 12mo. London: 1838.

Beville, P. C. G. Traité de l'Education des Abeilles.  
8vo. Paris: 1804.

Bienaymé, M. Mémoire sur les Abeilles. 12mo. Mets: 1803.

Bonner, J. Plan for increasing the number of Bee Hives.  
8vo. Edinburgh: 1795.

Bromwich, B. J. The experienced Bee Keeper.  
8vo. London: 1783.

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Butler, Chas. The Feminine Monarchie; or, The History of  
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8vo. Paris: Thermidor, an 6.

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12mo. Leipsic: 1820.

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2 tom. 12mo. Paris : 1771.
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Account of the Utilities that may be derived from these  
Discoveries, by their application to practice.  
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12mo. Göttingen : 1812.
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8vo. Ghent : 1816.
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- Ducouédic, P. *La Ruche Pyramidale.* 8vo. Paris : 1813.
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8vo. Strasbourg : 1808.
- Fontenay. *Manuel des Propriétaires d'Abeilles.*  
24mo. Bar-sur-Aube : 1829.
- Franconian Apiarian Society and Bee Calendar, *Transactions of.* . . . . . 12mo. Nuremberg : 1770-1774.
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- Galissardus, Pet. *Encomium Pulicis.* . 8vo. Lugd. : 1550.

Gedde, J. The English Apiary. 12mo. London: 1721.  
Googe. Whole Art and Trade of Husbandry.

4to. London: 1614.

Hartlibb, S. Reformed Commonwealth of Bees.

4to. . London: 1655.

Hill, Hyll, or Hylle, Thos. Profitable Instructions for the  
perfect ordering of Bees. . . . 8vo. London: 1579.

————— Londoner. A pleasaunt Instruction of the parfit  
Ordering of Bees, with the mervelous Nature, Propertie,  
and Government of them; and miraculous uses both of  
their Hony and Waxe (serving diversly) as well in inwarde  
as outwarde causes: gathered out of the best writers.

Black letter. 8vo. London: 1568.

————— Londoner. The profitable Art of Gardening,  
&c.; with The maruellous Gouvernement, Propertie, and  
Benefite of the Bees, with the rare Secretes of the Honie  
and Waxe.

4to. London: 1579; and 12mo. 1568; and 4to. 1586.

Hints for promoting a Bee Society. 8vo. . London: 1796.

Histoire Naturelle des Abeilles. 2 tom. 12mo. Paris: 1744.

Histoire Particulière de l'Abeille Commune.

8vo. Paris: 1805.

Hoffman, G. F. The newest Experience in Bee Keeping.

12mo. Quedlinburg and Leipsic: 1837.

Hüber, F. Natural History of Bees. 12mo. Edinburgh: 1808.

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————— New Observations on Bees. 12mo. Edinburgh: 1821:

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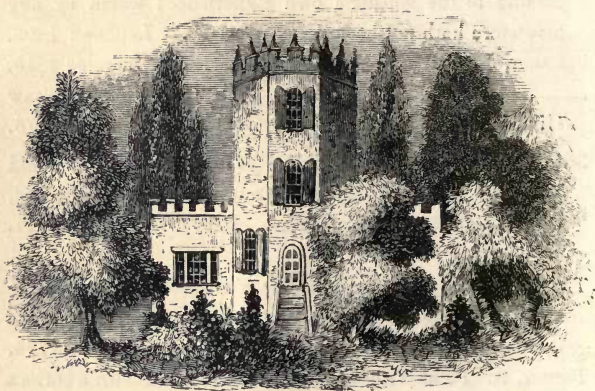


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- Jansch, A. Treatment of Swarms. 12mo. Vienna: 1774.
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- Levett, J. The Ordering of Bees. . 4to. London: 1634.
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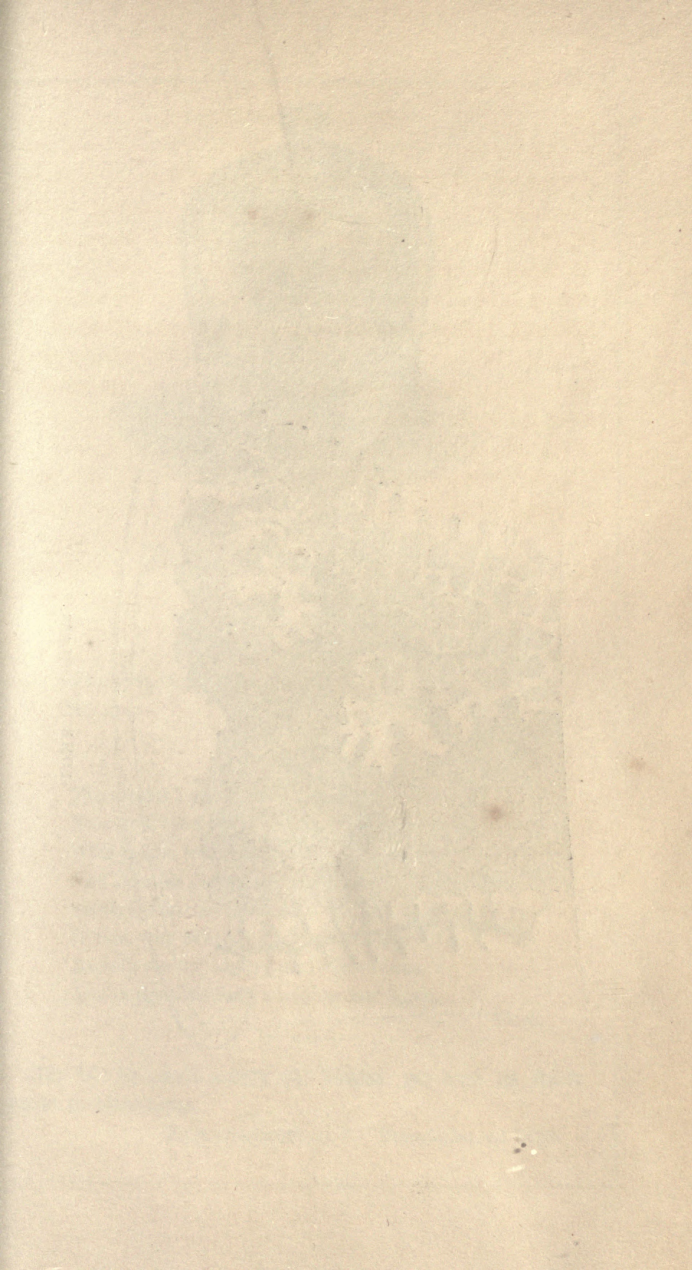
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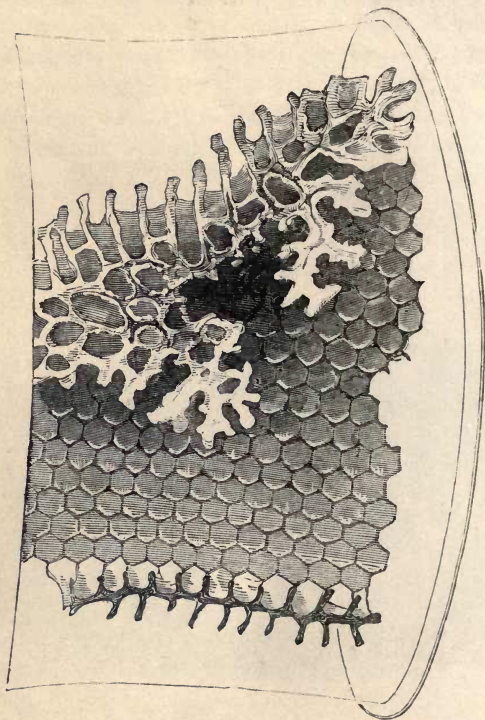
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- Riem and Werner. Practical Bee Father. 12mo. Leipsic :  
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12mo. Dresden : 1804.
- Rucellai, G. Le Api, (Poema) colle annotazioni di R. Titi.  
4to. Pad. : 1718.
- Rusden, Moses. A further Discovery of Bees.  
12mo. London : 1679.
- Serain, P. E. Instruction sur la Manière de gouverner les  
Abeilles. . . . . 8vo. Paris : 1802.
- Smith, R. Cottager's Bee Book. . 12mo. Oxford : 1839.
- Southerne, Edward. A Treatise concerning the right Use  
and Ordering of Bees, newlie made and set forth, ac-  
cording to the Author's own Experience; which by any  
heretofore hath not been done. 4to. . London : 1693.
- Spitzner, J. E. Perpetual Bee Calendar. 8vo. Leipsic : 1810.
- Practical Guide to Bee Keeping in Straw  
Hives. . . . . 12mo. Leipsic : 1775.
- Stiles, Sir F. H. F. A Specimen of the Labour of a kind  
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which they bury in rotten Wood. Phil. Trans. Abr. xi. 521.
- Thorley, John. Melissologia, or Female Monarchy, being  
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Bees. . . . . 8vo. London : 1744.
- Turner, R. Plane Trigonometry; in which is shewn a curious  
Trigonometrical Method of discovering the Places where  
the Bee hives in large Woods. . Folio. London : 1765.
- Vauquelin. Analysis of the Propolis, or Mastic of Bees.  
Nicholson's Journal, v. 48.

- Warder. True Amazon ; or, Monarchy of Bees.  
8vo. London : 1720.
- White. Collateral Bee Boxes. . . 8vo. London : 1706.
- Wildman, D. Guide for the Management of Bees.  
8vo. London : 1819.
- Wildman, Thos. Treatise on the Management of Bees.  
8vo. London : 1770.
- Willughbey, Fran. About the Hatching of a kind of Bee,  
lodged in old Willows. . Phil. Trans. Abr. ii. 774 : 1670.
- Worlidge, John. Apiarium, or a Discourse of the Govern-  
ment and Ordering of Bees, with their Nature and Pro-  
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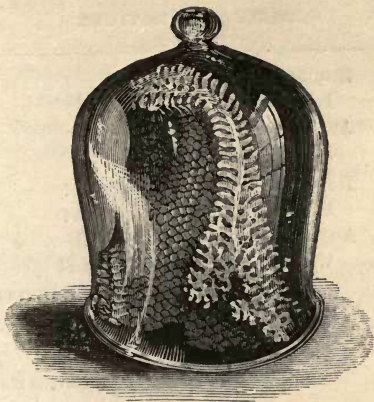








COMB IN A GLASS.



## Prelude of *Mottors*.

---

Floriferis ut apes in saltibus omnia libant,  
Sic nos.—

LUCRETIVS.

---

The careful Insect 'midst his works I view,  
Now from the flowers exhaust the fragrant dew;  
With golden treasures load his little thighs,  
And steer his distant journey through the skies.  
Some, against hostile drones, the hive defend,  
Others, with sweets the waxen cells distend;  
Each in the toil his destined office bears,  
And in the little bulk a mighty soul appears.

GAY.

---

The Bee is small among the fowles, yet doth its fruite  
passe in sweetnesse.

ECCLESIASTICUS xi. 3. *Translation, ed. 1603.*

How doth the little busy Bee  
 Improve each shining hour !  
 And gather honey all the day  
 From every opening flower !  
 How skilfully she builds her cell !  
 How neat she spreads the wax !  
 And labours hard to store it well  
 With the sweet food she makes !

WATTS'S DIVINE SONGS.

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Je pique mais j'attache.

MADAME DE SEVIGNÉ'S MOTTO.

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So work the Honey Bees,  
 Creatures, that, by a rule in nature, teach  
 The art of order to a peopled kingdom.  
 They have a king, and officers of sorts :  
 Where some, like magistrates, correct at home ;  
 Others, like merchants, venture trade abroad ;  
 Others, like soldiers, armed in their stings,  
 Make boot upon the summer's velvet buds ;  
 Which pillage they with merry march bring home  
 To the tent royal of their emperor :  
 Who, busied in his majesty, surveys  
 The singing masons building roofs of gold ;  
 The civil citizens kneading up the honey ;  
 The poor mechanic porters crowding in  
 Their heavy burdens at his narrow gate ;  
 The sad-eyed justice, with his surly hum  
 Delivering o'er to executors pale  
 The lazy yawning Drone.

SHAKSPEARE. *Henry V.* Act i. Scene 2.

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Θεῖόν τι τὸ γένος τὸ τῶν Μελιττῶν.

OLD GREEK PHILOSOPHER.

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Sic vos non vobis mellificatis Apes.

MARO, AN OLD BEE-MASTER



Αἶολε, ἡμεροθαλλὲς ἔαρ φαίνουσα, Μέλισσα\*  
 Ξουθα, ἐφ' ὠράοις ἀνθεσι μαινομένα,  
 Χῶρον ἐφ' ἡδύπνοον πωτωμένα ἔργα τίθεσσο,  
 Ὅφρα τέον πληρῆς κηροπαγὴ θάλαμον.

NICIAS THE PHYSICIAN.

Thou nimble yellow Bee, that bringst the softly blooming spring,  
 Thee the lobe of budding flowers is ever maddening.  
 Flitting o'er sweetly-breathing fields increase thy honied store  
 Until thy wax-compacted cells, at length can hold no more.

MERIVALE'S TRANSLATION.

'Tis seldom, when the Bee doth leave her comb  
 In the dead carrion.

\* \* \* \* \*

When like the Bee, tolling from every flower  
 The virtuous sweets;  
 Our thighs packed with wax, our mouths with honey,  
 We bring it to the Hive; and, like the Bees,  
 Are murdered for our pains.

SHAKSPEARE. 2 *Henry IV.* Act iv. Scene 4.

It's all Buzz.

TONY LUMPKIN. *She Stoops to Conquer.*

Κατὰ γεωμετρικὴν τινα μηχανῶνται πρόνοιαν.

PAPPUS.

ΔΙ' Ἄ ΑΠΙΑΡΙΟΣ ΟΥ ΘΕΛΩ ΕΙΝΑΙ.

\* Απιδος οὐ σέβομαι τελετάς, οὐδ' ὄργια Νείλου\*

\* Ἀγγλικὸς ὀρθοδοκᾶν Ἀριον οὐκ ἄγαμαι\*

Καὶ διὸ τοῦτ' ἄρ' ἔγωγ' Ἀπιάριος οὐ θέλω εἶναι

\* Ὅς νάλω γαίᾳς τηλόθεν ἐξ Ἀπίης.

\* Ἀνώνυμόν τι.

\* Μέλισσα, quasi à μέλειν, "busy bee."—WATTS.

The Commons, like an angry Hive of Bees,  
That want their leader, scatter up and down,  
And care not whom they sting.

SHAKSPEARE. *2 Henry VI.* Act iii. Scene 2.

A DEAD BEE MAKETH NO HONEY.

HERBERT'S PROVERB.

EVERY BEE'S HONEY IS SWEET.

HERBERT'S PROVERB.

As God hath given them stings, let us adore  
The awful emblem ; nor in God's great world  
Wish adders baneless ; but by graver thought,  
Gather sweet honey from the stinging Bees ;  
And adder's oil 'tis said will heal its wounds.

THE BAPTISTERY.

But for your words, they rob the Hybla Bees  
And leave them honeyless.

*Ant.* Not stingless too.

*Bru.*

O yes, and soundless too ;

For you have stolen their buzzing, Antony,  
And, very wisely, threat before you sting.

SHAKSPEARE. *Julius Cæsar,* Act v. Scene 1.



## P R E F A C E.

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THE following Work is printed in its present enlarged form, as it seems not unlikely that it may prove acceptable to Bee-keepers of another class than that for which it was originally written. Simplicity of style and clearness of expression were mainly aimed at in the

two "*Short and Simple Letters to Cottagers, from a Bee Preserver.*" I believed, and I have found on trial, that if any one sets about writing, after making up his mind to draw only from "*the well of English, pure and undefiled,*" he will be able to give form to *at least* all the ideas which he could do by adopting a more bombastic style : one, tainted and defiled, I must call it, by an useless admixture of barbarisms and words of foreign fashion. I have therefore not at all altered the style of the Letters, which were intended for the Cottagers of England. English is no where spoken so purely or so forcibly as it is by the villagers in those counties which have no dialect of their own. All classes therefore cannot do better than try to speak and write as the poor speak. The poor have not the same temptations from foreign travel, the reading of ill-written books, and the senseless fashions of the times, to corrupt and debase their mother tongue. And a distinct language is one of the bad signs of a separation in thought and interest among those who should be bound up together as one great family, by the tie of blood and of country, to say nothing of that higher bond of union, in virtue of which we are all brethren. It is more than a sign.—It has contributed to bring



about this unhappy result, and unless we spurn it from us, will be the means of perpetuating it.\*

I have added an Appendix, containing some experiments and observations, which would be useless to cottagers, but which other Bee-keepers may repeat if they please. I have also appended a curious account of the management of Bees in the far-famed Mount Hymettus, for which I am indebted to the late lamented Davies Gilbert, himself an experienced Bee-keeper of no ordinary standing.

Many communications have already been received, addressed to me by kind, though unknown, friends, in consequence of the invitation at the end of the first Letter. These I shall still be happy to receive and to answer, as far as lies in my power, if directed to me, care of Mr. Milton, Italian Warehouse, Great Marylebone Street.† I have prefixed to this Work a list of

\* Instances of this will occur to every one at all read in history, both in ancient times, and in those which preceded the French Revolution. May God keep us from these evils, and give us wisdom to see the signs of danger even in the changes of language!

† At his Apiarian Repository, models of all the Hives described in this Work may be seen, and any one or more of the full size may be procured, simply by sending to him the number prefixed to the desired article in the list of Hives, which is contained in the Appendix, with a remittance for the amount. The Hives will be sold at 15 per cent. above the contract price; 10 per cent.

Bee books, the most complete, I believe, which has hitherto appeared. It includes a large number in my own possession, to which my initials are prefixed. I shall be most happy to lend any which my readers may wish to see, and will thank them much if they will put me in the way of completing my list, by sending me the name of any bookseller who may have works on the subject not named therein. But my list is not confined to those in my possession:—it includes a large number belonging to Mr. Dawson, Botesdale, Bury St. Edmond's, a kind though unseen friend; also the collection of Mr. Payne, author of the *Apiarian Guide*; and those belonging to Mr. Milton, the agent for the sale of the Hives described in this book. The list is brought still nearer to completion by the aid of Watts's *Bibliotheca*, and the works contained in the British Museum. I shall thank any one who will aid me in filling up the list, by sending the name of any work not

will be the retailer's profit, and 5 per cent. will be applied as prizes to the most successful and deserving Bee-keepers. Particulars as to the places where the prizes are to be given will be made known in the respective districts around each *Apiarian depôt*. The conditions to be observed by competitors are given in the Appendix. Mr. Milton will be happy to receive names of tradespeople in the country, who may be willing to take charge of branch depôts upon the same terms.

contained therein, which they possess or have heard of, directed to me, care of Mr. Milton.

My first Letter has, I am happy to say, fully answered the end for which it was written. A very large impression has already been sold; many have found their way into the hands of cottagers, but doubtless the largest part of the impression has been taken off by those who cannot lay any claim to this honoured name. This is in itself a good, as it has, I trust, led very many to put their own poor in the way of keeping Bees, and by the best teaching, that of example, to show them how it may be done. As for profit, I do not pretend to have made much by my Bees, though I hope the Bees of England will make much by me before I have done with them. At least, they will get as much by me as their lives are worth, and I will leave each Bee to put a price upon his own life, and the sum total which they put on themselves will be the value of the good I have, or shall do to English Bees : to say nothing of what my book, if any copies go into foreign parts, may do to outlandish Bees. I have all along looked not to my own profit, but to the good of others as my first object. I trust I shall always do so, even if I were to pay as much every

year as my Bee experiments have hitherto cost. I think I have now learned about common things, and the way of Bee-keeping, as much as a man of my age can hope to do ; as much as time, care, and trouble can teach a man : so henceforth, I hope to get more honey with less trouble ; and to find THAT I HAVE BENEFITED MYSELF, WHILST I HAVE MAINLY TRIED TO HELP OTHERS. This is the best reward that a Christian man can get in this world, even in greater things than Bee-keeping. I have already made many Bees my friends, and Bee-keepers too, and hope before I die to increase my stock. My first Letter was intended to be a manual of Bee-keeping, my second of Bee-observing. The second cannot stand without the first ; the first is needed for profit—but he who neglects the second, loses all the pleasure and instruction which may be derived from this most delightful of all country pursuits.

I would venture to give one or two pieces of advice, though well-meant advice is often taken ungraciously.

I. Do not attempt too much at first, especially with the poor,—show them how they may take up their stocks in Autumn in the old way, using the fungus, and then join the Bees to their other stocks.



I would most earnestly beg the aid of the clergy and resident gentry, but, above all, their good wives ; in a word, of all who wish to help the poor who dwell round about them in a far humbler way, yet perhaps not less happily ; I would beg them, one and all, to aid me as an united body, in teaching their poor neighbours the best way of keeping Bees. Many people think the poor may be helped most, by giving them small allotments of land. I think this may do much ; and I will, whenever I am able, help on this plan. But much difficulty is often found in getting land ; and I do not think it is so certain or so safe a way of doing good, as by giving a poor man a stock of Bees, and then showing him how to take care of them, and to profit by them ; for digging is thirsty work, and the beer-shop often stands hard by the allotment : so, although the labourer after his daily toil may go by himself to his plot of ground, yet he is very likely to find one or two gardeners, thirsty like himself, to walk toward home with him, but before they get there to drop into the beer-shop ; and when once there, snugly seated in the chimney corner, neither I, nor, what is worse, their poor wives, can tell when they will get out of it. But a row of Bees keeps a man at home : all his spare moments may

be well filled by tending them, by watching their wondrous ways, and by loving them. In winter, he may work in his own chimney corner, at making Hives both for himself and to sell. This he will find almost as profitable as his Bees, for well-made Hives always meet a ready sale. Again, his Bee-hives are close to his cottage door; he will learn to like their sweet music better than the dry squeaking of a pot-house fiddle, and he may listen to it in the free open air, with his wife and children about him. They will be to him a countless family. He will be sure to love them if he cares for them, and they will love him too, and repay all his pains. Many a lesson a man and his wife may teach their children at the mouth of their Hives; for a Bee-garden is only second to a Sunday-school. As I told the Cottagers, in my first Letter, a good Bee-master must not be unchaste and uncleanly; for impurity and sluttiness (themselves being most chaste and neat) they utterly abhor: thou must not come among them smelling of sweat, or having a stinking breath, caused either through eating of leeks, onion, garlick, and the like, or by any other means, the noisomeness whereof is corrected with a cup of beer; thou must not be given to surfeiting or drunkenness. The best Bee-master is a water-drinker, for Bees only

drink water ;—but they are no tee-totallers, as I have shown in my first Letter, for beer and sugar is their best winter food ; and as a Bee-keeper's breath must be corrected by a cup of small beer, I should recommend, above all other drinks, one filled with good honey ale.

The most simple method of joining stocks is given in the present edition of my Letter. I myself instructed a cottager, Joseph Barnett, whose name I must here mention, in the method of doing this, and sent him round to other Bee-keepers. Where they would not adopt it themselves, his plan was this : he said, "I will give you a shilling to let me take your honey for you, if you will let me take the Bees away with me." "Take them, and welcome," was the usual answer, "and much good may a parcel of Bees, if you don't kill them, do you, without the comb." I had a small deal box made to carry them in, and when he got home, he united them to my own stocks. I have now one in capital condition, to which the Bees of four stocks were joined in the autumn of 1839. It is the most healthy and strong stock I ever had. On the 7th of March, 1840, I began feeding them ; as I always do in the spring, to put my Bees into heart. On the 9th, which was a warm day, they took into the middle box

four pounds weight of sugar, besides a little water, with which I mixed it. They immediately raised the temperature of their Hives twenty degrees at least, and the work of breeding no doubt went on rapidly. Any cottager who sold me his Bees that year, would, I am sure, be unwilling to do the same again, and learn that he may profit by no more using the sulphur match.

Some people have thought that it is impossible to introduce a new system, like that which I recommend, generally among the cottagers, who are so much wedded to the ways in which their fathers have walked before them. With this feeling I am the last to quarrel ; but I was resolved to try what I could do ; for I was sure that if I gained my end, I should benefit them by the change. Now success, far beyond what any teacher of new ways has a right to expect, has been granted to me. As a proof of this, I will give a conversation which took place the other day between Joseph Barnett and myself.

“ Well, Barnett, what do the people about Cumnor now think about our plan ?”

“ Oh, Sir, they take to it wonderful.”

“ Why how is that ? they would have nothing to do with it at first.”



“ Yes, Sir ; but they saw this year that my double Hives—what you call the married Hives—were the first to swarm, whilst many of them got no swarms at all. So this year they have all smoked their Bees instead of burning them.”

“ Well, how many Hives have you this year ?”

“ Not so many as last, Sir.”

“ Why how is that—I thought you said they were all taking to it ?”

“ Why you see, Sir, my eldest son is so deadly fond of smoking Bees, that I have given the job up mainly to him ; and he has got many a shilling this year by taking up the stocks of the people round about me.”

“ Well, I am glad to see, Barnett, that he is walking in his father’s steps, and makes an honest penny by saving the Bees’ lives ;—but do not call it *deadly* fond, though I know what you mean—you should say, *lively* fond ; for both he and you prevent much Bee-murder.”

II. Do not be put out of heart by two or three bad seasons—the years 1838 and 1839 were the worst, for Bees, I ever remember. Many persons who have not succeeded as they could wish have laid the blame at my door, though the weather was the cause. I should

hope, however sorry they may be for the bad seasons, they will not dare to blame HIM “who layeth the beams of His chambers in the waters : who maketh the clouds His chariot : who walketh upon the wings of the wind.”\* “He maketh peace in thy borders, and filleth thee with the finest of the wheat. He sendeth forth His commandment upon earth : His word runneth very swiftly. He giveth snow like wool : He scattereth the hoar-frost like ashes. He casteth forth His ice like morsels : who can stand before His cold ? He sendeth out His word, and melteth them : He causeth His wind to blow, and the waters flow.”†

III. Do not begin keeping Bees with a single stock ; some accident may happen to them, and then you may chance to be discouraged, and give it up altogether, or at best have to begin again. I have been a Bee-keeper for four-and-twenty years, and of course have in my time met with failures and reverses : sure success in any pursuit is not the lot of man ; but the three maxims, “What’s done can’t be helped,”—“Better luck next time,”—“Try again,”—are good

\* Ps. civ. 3.

† Ps. cxlvii. 14—18.

stock mottoes for the Apiary, and of great use there, as in the common affairs of life.

IV. Always believe your own eyes if you see a thing ten times ; you may be mistaken once, but each time you will keep a better look-out. When you are sure of a thing, do not be laughed out of it by those who think they know more about it than yourself. For instance, I myself have united stocks over and over again, and so if all the world was to tell me that it was impossible, as one man has done, I should not believe it. But always keep your temper when you try to show them that they are wrong.

I have said that I have been a Bee-keeper four-and-twenty years ; my first liking for it was given to me by my kind father reading to me a translation of the fourth Georgic of Virgil. I suppose I was born an experimentalist, so I went out next morning with a full determination to try a grand one. I found a shed which would do nicely, which had all that Virgil requires.

*First*, there is found a place, small and narrowed for the very use, shut in by a little tiled-roof and closed walls, through which the light comes in askant by four windows,

facing the four pointes of the compass.\* Next is found a two-year-old bull calf, whose crooked hornes bee just beginning to bud; the beast his nose-holes and breathing are stopped, in spite of his much kicking; and after he hath been thumped to death, his entrailles, bruised as they bee, melt inside his entire skinne. This done, he is left in the place afore-prepared, and under his sides are put bitts of boughes, and thyme, and fresh-plucked rosemarie. And all this doethe take place at the season when the zephyres are first curleing the waters, before the meades bee ruddy with their spring-tide colours, and before the swallow, that leetle chatterer, doethe hang her nest again the beam. In time, the warm humour beginneth to ferment inside the soft bones of the carcase; and wonderful to tell, there appear creatures, footless at first, but which soon getting unto themselves winges, mingle together and buzz about, joying more and more in their airy life. At last, burst they forth, thick as rain-droppes from a summer cloude, thick as arrowes, the which leabe the clanging stringes when the nimble Parthians make their first battel onset."†—*Old Translation.*

\* This slight anachronism was, no doubt, introduced by the man who has so faithfully done into English these true lines of Old Maro, in consequence of the invention of the compass *attracting* universal attention at the time he wrote. Perhaps some one learned in MSS. may find the original in the British Museum. At all events, Mr.—, who thinks himself infallible in detecting the date of composition by its style, may favour me with the exact year when it was done into English.

† Exiguus primùm, atque ipsos contractus ad usus  
Eligitur locus: hunc angustique imbrice tecti  
Parietibusque premunt arctis; et quatuor addunt,  
Quatuor à ventis obliquâ luce fenestras.  
Tum vitulus, bimâ curvans jam cornua fronte,  
Quæritur: huic geminæ nares, et spiritus oris  
Multa reluctanti obstruitur; plagisque perempto



I had no pity for the poor cow—no, not I—when a swarm of Bees was to be the glorious result: she would surely, I thought, be happy in her death, as she would give life to so many glorious creatures. But I was not quite sure that I should be able to act the part of Guy, Earl of Warwick, the cow-killer, however much I might resemble him in spirit. I mistrusted my infant strength, and doubted much whether I could stop up her nose-holes without assistance; so I straightway let the farming man into my counsels, promising him—what I considered an irresistible bribe not to tell—a very small taste of my first honey; he, however, to my astonishment, did not enter into my views; my cow-killing propensities were divulged abroad, and the

Tunsa per integram solvuntur viscera pellem.  
 Sic positum in clauso linguunt; et ramea costis  
 Subjiciunt fragmenta, thymum, casiasque recentes.  
 Hoc geritur, Zephyris primùm impellentibus undas,  
 Antè novis rubeant quàm prata coloribus, antè  
 Garrula quàm tignis nidum suspendat hirundo.  
 Interea teneris tepefactus in ossibus humor  
 Æstuat: et visenda modis animalia miris,  
 Trunca pedum primò, mox et stridentia pennis  
 Miscentur, tenuemque magis, magis aëra carpunt:  
 Donec, ut æstivis effusus nubibus imber,  
 Erupêre; aut ut nervo pulsante sagittæ,  
 Prima leves ineunt si quando prælia Parthi.

VIRGIL. *Georg.* IV. 295—314.

matter was compromised, and the cow's life spared, by the gift of a stock of Bees. If any excuse were wanted for my infant credulity, I would refer to an extract from the work of a full-grown man, which I have quoted in the Appendix, who declares that Virgil's experiment was in his time repeated with success in Cornwall. I am, therefore, I trust, qualified, by a long apprenticeship to the art, to know a Drone from a Worker, though it be written in a book that I do not.

I wrote a simple unpretending Letter of four-and-twenty pages, for the sole purpose of putting my friends, the Cottagers, in the way of keeping their Bees on a better system. I was careful to say nothing which I had not myself proved ; for, not to speak of the love for truth, which I trust I sincerely feel in common with all good men, I well knew that the adoption of my plan, as a whole, would be entirely marred by the detection of even the slightest inaccuracy in any of the details. I was doubly careful, then, to state nothing but facts. Judge then of my surprise when I heard that my little pamphlet of twenty-four pages was to be refuted, and myself overwhelmed, by a book which would never have appeared had I not

written. My tract, as I have said, was twenty-four pages. The first nineteen pages of this new work were entirely occupied by exposing my inaccuracies, detecting my falsehoods, and warning every one against the adoption of the plan which I recommend, without pretending that it is at all new. Well ! here I am, none the worse for this attack, and bearing no malice against Mr. Smith. I know him not personally, and can only trust that the good travelling title, Mr. Smith, is a *nom de guerre*, adopted for the purpose of this *pretty onslaught*. It has had one good effect on me : it has led me to go over the same ground, step by step, by which I was brought to my former conclusions, and I am happy to say that they are still unshaken. Mr. Smith had better look at home ; for I think that when the Bees are appealed to, they will fail to confirm many of his statements. *Requiescat in pace !* that is, may his book rest undisturbed on his publisher's shelf, for so alone it can do no damage to the poor Bees.

To give one example of a thing which I stated on my own personal experience, in the accuracy of which statement my veracity is of course involved, and in which Mr. Smith attempted that difficult thing, to prove

a negative. I said in my first Letter, "If you want to catch any of the Bees, make a bold sweep at them with your hand, as though there was no such thing as a sting in the world. I have so caught three or four at a time." To this it is answered, "They were Drones, I apprehend. I don't recommend this experiment."\* I repeat, without hesitation, my former statement, and can appeal to swarms of my friends who have seen me among my Bees, whether I cannot do stranger things than this. Moreover, I do recommend the experiment, at least to every one who desires to become the familiar friend of his Bees ; and without being so, no Bee-keeper can be successful. He loses the high pleasure of feeling that his Bees know him, and confide in him ; and is enabled to do fearlessly and promptly whatever they require.

Mr. Smith may have kept Bees twenty years, but I have kept them four-and-twenty, and so by this time may have learnt what a Drone is. Even were I blind, like poor Huber, I could tell one by the sound it makes when flying. I could tell one by the touch, for I can

\* The Cottager's Bee Book, containing Remarks on the Conservative Bee-keeper, founded on Twenty Years' Experience. By Richard Smith, Oxford, 1839.



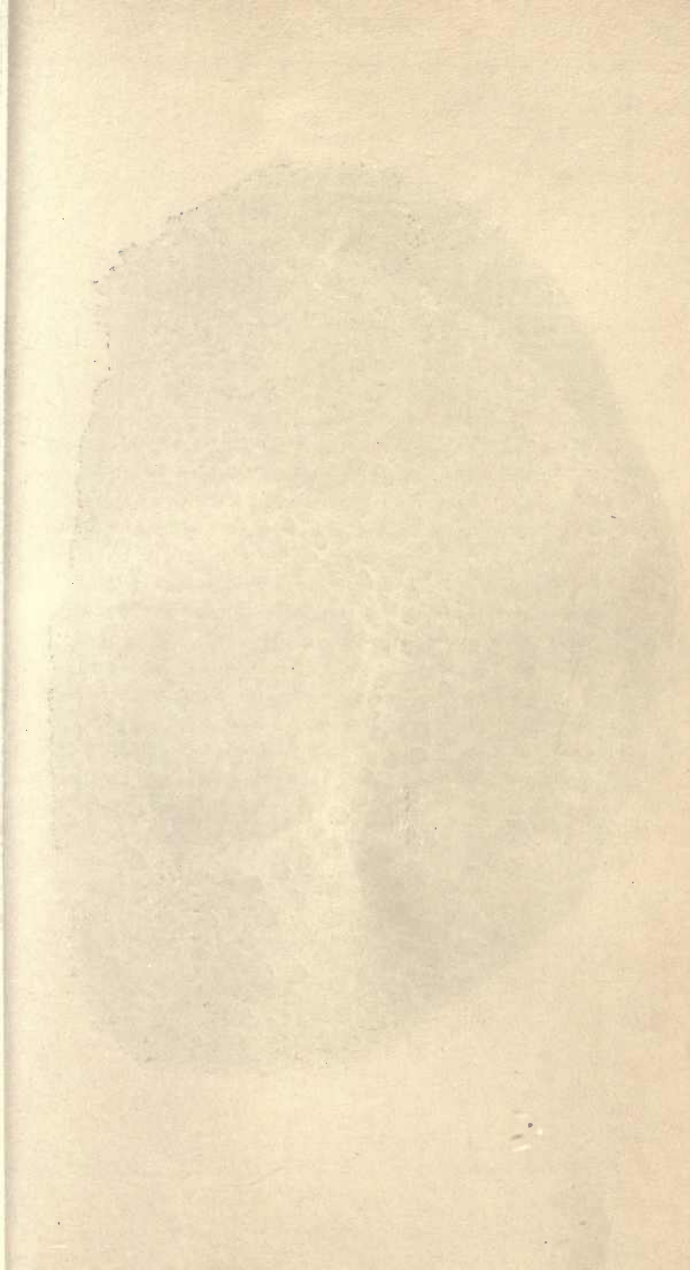
put my hands into a parcel of Bees, and pull out the Drones with my eyes shut.

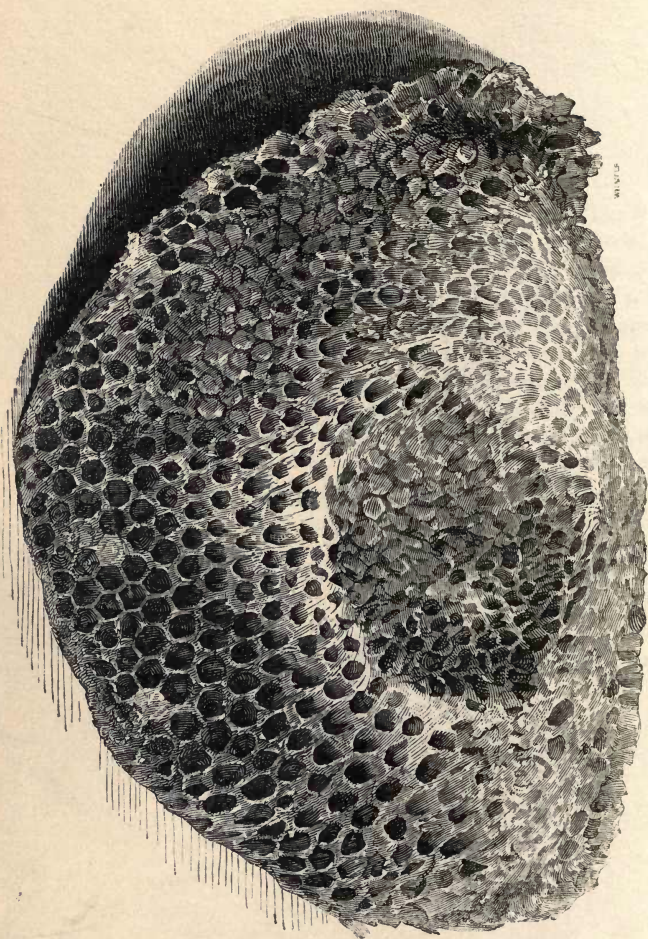
Above all, then, be kind to your Bees, and be patient, be watchful, be ready to learn a lesson even from them ; and then, whether or no you succeed in Bee-keeping, your temper, whoever you are, must be improved. Many a man, out of health and spirits, has gone to bask in the clear sunshine, at the mouth of his hives, and has thus, for a time at least, forgotten his cares or his pains ; with heart attuned to their sweet music, he has learnt fresh confidence in that heavenly Father who “correcteth those whom he loveth ;” and has been led to feel that none of his actions, even the most trifling, are beneath the care of that God who made him as well as them ; who showeth the same wisdom in these small insects as in man, created in His own image—to whom He hath given His sure promise, that “the Lord is good to all, and His tender mercies are over all His works.”\*

\* Psalm cxlv. 9.

A POSTSCRIPT, I have heard from Ladies, often contains the most important part of a letter. I am sure that I have herein to discharge one of the most pleasing as well as important duties which falls to my share as the writer of this Preface, viz. to acknowledge my sincere obligations to Josiah Wood Whimper, No. 20, Canterbury Place, Lambeth, for the great care and infinite trouble he has taken in drawing and cutting the illustrations of this volume. I would particularly refer to the figures of Comb in its several stages, which I think have never been equalled. Whenever any drawing did not please me, it was done again, without one word of complaint. The result has fully repaid me for all the pains I have taken; but I shall have an additional reward, if other students of Natural History are induced to follow my example, and publish the result of their experiments and observations; and I cannot doubt but that many of my readers, when they have finished my volume, will wish to hear from me again, and respond to my parting words,

VOS VALETE ET PLAUDITE.





W. H. P.

COMB, IN WHICH A HOLE HAS BEEN FILLED UP BY THE BEES.



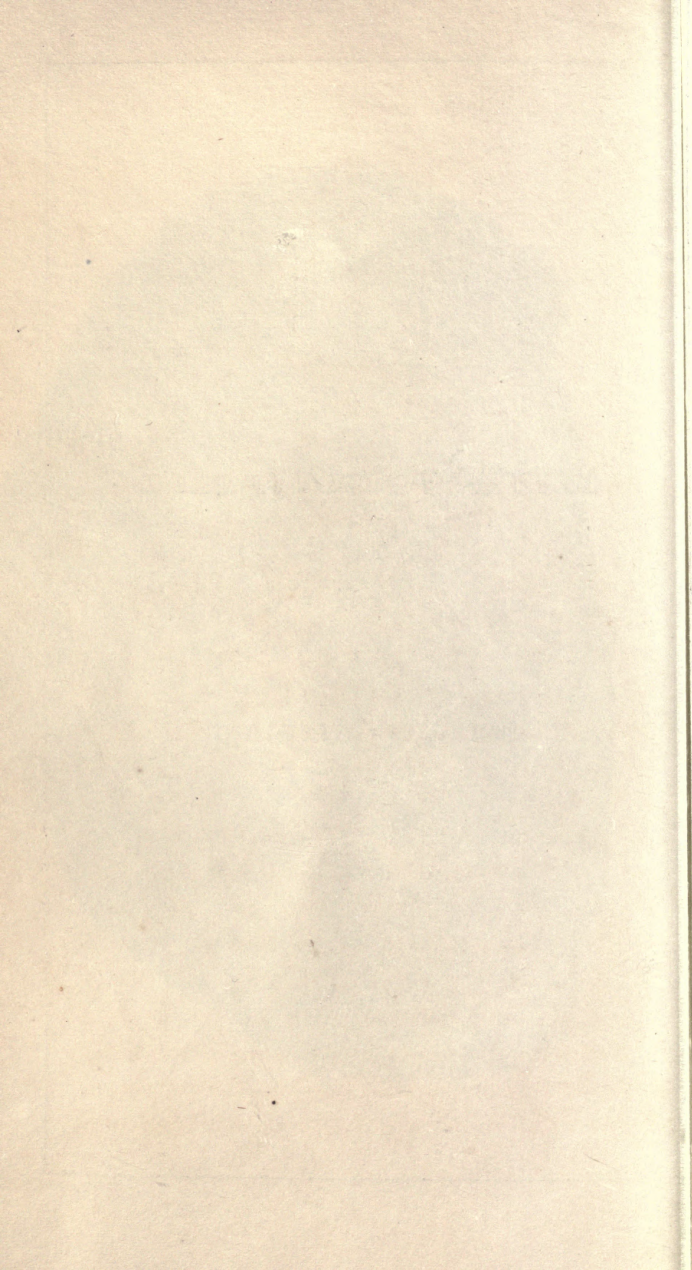
# LETTER TO COTTAGERS.

## PART I.

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On See=Keeping.

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A

# Short and Simple Letter to Cottagers,

FROM

A BEE PRESERVER.



"Sweet dropping words, like honey, he did shed."

SPENSER.

MY GOOD FRIENDS,

NOTHING gives me greater pleasure in a country walk than to hear a busy Bee buzz by my ear, as I pass the fence of a cottage. A row of Bees is

always a good sign. It shows that the owner takes pleasure in his home. He has something to fill up his spare minutes better than the beer-shop, and far more profitable too. Whenever I stop to have a talk with him about the Bees, I always get a civil answer, and thanks for any thing I can tell him.

There is an old and true saying, that it is no use trying to help a man who will not help himself. Now the cottager, who keeps Bees, *is* trying to help himself and his family too; and the help which I can give such a man will most likely come to good. I often hear, that when a man has good luck in the swarming time, and when it is luckily a good Bee year, the money he gets for his honey goes a good way to pay his rent, or to get some warm things for the winter. Now some years are certainly better Bee years than others. Man has nothing to do with the weather. But I wish to show you, my friends, how to make the most of good years when they do come, and that a little *common sense*, with pains taken in a good way, has more to do with the matter than what you call LUCK.

In the first place, then, NEVER KILL YOUR BEES. Many of you will say, "Our father and grandfather did so, and why should not we?" (Now it is a very good rule to do as your fathers did, when



you are not quite sure you can do better, but I hope to show you that this new path is better and straighter too.) “We think it far the best way to burn the lightest and the heaviest. The first would not live through the winter; we may get something from them, and plenty from the heaviest.” This is very well for those who know no better; but I am sure you are all willing to try a better way if you hear of one, as every one of you must feel some sorrow when you *murder* by thousands in the autumn those who have worked hard for you all the summer, and are ready to do so again next year. I myself was told by a Bee-master that he always saw the ghosts of the Bees the night after he burned them; and have heard of an old woman who never went to church the Sunday following. She felt she had done a most cruel deed, and she was right in so thinking, though wrong in staying away from church for this reason. If she felt it a sin, she ought to have gone to church, to pray God from her inmost soul to pardon her, and then gone home, with her mind quite ready to learn from any one wiser than herself a better mode of taking her honey. She might have taken a lesson from the Bee-master about whom I am going to tell you, had she been so happy as to know him. An honest Oxfordshire thatcher, who had all his life long kept Bees, and made a

good profit of them too, was asked by a brother Bee-master why he had got rid of his stock. "Oh," said he, "I am an old man, (he was above seventy,) and like to die soon, and I know I shall then have to give account of the least thing I now do; and so I cannot bear to murder my poor Bees by thousands!" A copy of this Letter was then given to him. He was much pleased with it, and took kindly to his Bees again in his old age; and I hope they will not only help to keep him, but cheer him too, all the days he has to live. But to pass over the cruelty;—if I can show that you may get much more honey without killing your Bees, the least you can do (if you will not take a friend's word for what he himself has done, and seen many others do in England and in foreign parts,) the least you can do is to try the plan with half your stock. Keep an account of what you get from each, and use that plan with all, which after five years gives you most honey.

In France, Germany, Switzerland, indeed everywhere, except in England, they never kill their Bees. Whenever I asked if they did so, they smiled at my question, and said, "Oh, that would never do; we should never keep up our stock!" "How, then, do you get the honey?" "Oh, nothing is easier!" Even in hard things, the proverb holds,

**Where there's a will, there's a way;**

and these very poor cottagers, without half the means we have, never burn their bees; and surely an Englishman is as clever and as little fond of cruelty as a Frenchman or Swiss.

I remember but one place abroad, where they kill their Bees—Chamouni in Switzerland, close under Mont Blanc. The winter there is very long and tedious, and the honey season very short. The honey also is very good, and so fetches a very high price. All these *verys* combine against the poor



Bees. The peasants wish to get every ounce of honey they can to sell to John Bull; so they take up all their stocks directly they begin to wax

lighter, and trust to their friends and partners in the low country to supply them with swarms in the following spring. Then the same system of murder goes on as before. But even here, where the cold makes the case an unusual one, I think a different plan would be found more profitable, as certainly it would be more humane. I do not know whether the plan of keeping the stocks through the winter has ever been fairly tried at Chamouni, but think it would succeed; for a winter cannot be too cold for Bees if they are kept dry. The spring there comes on with a jump, unlike "the spring that comes slowly up this way,"—unpleasant both to English Bees and Englishmen; but there the snow melts, and the flowers are out, as if by magic, in a week or so; and my belief is, that the Bees would come out in full force, all the better for their long sleep, as soon as the flowers are ready for them; but, even if it is found a bad plan to keep stocks all through the winter, they might, by smoking their Bees, instead of burning them, take all the honey which they do at present. They should then send their Bees in a bag or box to Salenche and other places, whence they look for swarms in the spring, and they would get both earlier and better swarms from these united Hives than they have on their present plan; but this one exception rather proves my rule. I know



no other place where Bee-murder goes on abroad as it does amongst us. Let us try to do the same; for what you now think hard, they find easy, though they do it in a rough sort of way. Some of them make their straw Hives with the top to take off, and fasten it down with wooden pegs: in July, they pull out the pegs, and with a large knife cut away the top of the Hive from the combs which are fixed to it, like the top of a pumpkin:\*



they then cut out what honey the Bees can spare, never caring for those which are flying about their heads: for they will not touch them if they have a

\* See the second volume of this work, being extracts from some books in the author's possession.

pipe in their mouth. When they have helped themselves, they peg the top down again, and leave the Bees to make all straight, and gather honey enough for the winter in August and September, which they can easily do in heath countries. Others put another large Hive on the top of a strong stock in May, as is done in some parts of England, which prevents their swarming. This Hive they take off when full. Others turn up their Hives in July or August, and cut out some of the combs. Others, who know more about it, place square wooden boxes one on another, putting empty boxes below, and taking away full ones from the top. I saw a doctor in Switzerland take honey from twelve Hives; he got 15lbs. from each; but this gives coarse honey, as I shall soon show. Some who know more about it, put an empty wooden box in front, and take it when full. These ways are clumsy, much worse than those I am going to teach you, but all better than burning the Bees. Well then, let this be your first rule, NEVER KILL ONE. That you may be able so to do, every thing must be got ready beforehand. You may find in damp meadows a fungus, which children call "Frogs' Cheese," and "Puff Balls." When quite ripe, if you pinch them, a dirty powder, like smoke, will come out. Pick them when half ripe. The largest are the best, and they often grow to the

size of a man's head. Put them in a bag, and when you have squeezed them to half the size, dry them in an oven after the bread is drawn, or before the fire. The fungus is fit for use when it will hold fire like tinder ; keep this dry till the time you take your Bees. Linen rags soaked in nitre will do, when the fungus cannot be had ; but even rags are worth money. The fungus may be had for picking. In the autumn weigh your Hives ; mark those which are heaviest and lightest. This, of course, you cannot do *rightly*, unless you know the weight of your Hives when empty. So always weigh them before you put the swarms into them, and mark the weight on the outside, that you may not forget it. Casts, except they are very early and strong, will seldom stand the winter, or they will be so weak next spring, that they will do no good. When the honey season is over, stop up over night all you intend to take up. These stocks should, if possible, stand next to good heavy ones, to which you may join the Bees in the way I am going to tell you. You should get a little tin box fitted to the nose of your bellows, having a sort of spout coming from it, which fits the door of your Beehive. Take a piece of fungus twice the size of a hen's egg, light it, and when it burns freely, put it into the box ; fit it into your bellows, and blow the smoke into your Hive. Stop that part of the

door up with wet clay which the tin spout does not fill, that none of the smoke may get out. The Bees at first will make a great buzzing; in about five minutes all will be as still as death. Lift the Hive



1 OLD MAID'S SMOKER.

2 BELLOWS AND SMOKER.

3 TIN BOX SMOKER.

4 CLAY PIPE SMOKER.

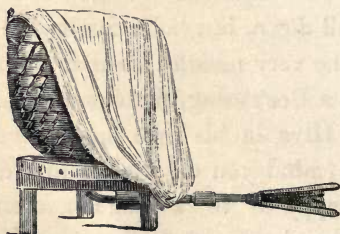


gently off, and turn those Bees which have fallen on to the bottom board into a large white dish. They will be quite harmless and still, as if they had been burned with brimstone; but the fungus does them no harm; it only makes them drunk, which is very good for Bees, though bad for men, as they get well in twenty minutes, have no head-ache next



morning, and are all merrier afterwards, and it was not their fault that they were so *overtaken*. Look for the Queen Bee, which may be easily known from her likeness to the Cut. It is well to have many people round the table to search for her, as also to cut out the combs and sweep the BEES off; for many hands, as well as eyes, are better than one. If you find her at first, put her softly on one side, and sweep all the other stupid Bees with a feather into the white dish. Then cut the combs carefully out, one by one, and if you have not already found the Queen, look sharp for her on each comb. Nine times out of ten she does not fall down, but holds fast to the top of the Hive, in the very middle: so that the sharp man—sharp as a Bee's sting, like Joseph Barnet—who keeps the Hive in his own hands, and cuts the combs out (mind you do it carefully, or you may be so unhappy as to become a REGICIDE,) has a much better chance of finding her majesty than those who are hunting for her among the Bees that have fallen down. If you are only going to take the combs out of one Hive, and wish to make sure that there is a good healthy Queen in the other in which the united stock is to live, you may get a sight of the Queen in this way; we will suppose that she has not fallen down with the rest, for, be the reason what it may, the Queen is stupi-

fied by the fungus less easily than the vulgar herd, either the Bees in their loyalty crowd round her, and so ward off the fumes as long as they can, till they themselves drop, or she has a stronger constitution than the rest; be this as it may, she very often does not drop from among the combs. In order to get a sight of her, turn the Hive upside down, combs, Bees, and all; then blow a little smoke through the bung-hole in the top of the Hive, which is now the bottom, put a thick cloth over the Hive, and the Queen will be among the first who will crawl up to its upper edge; seize her,



USE HER TENDERLY, FOR ON HER the lives and happiness of thousands depend; then go on with your work. Pour the Bees all back into the Hive from which you have cut the combs, and set it in its old place till the evening. You ought to leave little bits of comb sticking to the top of the Hive, about which the Bees, whose honey you have taken, will cluster like a new swarm; they will set about

clearing out the broken bits of wax and putting the Hive straight, as fast as they can. Anybody who does not know what you have done, who comes into your garden, would think this your strongest stock, instead of being a kingdom of paupers without a Queen. In the evening blow a little smoke into the strong Hive which stands next to them: when the Bees are a little quiet, turn it up gently, and pour some large spoonful of honey and water, or sugar and ale, into the combs where most Bees are clustered together. Put three bricks on the bottom board, so that when you set the Hive down again, no Bees may be crushed; then take the Hive from which you took the combs in the morning, and, with one smart blow, knock all the Bees out upon the bottom board of the strong Hive whose Bees you have sugared. Set their Hive gently in its place on the bricks, over the Bees which you have just knocked out; they will begin to lick the first drops of honey which trickle on to the board, and will be led up by the scent of that which you have poured into the combs, to mix themselves with the other Bees.

They will take to one another when they have helped each other to clean off the sugar with their tongues. The fact of their helping each other in their troubles makes them friends, just as it does grown men, and children, who are small men

and women. Or, to give you a still easier way: turn that Hive topsy-turvy from which you have taken the combs, and in which the queenless Bees are; tie a wet cloth round the part where the two hives join, after you have sprinkled the Bees, who are to be married, with some honey sweets; this will draw the others up, and it will be all right by morning; then put the married Hive back in its place. Those cottagers who cannot stand sixpence to buy the tin smoking-box, may blow the fungus smoke into their Hives in any other way they please. I have seen it done with a tobacco-pipe, made three or four times larger than usual on purpose. The smoker puts the bowl into his mouth and puffs away. This cannot be very pleasant, though it answers very well. To give you another way:—An empty Hive may be set topsy-turvy in a pail, to steady it. A lump of the fungus may then be stuck in a stick, split at one end, and made sharp at the other. The fungus must be lit, and the sharp end of the stick stuck at the bottom of the empty Hive; then place the Hive to be smoked over this, and tie a wet cloth round, to keep the smoke in: of course the two Hives must be the same size, or this plan will not do. In a few minutes the Bees will begin to drop down, and you will hear them rattle at the bottom of the empty Hive like hail; tap it a little, and they



will drop thicker; when they are all quiet, take the Hive off, and treat them as before. The bad part of this plan is, that some of the Bees are sure to fall on the burning fungus, and I am sure you would be very sorry to kill any one of them; so if you cannot get a tin-box to fit into your bellows, or the smoking tin, or the tobacco-pipe, try this plan; light a lump of fungus, and put it on a saucer, place a cup topsy-turvy over it, to prevent the Bees falling into the fire; a piece of wood must be put under the cup, to keep the edge up, that the smoke may rise; then place this old maid's smoker,—for cups and saucers are old maid's peculiars,—in the Hive which is topsy-turvy. The last plan is the simplest, costs nothing, for the cup and saucer may be returned unhurt if unbroken, and is therefore the best. All this may be done in less time than I have taken in writing about it, if you have any one or two people standing round you to help you: you will not get a single sting in doing it. Remember the old saying,

**Too many Cooks spoil the broth:**

they spoil Bees too; so do not let many people crowd into your garden, besides those who are there to help you; except some neighbour who is a Bee-keeper wishing to learn the plan, AND THEN YOU SHOULD BE WILLING TO TEACH HIM ALL YOU

KNOW, JUST AS I HAVE SHOWN YOU THIS BETTER WAY.

The best way to join two casts is to smoke them both, and then pour the Bees from two dishes into a large milk pan, first some of one and then some of the other, sprinkling them gently (not enough to daub them) with a little honey and water. Take away one Queen, and then put the united parcel into a Hive with one comb fastened to the crown of the Hive. This will make them take readily to one another, as an united and loving family to their new home. You will thus get a good, strong, and profitable stock, instead of two weak and comparatively worthless casts. Always do this with your casts, if you chance to have two, on the same or following day; but make this a standing rule, never keep a cast in a Hive by itself; either join it to another, or marry it to one of your stocks which wants strengthening; or, if you do not know what to do with it, give it to one of your neighbours, that he may start Bees. You may make him, or one of his children, a little fortune, without hurting yourself; for, with care, a cast taken to a good Bee-place, which is up to that time unstocked, may become the founder of a vast colony.

By carefully following these directions, any cottager may be saved the hateful task of becoming executioner to his own Bees; indeed, the common

way of taking honey is as if a shepherd were to kill his sheep for the sake of the wool. It is the story of the golden goose acted on a large scale, only in this case the murdering Bee-master is himself a very sorry goose. By following my directions, the cottager gets all the honey he would obtain by the old, cruel, and wasteful plan. Always join your weak stocks at swarming time in this way. Even if you are lucky enough to have none weak, always unite your casts to a Hive which, though strong, has plenty of room, FOR THE SAME NUMBER OF BEES (as I shall show you soon) WILL DO MORE GOOD TOGETHER THAN THEY WILL IN TWO PARCELS; but, above all, never use the sulphur match in the autumn, now you know my better way; if you do, you deserve to be sulphured yourself, for

*The Merciful Man is merciful to his Beast,*

and so is the merciful Bee-master to his Bees.

The most wonderful thing is this,—that A DOUBLED HIVE WILL EAT NO MORE HONEY IN THE WINTER THAN A SINGLE ONE. The reason of it seems to be, that where there are many Bees in a Hive, they can keep warm by hanging close together, instead of eating; so that, in a full Hive, the same quantity of honey goes further than in a weak one, as each Bee eats less. They keep them-

selves warm from the outside, and so do not require to be heated in the inside; as a man who can, by keeping Bees, or any other honest way, have a good coat on his back, is warm enough without a brandy bottle. This alone would show how good the plan is. It was found out one hundred years ago by a Mr. Thorley, and was always used by him. The wonder is, it has not been *more used*.

Make your Hives with a hole at the top, an inch and a half over, with a bung to fit into it. This is needful for the plan of capping, which I am now going to teach you. In May, when your Hives get full of Bees, and they begin to hang out, put a small straw Hive, which will hold about 10lbs., on the top of the strong stock, after you have pulled out the bung from the hole at the top. It should have a bit of glass worked into the back, that you may see when it is full. In good places, or where honey-dew is plenty, the Bees will fill it sometimes in a week or ten days. Directly it is full, take it off, it will be white honey; and, as the first in the market, will fetch at least sixpence, sometimes a shilling more than that taken in September on the old plan. "Well, Barnet, what have you made by your Bees this year?" "Oh, Sir, not much, for the latter part of the summer, as you well know, has been very bad for Bees. But, thanks to God and my little caps, I have still



made a pretty penny by them. I took some caps, some of them weighing 10lbs., and, as we had a very fine May, they were quite full, and perfect pictures. I got two shillings a pound for them from the Oxford gentlemen. The summer and autumn have been so wet, that my stocks have no honey to spare, though I hope they will get safe through the winter; and I shall have a rare stock for next year, if God pleases to send us a good Bee year, for we have had none of late." These little caps will give room for the Bees to work, who otherwise would hang out idle at the mouth of the Hives, waiting for swarming. I have had them hanging out for a month together. The Bees do not know the time when the Queen will be ready to swarm. Even when she is ready they are often kept back many days by clouds or winds; and they are too wise to tire themselves by work on a day when they *may* have a long journey to go in swarming. Not only are they idle, but the other Bees are forced to feed them; for every Bee that goes off with a swarm has his stomach full of honey, which is taken from the common stock. By means of the cap, you make those Bees work for you, who would otherwise be idle.

The cap must not be larger than the size I have told you. If you put on a full-sized Hive, as done abroad, p. 66, you give them so much room, and

make the Hive so much cooler, that they will not swarm at all. But this cap will not make them swarm one day later than they would otherwise do. Besides, if the cap is too large, the Queen will lay her eggs there also ; and when you take it off, you will find black combs instead of virgin honey. This is the most simple and easy change in the common way of keeping Bees, which any one may try.

So much for the stocks which you wish to swarm. I will now show you, that when you have once got your stock up to its full number, it is much more profitable *to prevent their swarming*. I am no enemy to Bee-swarmling ; far from it. There is no pleasanter sight in a garden than to see a Bee-swarm : there are no pleasanter sounds than those which wait upon your Bees when they swarm. Keep some good stocks for the sole purpose of swarming ; they will keep up your Hives to their full number. Do your best to prevent the others from swarming, and then they will be profitable to you. And as to the number of stocks, few cottagers keep enough ; there is hardly more trouble in taking care of twenty stocks than two. In Germany I saw a man, in a good honey country, who had two hundred ; he managed to keep them all rich, and so to make money of them, by changing their place as the honey season varied. Sometimes he sent them to the moors, sometimes to the meadows,

sometimes to the forest, and sometimes to the hills. On the old plan of burning the Bees, a cottager's stock is sometimes large, sometimes small. After a bad honey year, he is often tempted to burn many of his good old stocks, in order to make up by numbers the same quantity of honey which in better years he will get from few.

Suppose he leaves three stocks, of which two stand the winter, and the next year turns out a very good Bee year, he is then not ready to make the most of it,\* and of course only gets one-tenth of the honey which he would if he had twenty stocks, as he ought to have. Man has nothing to do with the weather, as I said before: and I am very glad of it, for I am sure it is managed much better as it is. All I can do is to show you how you may make most use of a good year, get a fair quantity of honey in a middling year, and not lose all your Bees, as many people do, in a bad one. It is found that in ten years, four are very bad years; four middling years; and two very good, when almost any quantity of honey may be got on a good plan. 290lbs. have been taken from one stock, without hurting the Bees, by a method which I will teach you presently; while the heaviest cottage Hive I ever heard of was under 100lbs., and this was not a first year's stock, so the

\* This happened to me in the capital Bee year, 1832.

honey was not of fine quality. I just now said it is better not to let all your Bees swarm; this you don't think; but wait a little, and listen to me. If I with ten stocks get 60lbs. of honey, which I easily can, from each, without destroying one of my stocks, am not I better off at the end of the year than you, whose ten stocks have all swarmed, and who, when you take up all the swarms in the autumn, think yourself well off if you get 20lbs. from each? You get 200, I get 600lbs. of honey. But I will show you how to be as well off as I am. I have said it is best to prevent swarming: now hear the reason. The Queen Bee lays from 10,000 to 30,000 eggs in the year. In a stock containing 3000 Bees, almost all of them in mid-dling years will be busy in nursing the grubs, *for they are such good mothers that they think it their first duty to feed their young*; gathering honey is their second. A swarm goes off: you have two Queens, each with 3000 Bees, busy in rearing the eggs which the two Queens lay all through the summer. They have no time to gather honey, and so in a bad year, a stock with plenty of Bees in it will be often almost empty and worthless when you take it up in the autumn, and sometimes even die in *the summer* if it is not fed. In Sussex I saw a man who took up four stocks in the autumn of 1838, and only got 6lbs. of honey from them

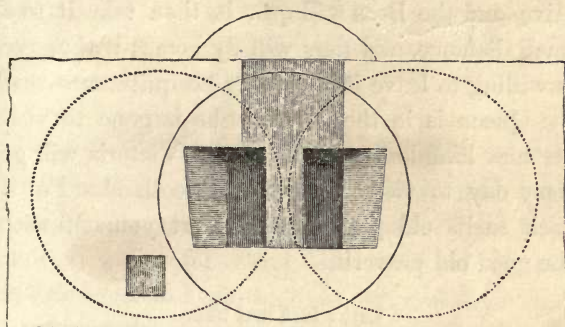


all. Now, if you prevent swarming by giving them plenty of room, 3000 Bees, who were nurses before to the grubs of one Queen, will be enough to do the nursing work to the Hive, though it be so much larger; for each Hive has only one Queen, and one Queen cannot lay eggs enough to require more nurses, though two may. The other 3000 will store honey for you in the spare room you give them, which you may take as I will show you. But before I fully explain my own plan, as I am going to speak of bottom boards, I will say that stone and slate stands, I think, are very bad for Bees. They are too cold; the Bees which in the winter come down upon them get chilled, and cannot get up again. Wooden bottom boards are far best, as well as most handy; the harder the wood is, the better, as it is less liable to dry rot.

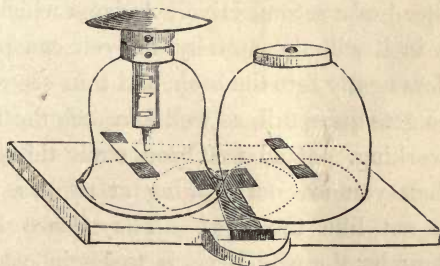
I will now teach you a plan by which fresh room (more than a cap can give) may be added to a straw Hive; it acts as well as side boxes, and costs less. Side boxes were invented by the Rev. Mr. White, a hundred years ago, and the plan I am now going to teach you is so simple, that any cottager who can use a chisel, or even a knife, may make his own bottom boards. Its great merit is, that it *costs nothing*. It all hinges upon making the Bees of a Hive, which in May would swarm, on the old plan, pass into the

open air through an empty Hive, which is a sort of *entrance-hall to the full one*. A strong stock will soon take possession of this new land, instead of being forced to the painful step of sending out a colony, and thus seeking a new home. This seems as painful to Bees as it is to Englishmen, for they avoid it whenever, and as long as they possibly can, though it must often be done by both. My plan is, as if an empty country, as big as England, were by some magic art moored alongside our little isle, and were to present an open field for our over-teeming people. Such a move would doubtless increase the happiness of Old England as it does that of the Bees. As the matter now stands, Canada or New Zealand must be the Englishman's home, just as the new Hive is to the Bees. You do not like to leave your own fire-side, and go many miles across the rough sea, unless you are forced to do so; but many more of your children must make up their minds to quit their own fire-side, unless God sends a plague or a war to cut us off by thousands and tens of thousands at once. This cure for the evil none of us, I hope, wish to see, though we must take it patiently if it comes. We must send out Colonies, for England cannot be enlarged as a Bee-hive may. I will now teach you how this may be done. It sounds very pretty in writing, and would be as pretty in prac-

tice if you will but try. Look at the wood cut. The bottom board is made so long that two Hives



can stand on it, side by side; the ring in the middle shows the place where your old stock must work during April and the beginning of May.



When it gets so full of Bees that it will soon swarm, shift the old stock to the right, and put an empty Hive on the other ring to the left. Stop them nicely round; the Bees will soon become used to their new house, and you may take

it as soon as it is full. Nothing is easier: you have only to blow a little smoke into the new Hive, and the Bees will quit it, then take it to a small distance, and they will fly home; if they are unwilling to leave it, you may be quite sure that the Queen is in the Hive. She is gone to visit her new kingdom, just as Queen Victoria will go some day to visit Ireland and Scotland. Put it back to its old place, and comfort yourself with the good old proverb,

**Better luck next time.**

Try again some fine day, and you will find, I hope, the Queen in her own proper home. Any old box, or a large flower-pot, will do to put on, very well, instead of a second Hive. A drum which has had figs in it will do capitally, for you can put a bit of glass neatly into the back, and thus see when the Hive gets quite full, as well as watch the Bees whilst working. Mind that you cover this glass over, when you are not looking at them, as the Bees do not like the light. The square hole, which is under the new Hive, is to let in cold air for ventilation, of which I shall talk to you presently. A plan something similar to this is mentioned in an old book on agriculture, printed in 1681, by Thomas Dring, at the corner of Fleet Street; but it failed, from the ignorance which the



author shows in it, on many points, about Bees. I am glad, however, to find that some one else has thought of that before, which was found out afresh by a clever Welsh gardener, Robert Jones, in the summer of 1837.

*Necessity is the mother of invention.*

He found it so, as others. The man mentioned in Thomas Dring's book put a glass Hive in front of his full straw Hive, and did not put on any cover to keep the light out, and then wondered that the Bees did not take to it kindly. It would have been odd if they had done so. But Robert Jones covered his glass, and so the Bees straightway took to their new home.

A board should of course be fixed to the top of the straw Hive, to carry the cap. It should be strong, so that it may not warp. If you make it of inch and a half stuff, you may drive four auger holes from the outside into the hole by which the Bees pass from the full Hive. Nail a piece of zinc with holes in it, at the end of each hollow way, to prevent the Bees passing through them into the open air.

Now, the black mark in the left-hand side of the board (p. 77) is a square hole cut in it, with two bits of zinc sliding in it, one full of holes, the other without any. When the Hive gets hot, pull out the one without holes; open the hole at the top of the

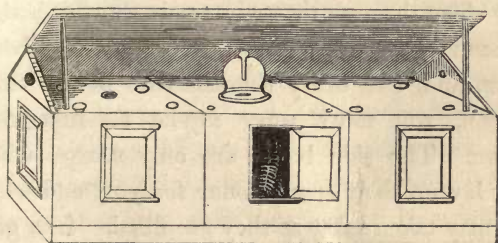
Hive, and put something full of small holes there, to prevent the Bees coming out, or insects getting in. A piece of cotton wool will do. You all know hot air goes up; so there will be a free draught through the Hive, which will keep the Queen away, and make the Bees work all the better. A little care in opening and shutting these holes will keep the honey quite pure. And this is what *ventilation* means. Side boxes should be ventilated when the thermometer is at 70°, not before. A cottager must guess at it, if he cannot get a “thermometer,” which means a measurer of heat, and costs about four shillings.

This plan of ventilation may also be used with the small caps, or glasses, if you have any. They sometimes get so hot (for the heat, as I said before, all goes up) that the Bees cannot stay in to work. Fit a cork to each hole on the outside. When the cap gets too hot draw them out, and the cool air will pass into the cap without altering the heat of the Hive, or hindering the hatch of the young grubs. If this does not make it cool enough, take a turn with your smoking bellows, if you have a pair. You must every now and then poke a piece of pointed wire down these holes, to clear out the gum with which the Bees will stop up the holes in the zinc. Like men, they do not know what is best for them. But in this act you are wiser

than they, though I fear not always; if you do not give in to them, they will be forced to give in to your better way.

Cannot you, whoever you be that read this, take a lesson from the Bees, by giving in to those who are wiser than you? I have already learned something by this lesson, and I trust to get it by heart more perfectly every day I live.

The next cut is a wooden Hive, acting on the same plan of ventilation and side room. Now some of you do not fancy wooden boxes, because you say the Bees do not like them. Now I would ask whether wild Bees live in *wooden* trees or in



trusses of *straw*? Believe me, they choose what is best for them. They choose wood; and wooden boxes, if thick enough, are warmer in winter, cooler in summer, freer from insects, and more handy than straw Hives. Only try it. If you can use carpenter's tools, make them at spare times. Have them strong enough; and never

mind turning out a rough job at first, if you do your best.

**Use before beauty**

is a good old saw. To be sure, they cost more to buy than straw Hives ; but I will show you that with boxes like the wood-cut, you may pay what they cost the first year, and leave some profit besides ; and then the second year, and ever after, all is gain. The Bees are swarmed into the middle box, and never after disturbed. It is to be as hot as they choose to make it. There the Queen lays her eggs ; there the nurse Bees do their work ; there they lay up honey sufficient to keep them through the winter ; there they sleep through that winter ; in short, it is their NURSERY, their DINING ROOM, their PALACE, their HOME, and, like every Englishman's home, THEIR CASTLE, FOR THEY MUST NEVER BE DISTURBED THERE. The side boxes are only BARNs, where they lay up their spare honey for you, and which you may take as fast as they are filled. In a good honey year, you will often get a box weighing thirty pounds, early in June. There is a slide at the top and bottom of the middle box, working from the front, which opens or cuts off the way from the centre box to the side. Always keep one of the side boxes empty. As soon as the one on the right hand gets pretty full of honey, and the Hive so hot that if you do not give them more room



they will soon swarm, pull out the slide, and let the Bees into the left-hand box ; this will make them cooler. As soon as they have taken to this new BARN, carry off the full one, as you took the hive, page 78. Empty it, and place it back again, to be used as soon as the left-hand one gets full. The boxes must each be about eleven clear inches on the inside, by nine inches high. This is the best size for common use. In very good honey countries, they may be made a little bigger; but this size is more handy, since you are able to meet more quickly any order for honey early in the year, and so get a better price for it. In June a box of this size is often filled in three weeks, where there is plenty of honey-dew on the oaks and lime trees. I have made what I think a still further improvement, since I wrote the first edition of this Letter, in the make of side-boxes. The worst part of them is, if they are made full size the Bees are not able to fill them, in a middling summer ; if they are made smaller, you do not get in good seasons so fine a box of honey as you otherwise might : so to meet both these difficulties, I have shifted the wooden end of the side box from the place where it used to stand, next to the *castle*, into the very middle of the side barn. This is good in two ways ;—there is not, on this plan, a thick double wooden wall between that and

the castle. This is the first good; the second is not far behindhand. By means of the partition placed on the middle of the barn, I can, by pulling out the slides which run in, in the middle of it, give the Bees a barn big enough to store forty pounds of honey, instead of about twenty, which the first half would hold. Always keep the slides in, till the Bees have taken well to the first half; then draw all these out, and if honeydews are plenty, they will soon take to the second. Mind, the Hives should be as hot as possible when the combs are building, and as cool as possible when honey is being stored. So, as soon as the barn is two-thirds filled with comb, push the top slide in altogether, the middle slide almost all the way, and leave the bottom one, quite open. Do the same with the passages from the middle Hive; this will let the heat pass from the centre box while the combs are building; and when all the slides but those at the bottom are pushed in, the side boxes will be kept cool, and the Bees still have a free passage by the bottom slide. Boxes are also far more safe than the common straw Hives in those places where there is much of that cruel and wicked thing, *Bee stealing*. I say cruel and wicked, because I think so. All stealing is wicked, and so Bee-stealing among the rest; and it is most cruel both to the poor Bees, and

also to the Bee-master. I can imagine no greater picture of misery than a poor Bee-master, who gets up on a dull November morning, and then goes straightway to his Bees, with the intent of doing something among his Hives, and finds them all gone or destroyed. He sees all his rich stocks taken bodily away, and the poor ones thrown on the ground as not worth stealing, though they were worth half a sovereign to him, for they would have swarmed next summer. He sees the poor Bees of these stocks crawling about the ground, half-numbered with the cold, and wondering what in the world has disturbed that sleep, in which they had quietly settled, for a long winter. Happy is he, if, by collecting the Bees which the robbers have shaken out on the ground, from the rich stocks which they have taken, as well as from the poor ones which they have left, happy is he if he can find enough of these poor misused beasts, or birds, if you like, to put into one Hive, under one Queen, maltreated, like her subjects, to enable them to live through the winter, and start afresh in the spring. I know not what punishment the law gives to Bee-stealers: beside being guilty of stealing so many pounds of honey, which bear a certain marketable value, they are also guilty of *Apicide*. I should think such a man met with no more than his deserts, if his

wicked intentions were by some power revealed to the Queens of ten hives against whom he meditates this foul treason, and they were straightway to issue their orders to their faithful subjects to sting that man within an inch of his life, fixing as many of their stings as possible, quite close to the Bee-stealer's cold and insensate heart. I know not how many Bee-stings can be planted within a square inch, but I remember that some learned schoolmen gravely maintained that a certain number of angels can stand upon a pin's point. I would leave such triflers to settle such like questions among them. All that I know is, that when they have settled the number, I will engage that my Bees shall plant the same number of stings in an equal share of the miserable Bee-stealer's body. A greater punishment man, at least, cannot inflict upon him. I know not its extent, for I happily have never been so far at enmity with my Bees as to provoke their just fury. I cannot trust myself further to paint the poor Bee-master's grief, who is made the victim of such miscreant Bee-stealers; so I give you a sketch of the scene which his garden presents, on such a fatal morning. Taught by the fate which awaits many a poor man's Bees, I beg you,—for

Prebention is better than cure,—

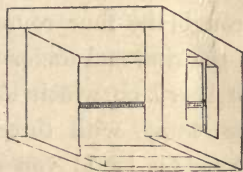


to make the bottom board fast to the stand with a bit of strong iron hoop, and a few good nails ;



fasten the box itself to the board in the same way ; and then you may give the cleverest Bee stealer leave to do his worst.

To come back from this talk about the poor Bee-master, to his side boxes, here is one of them



turned upside down, that you may see the board with the three slides in it, fixed in the middle. You see it has no end, but will fix close to the

middle box. I have, at p. 77, given a drawing of the ventilator. It is made of two pieces of zinc, the lesser fitting loosely inside the larger; which should be about an inch and a half over, more or less. The larger one has holes an inch and a half over, punched all the way up; it is also open at the bottom. The smaller pipe is full of small holes, through which the Bees cannot pass. The use of the large pipe is to prevent the Bees stopping up all the holes in the small one. The hot air will go through these big holes, or in at the bottom, and so out through the little pipe; the little pipe is closed at the bottom, to prevent the Bees going through. You must, however, every now and then pull out the little one, to clear out the holes. Over all is a tin cap, fitting like the top of a box, with an overhanging roof, to keep the rain off. It must be raised up when the Hive is too hot, and then the warm air will pass freely through the four round holes which are punched in the rim, and under the over-hanging roof. The board on which the three boxes stand should be strong, with three square holes cut in the bottom, (as I told you when speaking of the other bottom boards,) with tin slides working in them to let in the air. No air must ever be let into the middle box, on any account. But still the hole is of use in joining other Bees to

your strong stock, and for many other uses which a crafty Bee-master will soon find out,—

Try again,

being his standing rule.

The Hive should be made of very strong stuff, for the price of the wood is small when set by the side of the labour. If made strong, and well painted, they want no Bee-house; they will stand any weather. Indeed, without thinking of the cost of making a good Bee-house, I would rather that Bees should be in the open air. In spring, the close Bee-houses keep off the warmth of the sun's rays, so useful for hatching the early brood. In summer, they get so hot, that the Bees are forced to hang out long before they are ready to swarm. They often build combs on the outside of the Hive, and inside the house, instead of swarming.

These Hives were first brought into general use by Mr. Nutt. Side boxes were, however, made one hundred years ago by Mr. White, but without ventilators, which is the *grand thing*. He was the first box Bee-master I ever heard of,—so a cottager who wishes to take to this plan, cannot do better than begin where he left off. You will see directly how much easier it is for the Bees to store their honey in a side box, than in one Hive put on the top of

another, if you think how you would like to stack your corn up four pair of stairs instead of a ground-floor barn. Besides, it is much easier to keep a side box cool, than one Hive when put upon another. The fanning which Bees make with their wings on a hot day at the door shows how they like coolness. You often see hundreds hanging out when it is too hot to work; and cases have even been known, where the combs, made soft by heat, have fallen down, and smothered the Bees. All this is prevented by that hard word—VENTILATION.

The long continuance of severe cold in the winter of 1837 was very good for Bees—as it is only *damp* cold which hurts them. If the warm sun is carefully kept from them in the middle of the day, they will remain asleep, and the Hives will be found to have lost very little weight during the last six weeks. But if they are left where the warm sunshine can tempt them out, the east wind will catch them *by thousands*, and they will fall by thousands, without strength to rise. A curious fact fell under my own eyes, showing the great heat which they keep up during the coldest weather, and how much better the wooden boxes are than straw Hives. At the mouth of one of my boxes made on Mr. Nutt's plan, I saw, on the morning of the 22d of January, after two days



of most severe frost, an icicle, several inches long, hanging from the lighting board, along which it stretched, like a frozen river, to the mouth of the Hive, *but no further*. This proves that even when the thermometer is at zero, as it had then been in the open air, the Bees have the power of keeping their own heat above the freezing point, or 32 degrees. Their breath, after having been turned into water by the cold, ran down along the bottom board, which was *purposely put sloping* to throw out the wet, in a stream of warm water, to the mouth of the Hive, and there froze. My straw Hives had nothing of the sort; their moisture was all sucked in by the straw, and then frozen; when the thaw comes, the wooden box will be drier, and so more healthy than the straw Hives.

Your Bees, now, I will suppose, have done well in the summer. The place where you put them in the winter is of no less matter. If they are left in their summer place, fronting the sun, every bright day, even in December, tempts many out. They find nothing, are of course more hungry, and eat more on their return. Many of them never get back; when they get out of the warm sun into the cold wind, they fall stiff, and die. You may have seen hundreds lying on the ground about your Hives: if you pick them up, and warm them in your hand, they will come to. If you are afraid

of warming them in your hand by your breath, which you ought not to be, gather them into a small chip-box, and put them in your pocket for an hour or so. This will act like a vapour-bath on a man who is half-dead from frost. Then turn them out, when they begin to buzz, on the lighting-board at the mouth of your Hive. They will then, with a merry song of joy, and thanks to you for your kindness, speedily rejoin their fellow-subjects in the Hive, who have not suffered from the frost as they have done, or been revived by the care of a good Bee-doctor such as yourself.

In damp places many Bees die of the rot. Even in dry places a good deal of water settles on the top of the Hives inside, made by the breath of the Bees. The following is a good way to prevent this harming the Bees. When you put your Bees into their winter quarters, take the bung out of the hole in the top, and put a tin on the board on



which the cap stood in the summer. It is an upright ring, standing on a flat plate of tin, or

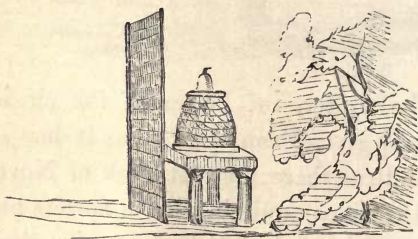
zinc, with a hole through the middle. Over this turn a glass topsy-turvy. The hot air comes up through the hole, turns into steam, and runs down the glass, outside the upright ring.

The best place to put Bees in is a *dry, cold, and dark room, or out-house*, if you can get it. (The



colder the winter, the better, if the air is dry. Damp cold gives them the rot, as it does sheep.) Put your Bees there the last week of November, and let them sleep quietly till the flowers begin to come out at the end of February. Set their bottom board slanting, that all the wet may run out at the door; or, still better, hang them up in a coarse cloth. This will let in the air, and suck in the water, which will soon dry away. Weigh them before you put them into their winter

quarters, and again when you bring them out, and you will find them much stronger, as well as heavier, than any you leave on their summer stands. Again, I say, try it, even if you do not believe me. If you have no such room or out-house, at least keep the sun away from them, or put them on the north side of your house, if the place is dry. The old Oxfordshire thatcher, mentioned at page 61, had long done so. He had learned this plan by always finding hornets and wasps laid up for the winter in the north side of the thatches which he pulled to pieces, and never in the south. Bees have lived very well through the winter, when buried; and this you may try, if you please, only mind you bury them



in a dry place. The best plan is to dig a hole, put dry cinders into it, half a foot thick; place your Bees, tied up in a cloth, on the cinders, and then fill up the hole with cinders to the level of the ground; then thatch the mound of cinders,



which should rise above the ground, with some straw, to prevent any wet trickling through. In Switzerland a whole village clubs together, and hires a cold dry room, which they darken, and put all their Bees in. Why should not any of you, who has such a place, take his neighbour's Bees in during the winter? But mind you mark them first, that each man may have his own in the spring. Nothing like the good old golden rule,—

**Do as you would be done by.**

This will come in, a hundred ways in Bee-keeping. In olden time, any man who wished to begin had no difficulty in borrowing a swarm from a neighbour; a year or two afterwards he repaid it by a first swarm, with from five to ten pounds of honey for interest, according as two or three years had passed since he borrowed. Why should you not do so too? If you thus help your neighbour all you can, you are none the worse off because he gets a share of the honey, which would otherwise be wasted: he is all the better, and so are you too, because you do him a kindness,—and no kindness is easier. If more cottagers kept Bees, much of the honey, which is now wasted, would be gathered. I have taken the trouble to see how much Bee produce is brought into England every year from foreign parts. It is 32,000*l.* in wax alone, besides honey. Every

sixpence of this might go amongst those to whom it is of the greatest consequence, namely, the cottagers. There is an old saying, that—

**Charity begins at home,**

and so it may well do, if it does not end there. Let your charity then enable your neighbours, together with you, to get a fair share in that money, which otherwise goes out of the country. The flowers, too, are all the better for the honey being taken. *So to a kind man, the more he gives, the more he has to give, because he has a blessing on what is left.* I heard a farmer say, that his orchard bore double the crop it had done before he took to Bees. And what is the reason honey is found in flowers? Its only use—rather, its chief use—is not for men to eat, but to draw Bees and honey-eating flies to the flowers. They carry the farina, or dust, on their legs from flower to flower, which makes them bear fruit. If there were no Bees, or flies, there would be no apples.

Some of my readers may be much pleased by the following proof of the advantage of a cold, dry, and perfectly dark place for putting Bees in during the winter months. Six stocks of Bees were hung up in a room, darkened on purpose, in the neighbourhood of Oxford. They were weighed

on the first of every month, and I give below, in a tabular form, the weight at each date, the loss of each per month, and the total loss :—

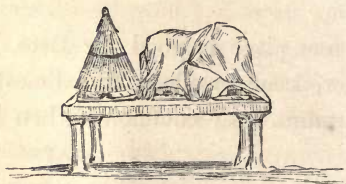
											Total Av. loss.			
	Dec.	Jan. loss.			Feb. loss.			Mar. loss.			loss. per m.			
No.	lb.	lb.	lb.		lb.	lb.		lb.	lb.		lb.	lb.	oz.	
1. weighed	34½	...	33	1½	...	31	2	...	29½	1½	...	5	1	10
2. —	23	...	22½	½	...	21	1½	...	18½	2½	...	4½	1	8
3. —	26	...	25	1	...	23½	1½	...	20	3½	...	6	2	0
4. —	40½	...	38	2½	...	35½	2½	...	34½	1	...	5¾	1	15
5. —	29	...	28	1	...	26	1½	...	23½	2½	...	5½	1	13
6. —	26	...	24½	1½	...	23	2	...	18¾	1¼	...	7¼	2	7
Total loss of six Hives.....											34	11	5	

Here we see that the Hives only lost 5lb. 10½ oz. per Hive, or about 1lb. 14 oz. per month. They were taken off their bottom boards, and a coarse cloth tied round them to admit the air, and then hung up in the room, which was dark, as dark as night.

Again: one place is good for Bees, in spring and summer, near meadows and lime-trees; another in autumn, near commons, when heather is in bloom.

In Switzerland you often see a man trudging the mountains with a Hive of Bees on his back; so well do they know how good change of place is for them. He takes it to a good Bee district, and leaves it there for a month or so. I confidently repeat, that change of pasture is a most excellent thing, wherever it can be accomplished. The only thing to be carefully minded is that their

new place be three or four miles off their old stalls; this will prevent many of the Bees straying home to their old place. The few who so do would of course perish if there were no Hive to receive them when they come home; but even these stragglers may be saved in the following way. Of course, you will remove your strong stocks, from which you have taken a portion of the honey, for they alone will be able to profit by the heather. Manage to have a stock which wants strengthening standing next to the stock which is about to take this journey; put a sack, or some other covering, over them both for a week or two before the day when you move one, as is shown in the wood-cut; then, when the strong one is gone,



place the weak one where his absent neighbour stood. Any Bee which strays from his new place will then find an open door ready to receive them; and as these visitors drop in singly, they will be received without suspicion: but we need not go so far as Switzerland to see this plan. In Yorkshire it is the regular custom of the country



to send the stocks to the moors for change of pasture, in August and September. Cotters, who have a little garden by the moorside, take in dozens every year, and get a shilling a stock for their trouble. The trouble is a mere nothing, at least not one shilling's-worth in all, and the pleasure is surely very great; for what can be a greater pleasure than to have ten additional stocks of Bees on a visit to your own, and to cheer you with their glad music whenever you are walking in your garden. To say nothing of the pleasure you must feel at their honied stores, by playing the part of a kind host to these busy Bees; and then, what is more, you may have the still greater pleasure of showing your friend, (for all Bee-masters are, or ought to be, friendly,) how to take up his Bees who have been your guests so long, as I trust you do your own, that is, WITHOUT KILLING THEM. You and he may do so, if you try; AND I, a Bee-master like yourself, BEG YOU MOST EARNESTLY TO TRY. What I have found a very good way with my Bees, you cannot find a very bad one. The stocks are taken up in the old way, as soon as the heather goes out of flower. I hope many a man will learn by my Letter to take them up by the fingers, instead of the sulphur match, that ready instrument of Bee murder. In France they put their hives into a boat, some hundreds together, which

floats down the stream by night, and stops by day. The Bees go out in the morning, return in the evening, and when they are all back and quiet, on the boat floats. I have heard they come home to the ringing of a bell; but I believe they would come home just the same whether the bell rings or no. I should like to see this tried on the Thames, for no river has more Bee food near its banks;—willows, the best Bee food in spring; meadows, clover, beans, and lime trees, in different places and times for summer. A handy man, who could make his own boxes, though not up to hard work, might, I am pretty sure, gather *through the mouths of his many thousand Bees, enough to fill his own one mouth*, though it be somewhat larger. He might float softly *down* the river, as the flowers go off at one place and come on at another; and any barge-man would be glad, for the small price of one pound of Thames honey, to give him a tow *up*, when he wishes to go back. I SHOULD LIKE TO SEE IT TRIED.

I have not said anything about the garden flowers which are best for Bees, as no cottager can grow enough to be of much help to him. His Bees are sure to do well if he has clover fields and lime trees near him, though he have never a rood of garden ground. Borage, however, is the best garden plant I know; it keeps in flower all the

summer, and the Bees take to it beyond any thing else. It will sow itself after the first year; indeed, it is very hard to get rid of it altogether when you have once let it into your garden.

I have been told by an unseen friend, himself learned in Bees, that *Salvia Nemoralis* is another prime Bee plant. *Mignonette* also is a plant of which you cannot sow too much. He is surely a hard man to please, who is not well pleased by the scent it yields, as well as by its look in his garden; and the Bees work at it early and late; no one who has tasted *mignonette* honey would wish to have better.

I must repeat again, NEVER KILL A BEE. Let this be your one GOLDEN rule; GOLDEN I am sure it will prove in more senses than one. That which seemed, I dare say, impossible to you, when you first heard my advice, you now may see how to set about. If you were sorry for your cruelty before, when you did not know how to do without it, you will be without excuse if you still keep to it, and, I may almost say, deserve to be stung to death by your Bees. The poor Bee has enough enemies to contend with—starvation and damp in the winter; moths, hornets, and robbers of their own kind in the autumn; dry summers, which often press them very hard; cold and backward springs.

It has been well said, that man who ought to be their best friend, is often their worst enemy. They have no defence against the brimstone matches, though, with some help from man, they can conquer all their other enemies. Be kind to them, and, like reasonable creatures, they will fully repay you. Do not listen to those who tell you that, after two or three years, the Bees will do no more good ; that they get old and lazy ; and that therefore they had better be taken up. They do no such thing. "A Bee," as an old writer quaintly said, "is a one-year Bird." Indeed, all that are hatched this year die next year, about July and August, after they have done the work of nursing up the young ones who are to take their places. You may know the old Bees by their ragged wings, torn during their year of hard work ; they look larger, more stupid, and not of the nimble and light shape which the young Bees have.



OLD BEE.



YOUNG BEE.

So that all the Bees which you burn in September are of that year's brood, and ready and willing to



begin work for you next year. True it is that the comb gets old and black; because Bees store up more Bee-bread, when it is plentiful, than they can use, and they never clean out the cells in which the young Bees have been reared, but leave the sort of cloak which they spin round them glued to the sides of the cells.

In very old Hives Bee-bread and the cast silk cloaks make them heavy; so that in weighing them, you must allow several pounds for this, if you want to know whether they have honey enough to stand a winter. So in this way, after many years, the cells become too small for breeding, and the Hive dwindles away, and dies a natural death. But for this there is a cure, a good and easy one. In the spring, before the breeding time begins, smoke the Hive which is to be doctored, turn it up, cut out half the old combs, put in the Bees again, and that summer they will fill up the gap. The next spring do the same with the other half, and you will thus have a new stock, to all intents and purposes, instead of an old one. In this way a good parson in Switzerland had one stock sixty years. "But the straw Hives grow old and rotten." Not if you protect them from the weather by a good thick coat of whitewash. This is better than the straw hackle covering; and much cheaper, as well as better, than the milk pan, as it keeps all the Hive

from the rain, and prevents insects getting in. The straw hackle is the worst, as it often harbours a mouse, who will sometimes gnaw through the Hive, make his nest inside, and eat the combs and the honey. When this is the case, he may be dislodged by the MAGIC FUNGUS.

This, too, is a cure when moths have laid their eggs in the Hive. Turn it up, and cut freely out the whole of such combs as have the grubs of moths in them; for it is easier for the Bees, if you do it in the spring, to make a new comb, than to mend an old one; and you may, perhaps, leave some grubs or eggs, unless you do so. But prevention is better than cure. Prevent wasps, moths, or robber-bees from coming in, by making the door smaller when they are about. The Bees will be better able to fight for themselves. They teach you what they want, by building up little pillars of wax in the doorway. If robbers have taken a Hive, use your fungus directly; take what honey is left for yourself, and join the smoked Bees to some Hive which wants strengthening. Keep them shut up for a day after, till they get all friends. None but the poorer ones rob; none but the weak are robbed. So you can prevent robbery, though not cure it. Unite all your weak Hives, and unite and feed your poor ones.

You say that feeding costs something; so it

does. But every pound of food given at the right time, as in a cold late spring, like the year 1837, will be repaid by the Bees when the weather changes. Another time, when feeding is quite needful, is when the weather comes bad within two days after a swarm is put into a Hive. The Bees, as I said before, swarm with their honey-bags full. You may have noticed that very few Bees go out the day after they swarm. They are then busily engaged in building their combs from the honey which they carried with them. You will stare at the notion of building combs with honey; but it is true, nevertheless. What they carry in on their legs is Bee-bread, not wax. The honey goes from their honey-bag into their stomach, and then drops out in little white plates of wax from under the scales of their abdomen, or tail. I have watched it myself for half an hour, coming out of a Bee, who was hanging in a cluster, with his belly towards me, close to the glass. I always feed my Bees for two or three days after they have swarmed, be the weather fair or foul. This saves time, for it helps them to get their combs sooner made, in which to store up honey for themselves and you too, directly they can get it. If the combs are not built all ready, they may perchance lose a good Honey Dew, which often comes about the time of swarming. Nothing you give your Bees is thrown away; all is repaid

with interest. Not a single ounce of honey has ever been wasted by Bees since the world was made. You do not waste your honey by feeding; but only, as it were, pour it out of one pot into another, where you may find it whenever you want it, and not only so, but you find a peck where you put a quart.

Another time when feeding is needed is in the dry hot months of those summers when the flowers have no honey, but fade as soon as they blow; feeding will then always cheer your Hive, and save the lives of many young Bees, whom their *dry* nurses cannot otherwise feed, and even save a whole Hive. Sometimes I myself have seen, in a dry summer, thousands of Bee grubs lying before the Hive, which the old Bees, unable to keep, have thrown out. This seems cruel, but it is in truth kindness; when thus thrown out, they quickly die, whilst if kept in the Hive, they would linger on a long time, half starving.

Any one may see the same sad sight near any wasps' nest, the morning after the first frost in September or October. I am always sorry for the poor little grubs who thus die (as we may say) before they are born; but, when I think that if they had been hatched, and come to years of discretion, they would have been sad enemies to the Bees, my sorrow is very much lessened.

Autumn feeding should not be done later than



September. Weigh the Hives you wish to keep ; if they are 2lbs. or 3lbs. short of 20lbs., give it them all at that time : they will lay it all up in their cells. They will take it up almost as quickly as you can give it them. I had a married stock which, in one warm night of September, between six in the evening and six in the morning, took up  $3\frac{1}{2}$  lbs. of Bee food ; and though feeding in the winter is better than no feeding at all, and has often saved Hives, still it murders many Bees who come down into the cold. It is as if you had always to go out and dig your potatoes in the frost and cold of December, instead of laying them up safe and handy.

I hope many a Bee-Master who reads my letter, will think, by the time he gets to this place, that Feeding is no such bad thing ; and that if he has not up to this time fed his Bees when they wanted it, he has not done his duty properly by them. Let him try, and he will find it will repay both his time and money. But it would be a poor thing were I to make you think that feeding is a good thing, if I do not tell you how to do it. Now, then, for it. First, as to food, *There is nothing so good as honey*. It is natural to the Bees, and therefore cannot disagree with them ; so never press your combs, for the honey which you squeeze out is nearly worthless to sell ; put your combs carefully by till your Bees want food.

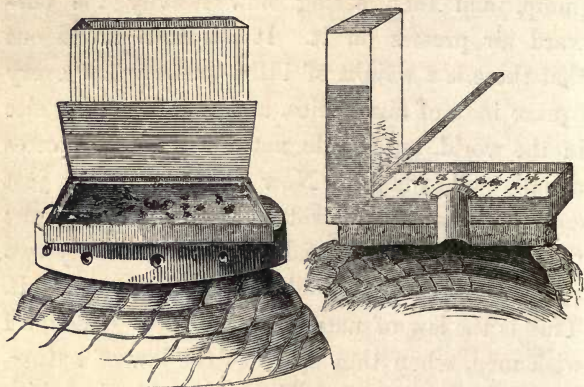
If you feed Bees on sugar and beer, which is next best, do not put more than 1 lb. of sugar to a quart of beer; nor boil it more than five minutes; this melts the sugar: longer boiling would make it thick and unwholesome.

If you wish to give your Hives a feed all round, which is a very good thing in spring, put the old combs from which the major part of the honey has drained, or empty combs filled with honey and beer, in front of your Hives. The Bees will clear them in a very short time, and not only thank you, but repay you too. If you want to strengthen one Hive, pull the bung out of the ring at the top of your Hive, (this you should always have,) and put the honey-combs on the top. Then turn an empty Hive over them.

Here is a clever contrivance for giving a Hive a pound or two of food at a time. Most of you know how a bird-glass acts. A good supply of water is kept in it by ATMOSPHERIC PRESSURE. You do not perhaps know what this means, but listen to me for a few moments, and I will try to teach you. The air which we breathe, and in which we live and move, just as the fishes do in the water, though we see it not, is to us what the water is to them. Now we do not think that the air has any weight, for we say "lighter than air," when we want to talk of a

thing as light as possible. But it has weight, nevertheless; and we can measure the exact weight of it, by pumping it out of a vessel, with an air pump, and then seeing how heavily the outward air presses on it. It has been found out that there is a weight of 14lbs. pressing on every square inch of our bodies, and of every thing else in the world, but we do not feel it, as it presses equally all round. Now this weight is just equal to a column of water thirty-two feet high; that is to say, if you had a bird-glass thirty-two feet high, the water would still be kept up in it. This is the law of nature, so to speak,—(though I wish men, when they speak of the law of nature, would think more of the law of God,)—by which barometers are made, which enable farmers to give a good guess when rain is coming. It is the law by which every old woman gets a supply of water from the pump to fill her tea-kettle: it is the law by which a bird-glass acts. Below the level of the hole through which it is supplied, a little air rises up through the water, and a little more water comes down, so that the bird always has a fresh supply. I feed my Bees in the same way. The feeder, of which I have given you a drawing, is nothing more than a very large bird-glass, made of zinc. For a Bee, as I have said before, is only a sort of bird.

The wood-cut on the left hand side, shows it placed on the top of a Hive; the one on the right is what is called a section of it, that is, it

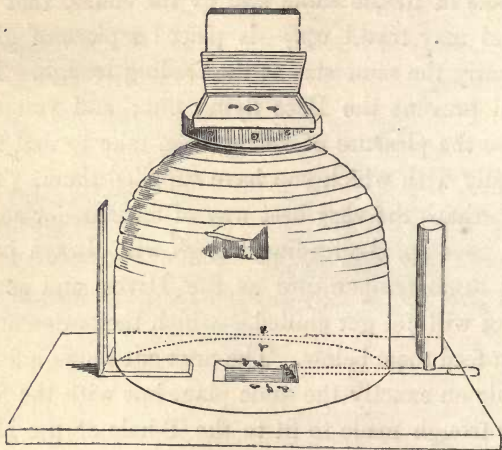


shows what you would see were it cut right in half. The upright column is three-fourths full of sugar and beer; it is kept there by the hydrostatic pressure of which I have been telling. The Bees travel up from the Hive through a ring, which is shown cut in half, on to a plate of zinc with holes in it, through which they suck their food. It always keeps at the same level, for when they draw it down below the top of the hole through which it is supplied, a little air forces itself up through the food, and the same quantity of food trickles down. Thus the Bees are kept from daubing themselves, and always have a con-



stant supply. At about the third of an inch above the collar and the perforated zinc which lies above it,—(N.B. the perforated zinc must of course have a hole in it, the same size as the collar, that the Bees may travel up,)—is placed a piece of glass, exactly the same size as the feeding trough. This will prevent the Bees flying out; and you may have the pleasure of seeing them take to that food kindly with which you have supplied them. This is perhaps the very best way of feeding, for as hot air goes up, the feeding trough will always be of the same temperature as the Hives, and so the Bees will not get chilled,—which they often are, if you feed them below. The next cut shows a feeder made on exactly the same plan, but with the feeding trough made to fit to the T-hole of the Hive. The same cut also shows another mode of feeding. A little shallow pond, about a quarter of an inch deep, is cut in the middle of the bottom board. A large gimblet hole is driven from the outside of the Hive into this pond, half the way down. In the bottom board, just outside where the Hive stands, a hole is bored, with a centre bit, into the gimblet hole, the size of the rim of an old physic bottle, which you intend to apply to the nobler use of feeding the Bees. Fill it with Bee-food, and turn the neck neatly down into this hole; it must fit tight, and then by means of atmospheric pressure,—

the hard word, the meaning of which I have already explained to you,—this physic bottle will



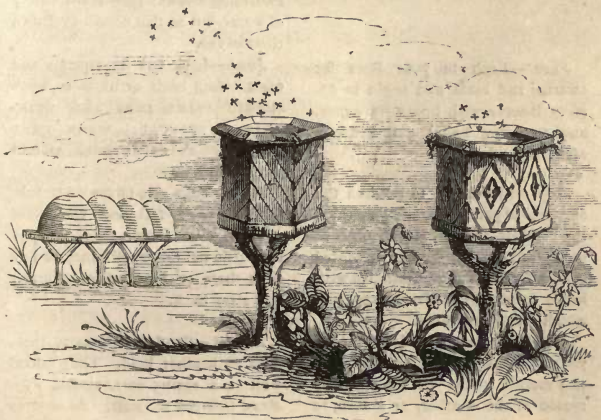
act just like the zinc Bee-feeder. If you have side boxes, put a piece of comb full of Bee-food into one of them; draw out the slides, and the Bees will then carry the supply you have given them into the centre box, and store it up. Lastly, I will tell you how to strengthen a weak stock, the combs of which do not come down to the bottom board. Turn the Hive up in the evening, softly slip the comb in, stop up the T-hole, and leave them in until the morning. The Bees will then have cleared it. Repeat this as often as

needed. Now, then, I think I have said enough about feeding; remember,

**Don't be stingy, nothing is wasted.**

Now, before I end this Letter, I will give you two Bee Calendars; one from the *Kalendarium Hortense*, of good John Evelyn, of Sayes Court, more for its curiosity than its use; as I would rather advise you to follow my plain monthly orders, which I have myself proven. Do AT LEAST ALL which I there tell you is needed, and when you do that well, go on to something farther; it is

A good thing to learn to walk, before you begin to run, in other things beside Bee-keeping. Do not laugh too much at Mr. Evelyn; he has told us all he knew, and I for one am much obliged to him.



BEE FLOWERS, P. 89.

Extracts from EVELYN'S "*Kalendarium Hortense*."

*January*.—Turn up your Beehives, and sprinkle them with a little warm sugar and sweet wort; do it dexterously.

*February*.—Half open your passages for the Bees, or a little before (if weather invite), but continue to feed weak stocks,

*March*.—By this time your Bees sit; keep them close night and morning, if the weather prove unkind.

*April*.—Open now your Beehives, for now they hatch; look carefully to them, and prepare your Hives, &c.

*May*.—Now set your Bees at full liberty; look out often, and expect swarms.

*June*.—Look to your Bees for swarms and casts, and begin to destroy insects with hoops (?), canes, and tempting baits; gather snails after rain.

*July*.—Now begin to straiten the entrance of your Bees, and help them to kill their Drones, if you observe too many; setting the new invented cucurbit glasses of beer mingled with honey to entice the flies, wasps, &c., which waste your store.

*August*.—Now vindemiate and take your Bees towards the expiration of this month, unless you see cause by reason of the weather, or season, to defer it until mid-September; if your

*January*.—Leave your Bees quite quiet. He is a poor Bee-master who has now to feed his Bees; a worse, who does it by sprinkling.

*February*.—Put your Bees back to their summer stands, if you have moved them, as soon as the weather and early crocusses invite; weigh your stocks first, and jot down the weights.

*March*.—Begin to feed light stocks; do it with no sparing hand, but as though you loved them. Keep the entrance narrow.

*April*.—Go on feeding; enlarge the entrance; get all ready for swarming. Sow borage, mignonette, and other Bee flowers, if you have room.

*May*.—Make the entrance large; give room to those you do not mean to swarm. Keep an eye on your swarming stocks; give them plenty of water, but so that none may drown themselves.

*June*.—Look out for swarms and casts. Join casts or unite to weak stocks; (TAKE CUPS AND BELL-GLASSES, IF FULL;) WHEN THEY SWARM, BE QUIET, YET BOLD, AMONG YOUR BEES.

*July*.—Take side boxes when full. If the flowers fail near you, send your bees to clover fields or lime trees; do not let the distance be less than three or four miles, or many will stray back.

*August*.—Send your Bees to common or heather land. They travel well in a spring cart, stuffed with straw to break the jolts. As soon as flowers begin to fail, take up your



stocks be very light and weak, begin the earlier.

*September.*—No longer now defer the taking of your Bees; straitening the entrances to such Hives as you leave to a small passage, and continuing your hostility against wasps and other robbing insects.

*December.*—Now feed your weak stocks.

Bees with the fungus, or rags dipped in water. Join the Bees (see Letter I.) to your other stocks.

*September.*—Feed the stocks which are to stand, if not heavy enough. Protect the food, so that strange Bees and wasps may not get to it.

*October.*—Go on feeding early in the month, if it be needed. Market your honey, and refine your wax.

*November.*—Put your Bees into winter quarters, or if you have no dry, dark, and quiet place, put a hurdle before them; weigh them first.

*December.*—Do nothing to your Bees. Make Hives. Write out the notes which you have jotted down the year past. And be thankful to God for the money you have got for your wax and honey, and don't waste it.

I have printed this Calendar from Evelyn's book, which of course is not in the hands of many Bee-keepers, as it shows how very little people knew of their Bees then, and what strange fancies they had about them. Evelyn, like many other old writers, seems to have fancied that the Bees sit upon their eggs, like hens. This must be a queer sight, at all events, and I should much like to see it, though I am sure I should have to look very long without so doing. His mode of feeding, too, was very rude and hurtful to his Bees, though, I am sorry to say, I know some people now-a-days who do the same.

I know some persons, who, like that dear old man, Evelyn, even now feed their Bees in his way. He says, in his Calendar for January, "Turn up your Hives, and sprinkle them with a little warm sugar and sweetwort; do it dexterously." What should we think of a doctor, who, when called to visit a patient in a low fever, and very weak, orders a gallon of broth to be poured upon him as he lies in bed, and then leaves him to dry himself as he can, or even opens the window on a cold frosty night, when he is in this pickle? We should all say this man had a fair chance of DYING OF THE DOCTOR, which I fear is a very common complaint; AND MANY BEES, I AM SURE, DIE OF BEE-DOCTORS WHO ACT IN THIS WAY. These feeders sometimes pull the bung out of the top of their straw Hive, and pour in a quantity of sugar and beer. A weak stock should have this food given them without stint in September, and then be let to store it up for themselves. If the weather be cold, the mixture will of course freeze on the Bees, or at least stick upon their wings, and make them "right nasty;" as old Evelyn said of Czar Peter the Great, when he was at his house, Say's Court, Deptford.

Many people, who would otherwise keep Bees, are afraid of their stings, and so will have nothing to say to them. There are some people, it is true,

to whom a sting is really dangerous: let them have nothing to do with them, unless they love their Bees so much as rather to brave all consequences than to give up keeping them. There are some people who if they get a sting in their finger straightway swell up to the shoulder, or even further; this is certainly not pleasant, though I do not believe any great harm comes of it. The worst place in which you can be stung is the inside of the throat; I have heard of a man dying of swallowing a wasp, which was inside a peach which he bit in half; it stung him in the throat, which, as he did not know what to do to cure himself, closed up the passage of the breath, and so stifled him. If he had been an unhappy Bee-murderer, he would then find how unpleasant it is to be stifled. He ought to have run straight off to a doctor, who would, I believe, have put a small pipe down his throat, to keep the passage for the wind open. I myself was once blowing into a glass, to drive the Bees out, when in drawing in my breath sharply I swallowed a Bee. I prepared myself for a run to the doctor's, had I felt its sting in my throat, or lower down in my inside pocket; but the Bee passed so rapidly down, that he had not time to sting; when he got to his journey's end, no doubt not a little surprised at the path he had travelled, he resigned himself to his fate, like a good Bee,

and did not revenge himself by stinging me. Many remedies have been given for a sting ; above all, pull the sting completely out, as it is barbed, like a fish-hook, and will work into the flesh. Then squeeze the poison out with the pipe of a small key, as you would a thorn, and put a little honey on the place, just to keep the air away : if this is done at first, the swelling will generally be a mere nothing. The pain only lasts two minutes : at worst, it is only a swelled eye for a day or two. But, as I have said before, prevention is better than cure. Listen to the words of an old writer, who lived two hundred years ago :—“ If thou wilt have the favour of thy Bees, that they sting thee not, thou must avoid some things which offend them : thou must not be unchaste and uncleanly ; for impurity and sluttiness (themselves being most chaste and neat) they utterly abhor : thou must not come among them smelling of sweat, or having a stinking breath, caused either through eating of leeks, onion, garlick, and the like, or by any other means, the noisomeness whereof is corrected with a cup of beer ; thou must not be given to surfeiting or drunkenness ; thou must not come puffing and blowing unto them, neither hastily stir among them, nor resolutely defend thyself when they seem to threaten thee : but softly moving thy hand before thy face, gently put them by ;



and lastly, thou must be no stranger unto them. In a word, thou must be chaste, cleanly, sweet, sober, quiet, and familiar, so will they love thee, and know thee from all other.”\* Above all, never blow on them; they will try to sting directly if you do. If they come all about you, making the noise which you will soon learn to know as a sign of anger, go quietly away, and put your head into a thick shrub, if any is near. This will brush them off. If you want to catch any of the Bees, make a bold sweep at them with your hand, as though there was no such thing as a sting in the world; the Bee will be so astonished, that he will not sting at first. Then hold him in your closed hand, without pressing him, and he will not sting. I have so caught three or four at a time. If you want to do any thing to a single Bee, catch him, “as if you loved him,” between your finger and thumb, where the tail joins on to the body; he thus cannot sting you.

I have now said my say. Much good may it do you, which I am sure it will, if you give it a fair trial. READ IT OFTEN; KEEP IT SAFE; LEND IT TO YOUR NEIGHBOURS WHO DO NOT KEEP BEES; TALK IT OVER WITH THOSE WHO DO; LEARN FROM THE BEE TO WORK HARD AND WASTE NOTHING. REMEMBER, NOTHING WORTH DOING CAN BE DONE

\* Butler. Chap. i. part 33.

WITHOUT A LITTLE TROUBLE; AND, ABOVE ALL,  
HELP EACH OTHER ALL YOU CAN.

So, good bye to you.



GOD SAVE THE QUEEN.

# APPENDIX.

## PART I.



APPENDIX



## APPENDIX.

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### LETTER FROM MR. SAVAGE.

SWAFFHAM, *Dec. 2, 1841.*

REV. SIR,—I am happy to say my Hives have given good satisfaction when they have been properly managed. This year, the best I have known of forty years' experience, has been a most interesting one, having but *one* swarm from nine stocks, which have produced from 25 to 40 lbs. of superfluous honey each. I shall be most happy to hear of your prosperity in Apiarian science. We have had honey collected this season later than I ever knew it, and of good flavour. I did not send a cover with the Hive, not knowing whether it would be placed abroad, or in any kind of house. I do not know whether my steps will ever be directed towards the neighbourhood of Windsor; if so, should feel a pleasure in visiting your Apiary, and in communicating any information I may be able, on a subject worthy the atten-

tion of humanity,—in the preservation of the industrious Bee. Wishing you every enjoyment in so praiseworthy an object,

I am, REV. SIR, your obliged and humble Servant,

W. SAVAGE.

#### DIRECTIONS FOR THE USE OF SAVAGE'S NEWLY-INVENTED BEE-HIVE;

*Which may be bought at Messrs. Page's, Haymarket, Norwich.*

*First.*—The feature of this Hive is, that the honey may be taken without the destruction of the Bees.

*Second.*—That ample room is provided contiguous to the stock for the reception of any *superfluous honey* the seasons may afford, which may be taken in whole or in part, from the *end Hives*, or *Remunerators*, at any time in the season, and without the least danger of impoverishing the parent stock, which is sufficiently stored with honey previous to the admission of the Bees into the Remunerators.

*Third.*—That deprivation may be attended to without the introduction of any tin divider, where many Bees are unavoidably destroyed.

*Fourth.*—That the Hive defies the admission of insects of every description, which are a great annoyance to the population.

*Fifth.*—That the doorway at front or entrance may be enlarged or contracted in a moment, at pleasure, upon the approach of robbers, &c. &c.

*Sixth.*—The shutter of the windows to serve as an index of facts and observations, as they occur.

*Seventh.*—The middle Hive is withdrawn for the reception of the swarm, which may fill the *middle part* or *preserver* (in a good season) in about three weeks or a month; they are then admitted into the Remunerators, by withdrawing them and reversing their position, which will give a communication into every part of the Hive. The Remunerators are taken away to be emptied of their stores, and may *then* be returned again, either for *filling* or closing up the parent stock, for the winter.

*Eighth.*—Make choice of a fine morning for deprivation, about the hour of ten: let the Remunerator intended to be taken, be gently drawn from the Hive, and very slowly; and be determined never to take the life of a Bee; spread a napkin upon the Hive intended to be taken; when, as it is withdrawn, it will fall down and cover the lath window, and prevent any Bees from escaping at the time of its removal.

*Ninth.*—Remove it gently away a short distance from the Hive to any dark room; set the door at jar, and remove the napkin; the Bees will soon begin to leave the Remunerator, by missing their Queen, and in an hour's time (or less) will be returned to the parent stock in the apiary.

*Tenth.*—Never omit weighing, and noting down upon the shutter, the quantity taken every year, which may be from 15 to 25 lbs. from a swarm, and from 30 to 80 lbs. from a stock. In a good season Combs of the most delicate quality are collected from 2 to 3½ inches in thickness.

*Eleventh.*—Let the thin Slide or Cover be used where the Remunerator has

been taken, which when emptied may be returned again, either for filling or closing the Hive at the end of honey harvest.

*Twelfth.*—Towards the Autumn, close the door-way at the front by removing the slider, so as to admit but two or three Bees for the winter season; and upon its approach shade them from the rays of the sun, during the cold months.

*Thirteenth.*—On the approach of mild weather in the Spring, remove the Winter-shade and allow the Bees to rove abroad; this they will not do unless compelled by hunger or by a mild atmosphere, which is congenial to their nature.

*Fourteenth.*—As soon as the population appear to increase, enlarge the entrance at the door-way as occasion may require (little or no fear of robbers may be entertained in the Spring), as vast quantities of farina are now collected; and as the showers of April are often sudden and heavy, give them sufficient room of admission at the door.

*Fifteenth.*—As soon as the Preserver appears to be getting filled with Bees, admit them into the Remunerators, when, if the weather is favourable and honey plentiful, they will soon cluster therein and commence forming combs; and often by the end of June vast quantities of honey are collected, which may be taken, or left until the Autumn; the Remunerators may then be emptied in whole or in part, and returned to the Hive, closing up the entrances of communication for the winter, by reversing them.

## EXTRACT FROM CENSURA LITTERARIA,

Vol. viii. p. 419.

ART. 3. A Treatise concerning the right Use and Ordering of Bees, newlie made and set forth, according to the Author's owne experience (which by any heretofore hath not been done). By Edmund Southern, Gent. Better late than never.



Imprinted at London, by Thomas Orwin, for Thomas Woodcocke, dwelling in Paule's Church Yarde, at the signe of the Blacke Beare. 1593. 4to. 17 leaves.

An epistle dedicatory to the Right Worshipfull Mistres Margaret Astley, wife to John Astley, Esquier, Master and Treasurer of her Maiestie's Jewels and Plate, and Gentleman of her Highnesse Privie Chamber; followed by an Address to the Reader.

The treatise is divided under various heads, and concludes with the following story:—

“I remember once there was a gentleman, a very friend of mine, which had good store of Bees, unto whom the parson (who yet liveth, and I feare is one of Martin Malapert's house) came and demanded tythe Bees. ‘Tythe Bees!’ quoth the gentleman, ‘I never yet payd any, neither is it the custom in this parish, and I am loth to be the first that shall bring it up, and yet I am very willing to pay my due; honey money and wax you shall have, with all my heart; but Bees cannot be told, therefore how shall I pay them?’ ‘Told, or told not,’ quoth the parson, ‘or due, or due not, I will have the tenth swarme, and you were best bring them home to my house.’ ‘Why, then, I might deceive you,’ quoth the gentleman, ‘and bring you a castling or an after swarme for a whole swarme.’ ‘Well,’ quoth he, ‘honey money and wax shall make amends for that.’ ‘But you can never have profit of those Bees, if they be castlings,’ quoth the gentleman, ‘which I bring you.’ ‘It is no matter for that,’ quoth the parson, ‘bring them me, I pray you.’ ‘The which shall be done,’ quoth the gentleman. It fortun'd within two daies the gentleman had a great swarme, the which he put into a Hive, and towards night carried them home to the parson's house; the parson, with his wife and familie, he found at supper in a faire hall; the gentleman saluted them, and told the parson he had brought him some Bees. ‘I mary,’ quoth the parson, ‘this is neighbourly done; I pray you carry them into my garden.’ ‘Nay, by troth,’ quoth the gentleman, ‘I will leave them even here.’ With that he gave the Hive a knock against the ground, and all the Bees fell out:



some stung the parson, some stung his wife, and some his children and family ; and out they ran as fast as they could into a chamber, and well was he who could make shift for himself, leaving their meate upon the table in the hall. The gentleman went home, carrying his emptie Hive with him. On the next morning the Bees were found in a quickset hedge by a poore man, who since hath had good profit of them, and is yet living. Within foure daies after the gentleman was cited to appear before the ordinary, who when he came, demanded why he had used the parson after that manner? ‘Why, Sir,’ quoth the gentleman, ‘I have not misused him, to my knowledge.’ ‘No!’ quoth the parson, ‘did not you make your Bees sting me and all my folks?’ ‘Not I,’ quoth the gentleman; ‘but you would needes have a swarme of Bees, the which I brought you home according to your own request, and left in your hall, and since I saw them not.’ ‘*I but,*’ quoth the ordinary, ‘why did you not let them alone in the Hive?’ ‘So I would,’ quoth the gentleman, ‘if they had been in my own garden.’ ‘Why did you not let the parson have the Hive?’ quoth the ordinary. ‘I could not spare it,’ quoth the gentleman; ‘for I bought my Hive in the market, and I am sure, as covetous as he is, he can have no tithe of that. I buy in the market according to the English laws; but I did by his Bees as he willed me, and as I have done by all his other tithes, which I have ever left in his hall, and so I did these; and yet there was no Bees ever demanded for tithes in our parish till now; and beside, the statutes for tithes in this case provided, is on my side; but honey money and wax he shall have with a good will.’ ‘And that is not much amiss,’ quoth the ordinary. So noting the circumstances of every case, gave sentence that both of them should stand to their own charges. So they were contented, and afterwards became friends; and if they do not well, I pray God we may.”

## BEES IN ATTICA.

*Communicated to me by MR. JOHN HAWKINS, of Bignor Park, near Petworth, Sussex, in 1802; and collected by him some years before from the Equimanus of Mendeli.*

THE size of the Hive ought to have a certain proportion to the size of the swarm which accompanies it. The Bees thrive not in an apartment too large and roomy.

The aspect of the Hives is towards the south; they ought to be well protected against the north wind. The mode of fixing them is, first, by excavating the ground to the depth of a spear or pithami, in which is placed the bore of the Hive; four large stones are then placed round, to fix it therein. The Mendeliotes do not clean the Hives, but the peasants, who have a few, visit them occasionally, particularly in March, and clean them; at the same time giving a little smoke. All the sickness and mortality of the Bees are supposed to proceed from the scarcity and want of food in the first instance. The Bees are not apt to be surprised, when they are ranging, by sudden showers or storms, having a faculty for foreseeing those changes of the atmosphere, and consequently they retire in time to their Hives. If a strong wind blows on the Hives in summer, they will issue forth, but do not venture to raise themselves high above the ground. In the cold weather of winter they confine themselves to the Hives.

The greatest enemy of the Bees is the Melisurgo, or Merops Apiaster, who makes great havoc in the air among these insects. The best precaution against the depredations of the Melisurgos is that of destroying their nests, which

are built in the holes of rocks and ravines. The Arvas, or Badger, after overturning a Hive, eats all the combs which it contains. The wasps attack only infirm Hives, being easily driven from the healthy and strong. The strong and healthy communities plunder the weak and infirm. To prevent the depredations of certain Hives, the only method is to change the situations of the plunderers and of the plundered, by which means a balance is established in the respective communities, the weak acquiring the superfluous force of the other, because the Bees return always to the same spot, without regarding the change of habitation.

The presence of a Queen Bee is absolutely necessary to every community, all operations being at a stand when she is wanting. The sex, however, of the Queen Bee is unknown, as well as the nature of the drones.

Bees are apt to range as far as four or five miles; but require water near their Hives.

Hives may be exhausted by swarming too often; the remedy against which is by killing the supernumerary Queen Bees, either in their worm state, or when they have escaped with the young swarms. In the first place they may be distinguished by their position on the outer row of cells, or on the lower cells of each cake in the Hive. The Hive is at this time carefully visited, and the worms in these lower cells cut off and destroyed by the hand.

No Hives are habitually barren.

The fecundary Hives yield the least honey. The Hives which have not produced swarms yield that season the most. The early swarms, such as are sent off in April or May, which are however rare, are most healthy and vigorous and productive; they are consequently more esteemed than the rest. A community, wanting a Queen, will not tolerate a new one from another Hive, which it inevitably puts to death; but the Hive must be suffered to generate a new Queen from the combs of another Hive.

*Answers from Buera of Athens, aged eighty years.*

THE Bees like not too roomy an apartment, as is found by the weak swarms; and if such an habitation be not changed for a smaller one more proportionate to their numbers, they languish, and ultimately perish. In a year of abundance, it is necessary to enlarge the *kosinia* two fingers, by extending the wicker work.

The Hives must be placed in a situation where they are not only well protected against the north wind, but where they catch the rays of the rising sun.

In bad years (in such as have a scanty supply of food, and therefore afford but little honey) the Hives are subject to the worm, and the Queen Bee is subject to a louse, which fixes itself on her back, between the wings, and causes a visible decline in her health. In these bad years, too, the wasps make considerable havoc among the Hives. Smoke is applied as a remedy for the louse, vinegar for the worm, and an expedient is used by the Bees against the wasps, by narrowing the doorway with a composition resembling tar. The wasps attack weak Hives, but not every year; the present year, for instance, has proved a very bad one for honey, yet the wasps have been very few. It is remarkable that they devour not only the honey, but the Bees themselves, after a sharp contest. One Hive is only plundered by another in the event of its wanting a Queen. The only remedy is by straightly giving them a cake of worms from another Hive, from which is soon generated another Queen, provided that it happens in the proper season. Should this cake not generate a Queen Bee in fifteen days, another should be placed in the Hive. If a young Queen be introduced, it would infallibly be killed as an usurper. A Hive, however, which loses its Queen in the winter, cannot be provided with another in this manner, and thus perishes.

The Queen Bee is the mother of all the rest, no worms



being generated in the cells when she is wanting. In these cells she deposits her eggs, one in each, from which are generated the worms. The cell is thus nearly closed, a small orifice only remaining, through which the working Bees daily supply the worms with water; should the state of the weather be such as to prevent the Bees from fetching water for a few days, the worms perish. These dead worms are then removed out of the Hive by the working Bees, if they are healthy and strong, otherwise they are unable, and perish from the putrid exhalations.

One community tolerates only one Queen; the supernumerary Queens, as fast as they are generated, either migrate with the young swarms, or they are put to death by the Bees themselves; most of the drones, too, are killed in seasons when food and honey are scarce.

A community which wants a Queen perishes, the Bees cease to range for food, devour all the honey, and then perish with famine.

The Queens' cells may be easily distinguished from the rest by their superior size, and by their position on the extreme edge or disk of the cake; these are cut off by the Beeman whenever it is thought fit to check the operation of swarming, to prevent the Hive from weakening itself.

The progress and duration of breeding depends entirely upon the food of the Bees, beginning and ending with the inflorescence of those plants which serve for their nutrition; and acquiring most activity and vigour in those seasons when their most favourite food presents itself; this is in May, when the Thymasi first opens.

In the best seasons, a Hive may be multiplied two or even three times, which is the most it is capable of producing, but these new swarms, in the same season, may produce others. A Beeman is, however, satisfied if the season be such as to double the number of his Hives, which he terms a good season.

To recall a swarm which has left its Hive, the Queen

Bee of the fugitive swarm must be taken and destroyed, after which the rest will return. There are not any habitually barren Hives, it being impossible for a community to exist without its producing worms.

There is much inequality in the health and vigour of the Hives in the same season, just as in the constitutions of individuals of the human race. In a good year, not all the Hives are healthy and vigorous; and *vice versâ*, in a bad year, not all the Hives are sickly and weak. These changes from bad to better, and from good to bad, are equally capricious. The remedy for inferior Hives is the exchange of position with healthy ones.

In good seasons it is necessary to visit the Hive more frequently than in bad ones, for the purpose of anticipating the swarming. It is often necessary to inspect the state of the combs every fifth day, but the interval must never exceed fifteen or twenty days, because the insect is perfect in twenty-five days after the laying of the egg.

The most fecundary Hives yield the most honey.

A Hive is provided with inhabitants by introducing therein four, or the half of all the comb-cakes containing worms, which are in a vigorous Hive, after which their positions are exchanged. The mode of depositing a swarm is by shaking it into a new Hive, fixing the Hive in a proper position, and providing it with two cakes of honey from another Hive.

The earliest swarms are the most healthy and vigorous. There is no mode of uniting small Hives, because they would destroy each other. Hives, however, may be reinforced with new inhabitants by exchanging their positions with more healthy and full ones, as above mentioned. This, however, succeeds only when food is plentiful, for when it is rather scarce, discord ensues between the new and old inhabitants, with mutual destruction; at such times, therefore, the Hives must not be touched.

The Thymasi is by far the best and principal food of the

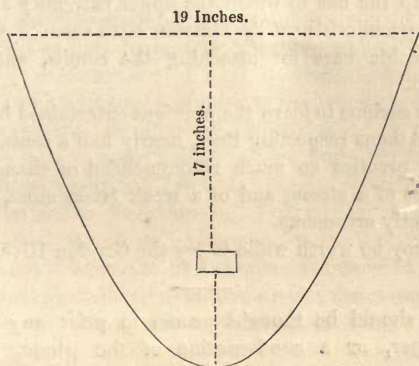
Bees, and, in good seasons, begins to open its blossoms on the 10th of May, O. S., and continues in flower till August. The Crimes opens in March, which is the first object of food; after this, the heath is the most favourite food, which flowers in September; this produces very bad honey, which sells for only half the price of the other sort, and is therefore seldom taken from the Hives. Kennari yields likewise a bad honey.

The honey crop is taken from the 6th to the 15th of August. The reason why this work is omitted on the first six days of August is, because these are the chief unlucky days of the year, the *dies infausti*, termed here *drumes*. From the signs of the heavens, during those six days, is predicted, by the common people, the nature of the ensuing season.

The quality of honey in good and in bad years is the same. The failure of a crop in 1796, arose from the want of rains in the spring, and in consequence of the Thymasi not blooming.

The number of Hives belonging to Athens in 1795 was 3,400.

### THE HIVE.



The Hive must be well limed within, and smeared on the outside with a mixture of cow-dung and clay.

The number of bars on the top of the Hive, to attach the combs, varies from 12 to 14.

The contents between six and seven dry gallons.

The entrance two inches long, by one inch in height, and four inches from the bottom.

To the four central bars, which are always left for the provision of the Hive, are suspended the largest combs: these contain the best honey, and have generally some worms, which are objects of solicitude to the community.

A bunch of twigs from the plane tree, with its leaves on, is placed immediately over the bars, and this again is covered by a sheaf of straw.

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*These are Mr. Hawkins's Memoranda:—*

"I learnt from him, in conversation, that the Beemen protect themselves by the smoke of linen rags; that they remove the covering from the top of the Hive; and after cutting the edges of any combs from the sides of the Hive by means of a long and slender knife, they remove it by taking up the bar to which the upper extremity adheres.

"The peculiarities of the Grecian Hive seem to consist in its moveable bars for attaching the combs, and in its open top.

"It is curious to learn the opinions entertained by an old man of Athens respecting Bees, nearly half a century ago.

"The practice so much recommended of changing the situations of a strong and of a weak Hive, must, I think, be perfectly erroneous.

"It may be worth while to try the Grecian Hive."

---

If it should be thought proper to print any part of this paper, or a condensation of the whole, I think



Mr. Hawkins's consent should first be obtained, which I dare say he would very readily grant.

DAVIES GILBERT.

*East Bourn, July, 1828.*

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## HONEY OF THE HYMETTUS.

THIS spot was certainly, at one time, more abundantly supplied with flowers than at present; these, too, so strongly scented, that hounds, on that account, frequently lost trace of the game when hunting on these regions. But there is no land like Greece, in which, for centuries, the works, not only of men, but of nature also, have been, as far as possible, destroyed. Trees and shrubs were cut down, in the continued wars, without any thought of the consequence; and what the axe spared the shepherds burned, in order to raise from the ashes, during the first year, a few blades of grass for their goats . . . Were not the Grecian climate so favourable, the greatest part of the country must long since have become a bare, stony, and rocky wilderness. The Hymettus has now no better vegetation than the mountains of Attica. The honey of the Laurion mountains was much prized (*Erica Mediterranea* grows there in abundance). Throughout Greece, honey is more agreeable and aromatic than in other lands, owing to the heat being moderate, for which reason the juices of the plants are in a more agreeable concentrated state. The honey of the Hymettus no longer possesses its superiority; it is, in other neighbourhoods, finer and more aromatic, *e. g.* in many of the Cyclades, especially in Sekino. The greatest quantity of honey is obtained from the monastery of Syrian, to the north-east of the city: IT IS DELIVERED TO THE LOCAL ARCHBISHOP. The shepherds at other parts of the Hymettus have also, most probably, Bee-hives; and the honey from Pentelicon is also reckoned among the Hymettic. The number of Hives on these mountains yielding

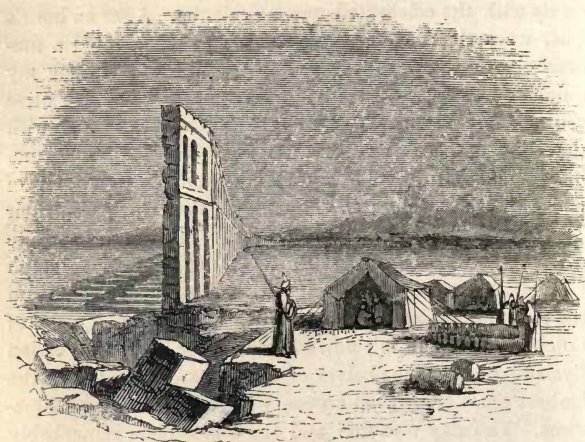
honey has been averaged, of late years, at five thousand. The principal food of these Bees is *Satureia capitata* (*Saturei*), then *Lentiscus*, *Cistus*, *Salvia*, *Lavandula*, and other herbs. Otherwise the *Hymettus* is very bare ; on its declivities and in some of the dales are wild olives, with shrubs of myrtle, laurel, and oleander. *Pinus maritima* grows on its summit very imperfectly, but near the monastery it is pretty. Besides this, there grow on the *Hymettus*, hyacinths, *Amaryllis lutea*, dark violet crocus, &c.—*Extract from Fiedler's Reise durch Griechenland, in the Foreign Quarterly Review.*



### DR. SIBTHORP'S JOURNAL.

*Nov. 3.* LEAVING the hill of Anchesmus, and the monastery of Asomato on our left, we passed along the banks of the Ilissus. The bed was narrow, dry, and frequently choked with stones ; it was fringed with the Oleanders

and *Agnus castus*. Not far from the base of the mountain it divided, and one of its branches was dignified formerly with the celebrated name *Eridanus*. After an hour's ride, we arrived at the monastery, which presented a melancholy appearance. I took a young Caloyer for my guide to the top of the mountain. Having left the olive grounds, we found the rock at first thinly covered with the *Kermes* oak, the *Spartium Scorpius*, and *Spinosum*, mixed with *Satureia Thymbra* and *Capitata*, the latter of which is the celebrated Thyme of the Ancients, their *Thymbra*. I observed some strata of marble of a white colour, almost rivalling in beauty that of *Pendali*. Though *Hymettus* was barren of plants, I had not advanced far up the mountain before I was gratified with a new species of *Colchicum*, now in full flower. I saw the beautiful Persian *Cyclamen* under the shelves of the rocks, and towards the highest parts the vernal crocus was just opening its blossoms. The day was fine, and the atmosphere remarkably clear; from the summit I commanded an extensive view of the straits of *Negropont*, and various of the *Cyelades*; the eastern coast of *Attica*, with its numerous ports stretching to *Cape Colonna*; the *Saronic gulph*, with its lands interspersed in it; the rich plains of *Messora* and others, with its city and groves of olives; the mountains of *Pendali*, and *Parnes* in *Attica*, and of *Citheum* in *Bœotea*. *Hymettus* cannot be ranked among the highest mountains of Greece; its height is less than that of *Parnes*, and nearly the same with that of *Pendali*; not sheltered by wood, it is exposed to the wind, and has a sun-burnt appearance. The neglected state of the monastery arose from the debts which it had contracted; these, in some measure, had been lately paid by the See of Athens, to which the revenues of the monastery belonged. THE HONEY MADE IN IT WAS THE PROPERTY OF THE BISHOP; and the Caloyers were so poor and so strictly watched, that they could not procure me even a taste of it."—P. 149.



## ARAB HIVES.

THE scene I have drawn for you is on the track from Tunis to Zagowar: a few Bedouin tents, pitched by the side of the vast aqueduct, which conveyed water from the sweet streams of the Oasis at Zagowar, to Carthage. It occasionally was reared on such lofty arches as you see in the drawing, and occasionally was tunnelled under ground. Though I had not room to turn, but was obliged to back out, I rode into the pipe which conveys the water, at a place where it was entering a hill. The Hives are wicker baskets, like brawn hampers, plastered over with mud, and laid on their sides. The statistics of the Honey and the Bees I did not gather, not then being Apiarian; now I shall know better: and the next time I visit the Bedouin, with his two-handed sword, I shall bring you back a most detailed account.—*Letter from H. W. Acland, Esq.*



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7. Instructions for the Profitable Ordering of Fish-Ponds, and for Breeding of Fish.

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The Fourth Edition.

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By Sir J. More.

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L O N D O N,

Printed and Sold by J. How, at the Seven Stars in  
*Talbot-Court, in Grace-Church-street, 1707.*

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\*\*\* I have reprinted entire the Chapter of this Work, (1 vol. 12mo.) which relates to Bee Management.

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## ENGLAND'S INTEREST,

AND THE

*Farmer's Friend, &c.*

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### CHAP. VI.

*Of the Husbandry and Employment of Bees, and the great Profit and Advaniage thereof.*

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#### THE INTRODUCTION.

AMONG all the creatures which our bountiful God has made for the use and service of man, in respect of great profit with small cost, of their ubiquity, or being in all countries, of their comely order and continual labour, the Bees are most worthy of our admiration.

For first, with the provision of a Hive and some little care and attendance, (which need be no hindrance to other business, but rather a delightful recreation in the midst of our labours,) they bring sweet product both for food and medicine.

There is no fruit or flower, no wood or forrest, no hill or dale, no promontary or campaign land, no fruitful or unfruitful soil, but what affordeth matter for the Bee to work upon.

In their labour and order at home and abroad, they may be a pattern unto men both of the one and the other; for unless they are hindered by weather, weakness, or want of stuff to work upon, their labour never ceaseth; and for their order, it is such that they may well be said to have a commonwealth, since all they do is in common without respect to private interest. They work for all, they watch for all, and they fight for all. In their private quarrels when they are from their Hive, how much soever you abuse them, they will not resist, if they can by any means get away; but when they are at their Hive, the common treasury for themselves and their young, they'll fight it out and contend for this properly to the last shanks. The epithets given to Bees by several authors which have written on this subject, are *profitable, laborious, busie, loyal, swift, nimble, quick of scent, bold, valiant, cunning, chaste, neat, brown and chilly.*

#### I.—OF THE BEE-GARDEN AND SEATS FOR THE HIVES.

1. Your Bee-garden must be in a plat of ground, near your house, that you may always have them in sight, your assistance being often suddenly required in all storms and fighting, when 'tis your business to provide them with a new house, and to part them in the fray.

2. See that they be securely fenced from all cattle, and especially from hogs, and that they be secured from wind, that when the Bees come home laden and weary, they may soon settle at their Hives.

3. Let your north fence of your garden be very close, and high withal, to secure them from the piercing winds of the quarter, and therefore, if possible, set your Bees on the



south side of your house, where they will have most sun in winter, and best settle to their Hives.

4. Let the east fence of your garden be big and high, to keep the Bees as well from the wind as sun, for the morning sun does often bring them forth of their hives, when the wind is so cold and sharp that they cannot endure it. But in no wise let the place be shadowed from the south sun, for that does not only dry the leaves and relieve the Bees in winter and spring, but causes them to swarm in summer.

A house or wall, or good pales, is fittest for the north fence, and a quickset edge for any of the other quarters, and it may serve for the first, if it be thick.

Take care that the garden be always kept clean and sweet, free from noisome scents. I have known a good Hive spoiled by having poultry roost over them.

Take care that it be neither cold in winter nor very hot in summer, *Locus æstate non fervidus, heeme\* tepidus*. A bare flower† is very prejudicial; a grassy ground I esteem to be best; but let it be kept cut in summer, for long grass harbours the Bees' enemies; and let it not be wet in winter.

Let it be conveniently set with trees and bushes, fit to receive the swarms, as plum, cherry, apple, filberds, hazels, and thorns, and these chiefly in the south and east fences, and not too near the stalls.

The place being thus fitted, the seats are to be provided, which, whether stools or benches, must be set a little shelving, that the rain may neither run into the hive nor stay at the door.

'Tis not good to set many stalls on a bench, because in winter it may cause the Bees to fight; for hereby they have access, by foot, to one another's houses, which they may sometimes mistake for their own.

The single, therefore, are best, which I would advise to be set at least two feet apart, and rather supported with four legs than to be flat on the ground; if the legs are

\* Sic.

† Qy. Flower-garden.

twelve or fourteen inches, three or four inches may be forced into the ground for their surer standing.

For their size they should not be above half an inch or an inch without the Hive, save only before, where there ought to be the space of three or four inches, that the Bees may have room enough to light upon it.

The best stools are of wood; those of stone are too hot in summer, and too cold in winter.

The stools must be set towards the south, or rather with a point or two towards the west, that the Hive may somewhat break the east wind from the door, and that the door may be light at sun setting.

The stools should stand in straight ranks or rows from west to east, five feet one from another, measuring from door to door, and from south to north, six feet one behind another; besides, let them stand as far from three of the fences as they do from one another.

The number of the Hives in a garden is not to be determined. But it is generally computed that the climacterical number of nine times seven, which is also the climacteric of man, is a sufficient stock for a Bee-garden; and out of this a man may supply himself with a competent maintenance.

## II.—OF THE HIVES, AND MANNER OF DRESSING THEM.

In some countries they use Hives made of straw bound with brambles; in some, wicker Hives, made of prive willow,\* or harl, dawbed with cow dung, tempered with gravelly dust, or sand, or ashes.

The straw Hives are the best, because in them the Bees do best defend themselves from the cold, when they hang round together in the form of a globe, (which the philosophers do account a perfect figure,) and therefore the nearer the Hive doth come to the form thereof, the warmer and safer will the Bees be kept; but of necessity the bottom must be broad for the upright and sure standing of the

\* Sic.

Hive, and for the better taking down of the combs, and the top must rise from two or three inches higher than the form of a globe.

A handle on the top of each hive is requisite for two uses ; viz. carrying the Hive, and staying the hackle from falling off.

Your Hive must be of any size, between five or seven gallons, that any swarm, of what quantity or time soever, may be fitly hived. Have always by you Hives enough in store, but most of the middling sort, lest you should want when you have an occasion.

Your Hive being thus made, it must be dress'd after this manner: take off all the staring straws, twigs, and jags, that are offensive in the Hive, and make it as smooth as possible; if you need but few Hives, you may prune them clean with a knife; if many, then you may singe or sweep the inside; but do it which way you will, rub it well at last with a piece of a grind-stone, or rough sand-stone.

Your Hives being pruned put in your spleets, three or four of them, as the largeness of your Hive shall require, the upper ends whereof set together at the top of the Hive, and the lower fasten about a handful above the skirt; besides these spleets within the Hive, the straw Hive must have four other spleets driven up into the skirts, to keep the Hive from sinking when it is loaded; two of them are the two door-posts, the other two are hind-posts, set at equal distances.

In swarming time, season the Hives that you are minded to use, thus: rub them down with sweet herbs, such as the Bees love, as thyme, baulm, savory, marjoram, fennel, hysop, mallows, bean-top, &c. And when the swarm is settled, take a branch of the tree whereon it is, and wipe it clean, and then wet the inside of your Hive with a little honey mead, or salt and water, or small-beer. And thus the Hives are to be prepared and dressed.

You must be sure always to keep your Hives close covered, and the best covering is a thick hackle. *Alvearia*

*straminea operire utilissima.* The manner of making the hackle is thus; take four or five good handfuls of wheat or rye-straw drawn out of the sheaf; beat out the corn, draw out the ears of each handful longer on the one side than the other, and putting the long sides together in form of a sugar-loaf for casting off the rain, bind them all in one under the ears as fast as you can: the head is to be covered and bound fast with a cap, which must be artificially wreathed or platted on the top. For the length of the hackle each one is to be fitted to the Hive, so that the skirts thereof may reach to the stool, or within half an inch of it round about, save only before, where it must be parted somewhat shorter, that the Bees' passage be not hindered; and then gird the hackle close to the hive, lest the wind disorder it: the hackle thus fitted and placed is now and then to be removed, not only to meet with mice, moths, spiders, earwigs, &c. which harbour under it, and to see what breaches the mouse and titmouse have made, but also to air the moist Hive; and this must be done in a warm and windy day after much wet.

In the next place, your Hives must be kept close, for defence of the Bees against their enemies; the best cloom for the purpose is cow-dung, tempered with lime or ashes, with sand or fine gravel, which are also good against the gnawing of mice; with the cloom close up the skirts and bracks\* of your Hives, that there be no way into them but only by the door, and then take care not to move them without urgent occasion.

When you have occasion to remove them, tile up a side of the Hive with a little tile-shard, lest the Bees should be crush'd by the rhum† of the Hive; and when removed, cloom them up fast again, as before directed.

Care must be taken of the Bees' entrance into the Hive, which must have three doors,—a summer door, which must be made of such a size, that the Bees in summer, when their

\* Does *bracks* mean *backs*?

† Is this a misprint for "rim"?



number is greatest, may have air enough, and free egress and regress: the space of four square inches is sufficient for any stall.

The summer door is thus made: first cut away the lowest rowl the space of five inches, and with the thread which bound that part make fast both ends; then fill it up again, the two extream half inches of the place, with two door-posts, which are splits of four or five inches long, run thro' the bottom of the Hive.

The winter door or wicket is made of a piece of wood an inch and a quarter thick, and almost an inch high, and five inches long; at each end whereof cut away half an inch, all save before, leaving the uncut ends a quarter thick, with the full height, to fit the door-posts; then in the middle of the nether side, cut through the thickness a passage of a third part of an inch wide and three inches long. The use of this door is to restrain the passage, when there needeth not so much room, that the Bees may the better keep out the robbers, that the cold may have the less force, and that the mice may not enter.

The bar or shutting is to be made four square, of some heavy matter, as lead, that neither the wind nor the crafty titmouse may remove it: with this bar you may shut or half shut your wicket, as you see occasion, to defend your Bees according to the rigour of the season.

Every Hive ought to have its settle before it, which is a piece of board of the breadth of the stool, and that length; it may stand leaning from the ground to the fore-part of the stool, on which the Bees may settle when they come home, and on which they may sun themselves.

I shall conclude this chapter with giving you some rules for ordering your Hives in the four quarters of the year. But you must understand, that the four quarters of the Bee year begin one month sooner than the astrologers; and, contrary to usual custom, I must begin with the summer.

In the summer season the Hives must have their large

entrance open, that they may have air enough, and that they may not hinder one another as they return home from their work, or be stopped in swarming; and therefore at Gemini set the doors wide open, without bar or wicket, and so let them stand all the season.

The Bees' autumn begins at Virgo, which is the most dangerous time of all the year for wasps, who now learn the way into the Bees' Hives, and rob 'em of their honey; therefore shut up your winter gates and bar them close to keep out the thieves and robbers.

The Bees winter begins with Sagittarius, in which, as the plants lie still in the earth, waiting the sun's return to revive them, so the Bees lie still in their Hives sleeping away their fruitless hours, and living on the product of their summer labours: yet if there happens a mild and warm day they presently go abroad to take the fresh air, recreate themselves, drink, exercise their wings, carry forth their dead, &c., and having thus refreshed themselves, return to their Hive; but many of these days are dangerous, because by warmth of the weather they imagine the summer is at hand, and so they revel and consume the victuals which they would spare in frost and snowy weather. You must be sure this quarter to keep your doors close shut when it is cold weather, and never to open them but in a warm air, and be sure you shut them again at night.

The last quarter of the Bee year is the spring, which enters with Pisces, at which time the plants begin to sprout, and the Bees begin to breed again. The first fair day, therefore, in this quarter, open the doors of your Hives, and so let them continue; for the colds will not at this time of year hurt your Bees, and the day cold will do them more good than hurt: the weaker swarms which are more subject to cold, you must leave but just room enough in the door for one Bee to pass, that the robbers may not have too large an entrance; for now, by the help of the sun, they are able to maintain a vigorous seige.

At this time in a morning, before the Bees come much abroad, gently lift up your Hives, and quickly sweep away the dead Bees and other rubbish, and scrape your stool clean, then set the Hive down, and cloom it close up.

### III.—OF THE BREEDING OF BEES, AND OF THE DRONE.

There is a great contest amongst philosophical Bee-masters how the Bees are generated: some are of opinion that they never generate, but receive and bring home their seed from flowers; others say that they have amongst 'em both sexes, yet do not agree which are the males and which are the females.

The Drone is a gross stingless Bee, that spendeth his time in idleness; yet is there such a necessary use of him, that without him the Bee cannot be: it is the opinion of some that he is made of a Honey Bee, which is even as likely as that a dwarf, having his guts pull'd out, should become a giant. The truth is, the Drone is of the same species with the Honey Bee, but of a different sex, and by whose masculine virtue and natural heat the Honey Bee secretly conceiveth, and beginneth their breeding at the sun's entrance into Pisces, when they first gather on flowers; but their chief time is in Aries, Taurus, and Gemini, which months yield ambrosia in great plenty, variety, and virtue.

The Bees will be sure to serve themselves first, their first generation being always females.

### IV.—OF THE SWARMING OF BEES, AND THE HIVING OF THEM.

The stocks having bred, and filled their Hives, do send forth their swarms, which consist of such parts as doth the stock; namely, of a Queen Bee, Honey Bees, as well old as young, and Drone Bee.

Many are of opinion that the swarm consisteth only of young Bees, and that the old ones tarry behind ; yet indeed the swarm is not younger than the stock, for there is both of both sorts. The young Bees remain in the stock with the old for their defence and for the greatest labour ; and the old ones go with the young in the swarms for their aid and guidance in the work. The Drones they take with them for the propagation of their kind ; and therefore those swarms that have many Drones with them will surely prosper.

A warm, calm, and showery spring causes many and strong swarms, but sudden rains prevent them : dry weather makes plenty of honey, and moist, of swarms. The chief time for breeding Bees is the spring, and the summer for gathering of honey ; so that when a dry summer followeth a moist spring, the Bee-folds will be rich.

The Bees delight to swarm in calm and warm weather, but especially in a hot gleam, after a shower of rain. The swarms for the generality rise between the hours of nine and three, and sometimes an hour sooner or later. But they chuse rather the forenoon, if the weather please them.

The swarming months are two, Gemini and Cancer ; that is, one month before the longest day, and one month after.

Those swarms that come in the first swarming month are very good ; but such as come in the last fortnight of the last swarming month are but indifferent. Those that come before the blowing of knap-weed, come in very good time, and before the blowing of blackberry ; but blackberry swarms are never good.

A good stock doth usually cast a prime swarm, and an after swarm : one prime swarm is worth two or three after swarms, unless the prime swarm be divided in the swarming, or some part thereof stay behind.

The signs of the Hive's fulness and readiness to swarm are



seen at the Hive door, 1. By the Bees hovering in cold evenings and mornings. 2. By the moistness or sweating on the stool. 3. By their hasty running up and down. 4. By their first lying forth in foggy and sultry mornings and evenings, and going in again when the air is clear. 5. When they will swarm, sometimes they gather together without the door, not only upon the Hive, but the stool also, which is a sign of swarming; but when they lie and hang forth continually, it is a sign that they will not swarm.

For those stocks which, not swarming in Gemini, happen to lie forth, keep the Hive as cool as may be, by shadowing of it, and watering round about it, and by enlarging the door to give them air, and move the cluster gently with your brush and drive them in.

For such as will not swarm, your best way is to double the stall, by turning the skirt of the Hive upwards, and setting an empty prepar'd Hive upon it, into which they will ascend, and work and breed as well as in the old. Such a stall will be very good to be taken, or, being young, to be kept.

The signs of after swarms are more certain, the sign being always heard before they begin to swarm.

If the prime swarm happen to be broken, the second will both call and swarm the sooner, it may be the next day, and by that occasion haply a third and sometimes a fourth, but all within a fortnight after the prime swarm, except in some extraordinary years both for breed and honey. After a second swarm, I have heard a young Lady-Bee call, but the queen, not being willing to part with any more of her company, did not answer, and the next day she, with seven others, were brought forth dead; and sometimes when the queen hath given her consent to a third or fourth swarm, the Bees, finding their stock like to live, shew themselves loth to go out.

When the swarm is up, it is common to beat a pan, kettle, mortar, or brass candlestick, near the place where

'tis convenient for the swarm to pitch, and the Bees will follow the sound; and if they are got up into the air, the sound will bring them down, or else you may fling dust or sand at them, which will cause them to pitch.

Sometimes they will fly so fast that you cannot take them, and then they belong to the happy finder; yet the law of Christendom allows you to follow them into any place where you can see them. Sometimes they will lodge themselves in a hollow, or in an empty Hive, and therefore it is convenient to keep empty Hives in your garden. A poor woman having taken a swarm to keep for half, by New Year's tide had lost her half and her partner's; and being careless of the Hive when the Bees were dead, she let it stand abroad till she had forgotten it. The next summer, coming into her garden, she found some Bees passing to and from her Hive, which Bees were then busie in cleansing and dressing it. She, wisely fearing that the Bees came to carry away the wax that was left, bid her daughter take the Hive and carry it in. The wench, following her play, did happily forget her mother's commands, and by that means the Hive stood till an unexpected swarm came, which afterwards stocked her garden.

The manner of Hiving a swarm is as followeth: when the swarm is fully settled and at biggest, having prepared your Hive as before is ordered, take a mantle, or any convenient broad cloth, and lay it on the ground just under the swarm; then take two rests, which are pieces of wood somewhat longer than the bottom of your Hive is broad, and about an inch and a half thick, these lay at equal distances on your cloth, no farther asunder than that the bottom of the Hive may rest upon them both: you must also have a brush made of a handful of rosemary, hysop, fennel, or other Bee-herbs. This being finished, let the Hiver first drink of the best beer, and wash his hands and face therewith; then let him go gently to work, taking good heed where he sets his foot, and how he handles. Having

laid his rests and mantle, let him hold the Hive in one arm, and shake the Bees into it, and immediately, with great gentleness, set the Hive on the rests. If any of the Bees remain behind or return to the place of the swarm, let him lay in the place some stinking arable, or other noisome herb, which will keep the Bees from returning: this to be done if they pitch on a bough.

If they light on the ground within two foot of it, shake 'em or brush 'em on the mantle, and set the Hive on the rests over them; if they light at any small distance higher, you may raise the mantle and rests with stools, and do as before; if upon a high tree, you must cut off the bough with a sharp instrument, and, covering it with a mantle, or putting it into a large canvass bag, bring them gently down to the Hive; if they light on the body of a tree, then you must brush them into a mantle or bag, and Hive them as before; if they light on the top of any thing, then must you support the Hive on the top of a prong over them, and drive them upwards into it; if they fall in the middle of a hedge, then must you work away the nether part of the hedge, till you can come under them with your Hive. It is very difficult to move them if they get into a hollow tree; the only way I know of, is to smoke them before they are well settled, by which means they will seek out for another resting-place, or return to their stock. If a swarm parts, you must, as before, take one part of the swarm into your Hive, and spreading your mantle over it carry it to the other part; then, giving the Hive a gentle shock to bring them to the bottom, shake the other part into your Hive, and set it gently on your rests.

After sun setting that day you have taken you swarm, remove it to its seat in the Bee-garden, carrying it thither in the mantle; discharge it from the rests at that time, and from the mantle the next morning. All swarms, if the weather be fair, will desire to be abroad on the morrow, and knowing their want, having a house unfurnished with-

out provisions, will bestir themselves in their labours ; but they are much discouraged if they are kept in by the foul weather the first day : tho' they can live five or six days without honey, they grow weak and often dye.

The means to recover a drooping swarm is thus : the first sunshiny day turn up the Hive to the sun, that the heat may revive them, and sprinkle the sides of the Hives, and also the Bees with a little mead or honey-water ; hold them in the heat of the sun till you see many of them fly abroad, and then set it down.

#### V.—OF THE BEES' ENEMIES, AND HOW TO DESTROY THEM.

The good Bee, as other good people, hath many bad enemies, which she herself cannot overcome without the assistance of man, for whom she labours ; and therefore the wise Bee-man will take care to destroy the enemies of his best friend, the Bee, whose enemies are—

1. The mouse (whether he be of the field or house) is a dangerous enemy, for if he gets into the Hive he tears down the combs, makes havock of the honey, and so starves the Bees : some gnaw a hole thro' the top of the Hive ; some keep their old homes, and come to the Hive only for food ; and some make their abode between the hackle and the Hive.

To prevent which, take care that your Hives be well and close wrought ; for if the straw be loose and soft, they will the easier make their way thro' the Hive ; also take care that your Hive be close dawbed with cloom, that they may have entrance nowhere about the skirts, but at the door only ; it is also good that ever and anon you take off the Hives, not only for this but other causes. A Sampson's post is very good to place near your hives.

2. The woodpecker and sparrow are both enemies to the Bees ; the woodpecker, with his round long tongue, draweth out the honey ; but he doth more mischief to



Wood-Bees than those of the garden ; the sparrow doth devour the Bees from the time of the first breeding till the wheat be kernalled.

3. The titmouse is another enemy, of which there are three sorts. The great titmouse, from his black head and breast, is called a cole-mouse, and is the worst enemy to the Bees ; he always watches at the Hive for the coming and going out of the Bees ; he will stand at the door, and there never leave knocking 'till one cometh to see who is there, and then suddenly catching her, away he flies with her ; and when he hath eaten her, he comes again for more : eight or nine will scarce serve his turn at once. If the door be shut, that none can come out, he labours to remove the bar. If that be too heavy, he falls to undermining the door for a new way ; and when these devices cannot get them out, some have the skill to break the dawbed walls of the Hives above, over-against the place where they lie, and there they are sure to have their purpose. This is the greatest enemy the good Bee hath ; and, therefore, by the Bee-men of Hampshire, he is called a Bee-biter. The little russet titmouse in the winter feedeth only on dead Bees ; but in the spring he will take part with the great ones. The little green titmouse can only be accused of eating some few dead Bees, and that only in some hungry time.

4. The swallow is another Bee-eater, who catcheth the Bees in her chops as she flies, and that not far from the Hives, when they come laden and weary home. The only way to destroy these birds is by traps and springs, baited with dead Bees, set round the Hives, or by shooting them with guns.

5. The hornet, being much too strong for the Bees, is also a great devourer of them. Her manner is to fly about the Hive, till she have spy'd her prey settled at the door, and then suddenly she taketh it in her feet, and flies away with it, as a kite with a chicken. In destroying the hornet you must be wary, for their stinging does oftentimes

cause a fever; and less than thirty, as some say, will kill a man.

6. The wasp is a great enemy to the Bees, and more hurtful than the hornet; for the wasps destroy the honey as well as the Bees themselves. The best way to destroy them is by killing the mother wasps when they first come abroad; you may take them with your flap at your Bee-doors, on the hives, when they sit sunning themselves, and on the gooseberry bushes from the beginning of May.

7. The flying-moth is also another enemy; he lieth between the hackle and the Hive, and breedeth little worms, or crawling-moths, some on the skirts of the Hives, and some within on the stools. You are easily rid of these guests, for these and the snails are soon crushed; they are some of the meanest enemies, and are the soonest destroyed.

8. If you have any emmets or ants near your Hive, they will be a perpetual trouble to your Bees. While the Bees are strong and in health, they will fight and destroy the ants; but when they grow weak, the ants get the mastery of them, and take possession of the Hive. The best way to destroy this enemy is by scalding them.

9. The spider is another enemy, which harbours between the hackle and the Hive; and you shall seldom find but that she hath two or three Bees in store to feed on; and sometimes when the Bees are weak, they will be bold to enter the Hive, and there weave their fatal web. Ashes strewed on the outside of the Hive will not suffer the spider, moth, or anything of that nature, to harbour there. And thus much for destroying the Bees' enemies.

## VI.—OF THE REMOVING OF BEES.

In removing of Bees, be careful to avoid the five evils;—hindering of their swarming, and of their honey; gathering, breaking of their combs, robbing, and loss of Bees.

Remove always in a fair day, and as near as you can guess in settled weather; for when they are removed to another place, they will fly to their old standing as soon as they are let go, and hanker about for some days, where, if they meet with cold or wet, many of them will lose their lives.

The time of the year for removing the Bees is in the three still months, or within a fortnight before or after. You must not remove them in summer. You must never remove them in Virgo, for the old inhabitants of the garden finding new neighbours come among them, will be sure to visit them at a time when the chief of their strength is straggling abroad, seeking for their old dwelling; and they will bring the rest such cheer to their house-warming, as may happily make the house too hot for them; and then they must be forc'd to go along with them, and make them carry their own goods after them.

The fittest of all to remove them is in Libra. In the evening, when you design to remove, an hour before sun-setting (having first shut the Hive close), immediately lift up the stool; then having prepared another stool of the same height, and covered it with your mantle, so that the middle of the mantle be over the middle of the stool, set this covered stool in its place, or, if the old stool cannot well be moved, then set the covered stool by it. This done, lift up the stall from the old stool, and set it on the new; and then, wiping the Bees from the old stool with your brush, either take the stool away, or cover it with a cloth. Within a while, when the Bees are all in, fill up the door with grass, and tie the mantle at the four corners over the Hive, so that the knots may not slip; and then bind it to the Hive about the middle slackly, and rest it fast with a little stick.

The best way to carry your stall is upon a coul-staff, between two persons; if it be light, one may carry it in his hand. Be sure it be hung perpendicularly, for fear of

breaking the combs, especially if you happen to remove before Libra, when the wax is soft, and the honey is plentiful.

When you have brought the stall home, you may let it stand, bound as it is, all night in the house; on the morrow, when the weather serveth, set it on its seat; but if it be foul all that day, keep it bound until it be fair; and then, having loosed the line and taken away the mantle, cloom it up presently, leaving for three or four days a very narrow entrance, for fear of robbing.

#### VII.—OF THE FRUIT AND PROFIT OF BEES.

The most usual, and generally most useful manner of taking the combs, is by killing the Bees, for which the natural and seasonable time is in Virgo, from the end of the dog-days. At this time, therefore, consider with yourself what stalls you will kill: swarms that may live are yearlings; and two yearlings that are in proof, and may be kept in store.

Those of three or four years, which by reason of their swarming this last summer are full of Bees, most likely are fat, and therefore worth the taking; but they are also good for store, unless the frequent honey dews makes them over fat; but those of that age which are cast Hive are not likely to continue, and therefore are to be taken, as are also poor swarms not worth the feeding—all light stocks—for they will surely dye. Such also as they as do not carry out their dross, and drive away their Drones in good time, also those whom the robbers do easily assault, are to be most suspected; and if their combs be once broken, delay not their taking. Moreover, all stalls of three years old and upwards, that have mist swarming two years together, and especially those that have lain out the summer before, and did not cast this last summer, for such do seldom prosper. It is better, therefore, to take 'em



now they are good, than, in a vain hope of encrease, to keep them till they perish.

Neither is it safe to trust any, after they have stood five years and upwards, that have mist swarming two years together, unless it be some special sort of Bees, which always keep themselves in good heart: such as these I have kept nine or ten years. Likewise, if you have any that are very fat and full of honey, as some years some will be even down to the stool, those are ripe and ready to yield their fruit; one such stall is worth three or four. Take them, therefore, in the season. Take the worst and the best of them.

Having made choice of your stalls, to be taken two or three hours before sun-setting, dig a hole in the ground (as near the stalls as may be) of about nine inches deep, and almost as wide as the hive skirts, laying the small earth round about the brims. Then having a little stick slit in one end and stripped at the other, take a brimstone match five or six inches long, and about the bigness of your little finger, and making it fast in the slit, stick the stick in the middle of the bottom or in the side of the hole, so that the top of the match may stand even with the brim of the pit, or within one inch of it, and then set another by him drest after the same manner, if the first be not sufficient. When you have fired the matches at the upper ends, set over the Hive, and presently shut it close at the bottom with the small earth, that none of the smoke may come forth; so shall you have your Bees dead and down in a quarter of an hour.

But a moveable pit is much better, being always ready without any labour, for any stall in any place of the garden, which is to be made of the round trunk of an elm or other tree; the length or depth ten inches of the concave or hollow part, ten at the top, and eight at the bottom, the confex superficies eighteen inches; and so the trunk will be five inches thick below and four above. The pit being

placed, fasten the stick with the matches in the middle of the bottom, fire the match set over the stall, and stop in the smoke with linnen cloths. If any Bee escapes he will die that night; and you may kill them that do any harm, if you find them on the place.

I shall here omit the manner of driving of Bees from one stall to another, the invention having in it much of curiosity, and nothing of profit in it; and whilst some have endeavoured to enrich themselves by getting the honey, and saving the Bees at the same time, they have but made good the old proverb, All covet, all lose.

There is another way which has been try'd with success, which is called exsection or castration, which is done by cutting out part of the combs, part being left for the Bees' provision; but what is to be taken and what left, I find it not determined. This practice was anciently used in plentiful countries, as Greece, Sicily, Italy, &c. But, however they might succeed in those countries, I take our climate to be very unfit for that practice.

The Hive being taken and housed, lay it softly on the ground, upon the sides, not the edges of the combs; and loosing the ends of the splits with your fingers, and the edges of the combs, where they stick to the sides of the Hive, with a wooden slice, take them out one after another. Then having wiped off the half-dead Bees with a goose-feather, break the combs presently, while they are warm, into three parts. The first, honey and wax; the second, honey and wax with sandarack; the third, dry wax without honey; and that they may break right where you would have them, mark the place deeply with the edge of your knife.

But first provide necessary instruments, as pans, knives, tongs, sieves, or wheat-ridders; a slice, a wax-grate, knives, straining-bags, a tub or kive, with a tap and tap-ware; a hairen-cansive, honey-pots, wax molds, meath-barrels.

These things provided, take out the first combs, and set-

ting the honey-ends in a ridder (resting on tongs over a clean pan or kiver,) which will not leak; mark and break off the first part for honey, and leave it there; then going to the kive, fitted with a tap and tap-ware, mark and break off the second part for meath or hydromel; leave it there, and lay aside the third part for wax; then taking out one and the other, do the like till the ridder is full.

That honey which first flows of itself from the combs, is called virgin-honey; tho' the honey which comes of the first year's swarm is called by the same name.

In Hampshire, where there are great quantities of Beegardens well-stock'd, the Bee-man does not take the care as is here set down, but takes all the honey-combs out of the Hive with a light shovel; he puts all into a tub, and pounds 'em altogether; and then putting it confusedly into a strong-haired bag, does violently press out all that will run, and this (having first its season of heat over the fire) they put in barrels or other vessels to work. This done, they put what remains in the bag into a trough or other vessel, and wash it for meath. When the sweetest is all washed out, being crushed dry, the balls they try for wax.

The honey being put up warm into pots, will in two or three days' time work up a scum of course wax, dross, and other stuff, which must be taken off.

Good honey is clear, odoriferous, yellow, like pale gold, sharp, sweet, and pleasant to the taste of man, between thick and thin, and the best honey is at the bottom. The virgin honey is more chrystalline at first, and will be neither hard nor white, but changeth its liquidity and chrystalline clearness into a thick softness and bright yellow colour.

Meath or hydromel is of two sorts; the weaker and the stronger meath, or metheglin.

If your mead be not strong enough by the refuse of your combs, then put so much of your course honey into it, as will make it strong enough to bear an egg the breadth of a

twopence above the top of the liquor, which is sufficient for ordinary mead ; and afterwards, till night, ever and anon stir it about the kive. If you would make a greater quantity, then you must add a greater measure of water and honey ; namely, six gallons of water to one of honey. Some will boil this proportion of six to one, to four, but I think to five is very sufficient ; the spices to this proportion are cinnamon, ginger, pepper, grains of paradise, cloves, of each two drams. The next morning, put to the liquor some of the scum of the honey ; stir them together, and stoop the kive a little backwards ; when it hath settled an hour or two, draw it off to be boiled ; and when you see the sediment appear, stop, and let the rest run into some vessel by itself, which, when settled, strain into the boiler, and the dregs of all cast into your garden for the use of your Bees.

When your liquor is set over a gentle fire, and a thick scum is gathered all over, and the bubbles by the sides begin to break the scum, having damp'd your fire to cease the boiling, skim it clean, and then presently blow up your fire ; and when you see the second scum ready, having again damp'd the fire, take off the scum as before ; and then having again stirred your fire, let it boil handsomely for the space of an hour, or thereabouts, but be sure you always keep scumming of it as there is occasion.

After all this is done, put in your spices according to the former receipt, and let it boil a quarter of an hour more at least. The end of boiling is to cleanse the mead, which once done, any farther boiling does but rather diminish, than encrease the goodness and strength of the mead.

As soon as it hath done boiling, take it from the fire and set it to cool ; the next day when it is settled, strain it thro' a hair sieve or linnen bag into the kive, reserving still the dregs for the Bees, and let it stand cover'd three or four days till it work, and let it work two days ; then turn it into a barrel scalded with bay-leaves, making the spice bag



fast at the tap. If you make no great quantity of mead, you may tun it the next day, and let it work in the barrel; your ordinary mead which turns sour, will make excellent good vinegar.

Metheglin is the more generous and stronger sort of hydromel, for it beareth an egg to the breadth of a sixpence, and is usually made of finer honey with a less proportion of water, namely, of four to one. To every barrel of sixteen gallons of skimmed liquor, add thyme one ounce; eglantine, sweet marjoram, rosemary, of each half an ounce; ginger, two ounces; cinamon, one ounce; cloves and pepper, of each half an ounce; all gross beaten, the one half boiled loose in the liquor, and the other half put into a bag before in mead; so that after this manner being made, as ordinary mead will not keep above half a year: this, the longer it is kept, the stronger it is, and hath the more delicate flavour and taste.

This was a drink frequently used among the ancient Romans, who, I suppose, first taught the ordering of Bees, and brought this wholesome liquor into our island. We find by history, it was the approved and common drink of our ancestors, even of our kings and queens, who, in former ages, prefer'd the liquors of *the* product of this island, before those imported from foreign countries, as did the famous and renowned Queen Elizabeth, who every year had a vessel of metheglin made for her own drinking. A receipt of this Queens metheglin coming to my hands, I shall oblige the reader therewith, as follows:

Take a bushel of sweet briar-leaves, as much of thyme; half a bushel of rosemary-leaves, and a peck of bay-leaves; and, having well-washed them, boil them in a copper of fair water: let them boil the space of half an hour or better, and then pour out all the water and herbs into a fat, and let it stand till it be but milk warm; then strain the water from the herbs, and take to every gallon of water, one gallon of the finest honey, and beat it together for the space

of an hour; then let it stand 2 days, stirring it well twice or thrice a day; then take the liquor and boil it again, and skim it as long as there remains any scum; when it is clear, put into a fat as before, and let it stand to cool. You must then have in readiness a kive of new ale or beer, which as soon as you have emptied suddenly, presently put in the metheglin, and let it stand three days a working, and then tun it up in barrels, tying at every tap-hole, by a pack-thread, a little bag of beaten cloves and mace, to the value of an ounce. It must stand half a year before it be drank.

As the vertues of honey are transcendent, so are the vertues of meath and metheglin: when old, it is a wine most agreeable to the stomach. It recovereth, 1. A lost appetite. 2. It openeth the passage for the spirit and breath. 3. It softeneth the bowels. 4. It is good for them that have the cough or ptisick. 5. If a man take it not as his common drink, but every now and then as physick, he shall receive much benefit thereby, against quotidian agues, cachexies, and against all the diseases of the brain, as the epilepsy, &c. for which wine is pernicious. 6. It is very good against the yellow-jaundice. 7. It is also a counter-poison. 8. It nourisheth the body, and is consequently good against the consumption, and all emaciating diseases. 9. It is the best thing in the world for the prolongation of life. Pollio Romulus (who was a hundred years old) imputed the continuance of his health to this sovereign liquor, who, being asked by Augustus the emperor, by what means especially he had preserved that vigour, both of mind and body; his answer was, *Intus mulso, foris oleo*, by the use of metheglin inwardly, and of oyl outwardly. The same thing is manifested from the example of the ancient Britains, who have all along been addicted to meath and metheglin, and than whom no people in the world have more clear, beautiful, and healthful bodies; of whose metheglin, Lobel writeth thus: *Cambricus ille potus methægla, est altera*

*liquida, et limpida septentrionis theriaca.* The British metheglin, says he, is a sort of liquid and clear treacle of the North.

And as good and old metheglin excelleth all wines, as well in pleasantness of taste as for health, so being burnt, it is better than any burnt wine for comforting and settling a weak and sick stomach. The manner of burning of which, being not common in this age, I shall set down the method thereof. Set over the fire a deep pot or kettle, almost full of water; when it boileth, put in a pewter pot full of metheglin; before that beginneth to boil skim it, and put in two or three bruised cloves, and a branch of rosemary; then beat the yolk of an egg in a spoonful of cold meath, and stir them together; then put to that a spoonful of hot meath, and after that another, always beating them together; and then by degrees pour it into the pot, stirring it continually; then as soon as it boileth, take up the pot and pour it into a warm pot of the like bigness, firing it as it runneth, and so let it burn as long as it will. A metheglin posset is of the like vertue.

The manner of ordering the wax is as followeth:—take the wax and dross, and set it over the fire in a kettle or caldron, that may easily contain it; then pour in so much water as will make the wax swim, that it may boil without burning; and for this reason, while it is boiling gently over the fire, stir it often; when it is thoroughly melted, take it off the fire, and presently pour it out of the kettle into a strainer of fine thin linnen, or of twisted hair, ready placed upon a screw or press; lay on the cover, and press out the liquor, (as long as any wax comes) into a kiver of cold water; but first wet both the bag and the press to keep the wax from sticking: at the first cometh most water; at the last most dross, and in the middle most wax.

The wax growing hard, make it into balls, squeezing out the water with your hand. When you have thus done break all the balls into crumblets, and in a skillet or kettle

set it over a soft fire ; while it is melting, stir it and skim it with a spoon wet in cold water ; and as soon as it is melted and skimmed clean, take it off. And having provided the mold, first warm the bottom, especially if the cake be small, and besmear the sides with honey, and then instantly pour in the wax (being as cool as it will run) through a linnen strainer ; when you come near the bottom, pour it gently till you see the dross come, which strain into some other mold by it self ; and when it is cold, either try it again, or, having pared away the bottom, keep it as it is, for some use or other.

When the wax is in the mold, if there be any froth yet remaining on the top, blow it together at one side, and skim it off lightly with a wet spoon.

This done, set not the cake abroad where it may cool too hastily, but put it in a warm house not too far from the fire ; and if it be a large cake, cover it over warm to keep the top from cooling, till the inward heat be allay'd, and so let it stand, not moving the mold till the cake be cold ; if it stick, a little warming of the vessel or mold will loosen it, so that it will presently slip out.

The tokens or properties of good wax, according to *Sylv. de Med. Simp. Delect.* lib.i. *Cera sit flavissima, odorata, pinguis coacta, levis, pura et aliena omni materia carens ;* i.e. good wax is yellow, odoriferous or sweet, fat, fast or close, light, pure, and void of any other matter. That which is most light and yellow, farthest from red and nearest to white ; for as in gold the deepest, so in wax and honey the palest yellow is best ; yea, the pure virgins wax at the first is white ; wax must not be hollow, as is the froth ; for wax like oyl is best in the top, as honey is in the bottom ; and therefore the bottom, into which dross does descend, is not good.

Having thus given directions for the working of the wax, I have shewn all the profit of the industrious Bee, who, like a good common-wealthsman, works for the good of



others, tho' she loseth her life in the enterprise. The honey, the meath, metheglin and wax, are all of 'em as good commodities as any, but the wax more especially, it being full as good as the choice metal of its own colour: it is always a ready money commodity in London, especially English-wax, which generally sells at London betwixt five and six pound per hundred weight, when foreign-wax will not yield near that price.

But, as I have given you an account of the noble and generous wines pressed from the Bee-vineyards, and their vertues, I shall here give you a short account of the vertues of their wax.

Wax hath no fixed elementary quality, but is a mean between hot and cold, and between dry and moist. It mollifies the sinews; it ripeneth and resolveth ulcers; the quantity of a pea of wax being swallowed down by nurses, dissolveth the milk curdled in their breasts; and ten round pieces of wax, of the bigness of the grains of millet or hemp seed, will not suffer the milk to curdle in the stomach. Moreover, it maketh the most excellent light for clearness, and sweetness, and neatness, to be preferred before all others; and is such as is used in the palaces of kings and princes.

The yellow wax is by art, for certain purposes, turned into divers colours, as white, red and green: the doing of it is so common, and so well known, that I shall omit giving any account thereof; besides, it is of use or profit but to the wax-chandlers of the city of London.

And such is wax in its kinds, both natural and artificial. Natural wax is altered by distillation into an oyl of marvellous vertue: it is rather a cælestial or divine medicine, than humane; because in wounds it worketh miracles, and is therefore opposed by the surgeons, tho' they use it themselves; for it healeth a wound, be it never so wide and big, being before stitch'd up, in 10 or 12 days at the most; but it healeth those that are small in 3 or

4 days, by only anointing the wound therewith, and applying a cloth wet in the same. It stayeth the shedding of the hair, either on the head or face, by anointing therewith.

For inward diseases this oyl worketh miracles. If you give 1 dram at a time in white-wine, it will provoke urine, helps stitches and pains in the loins, the cold gout, and all other griefs coming of cold.

The manner of making this oyl is as follows: take of pure new yellow wax as much as will fill half your retort or body of glass; melt it on the fire, and then pour it into sweet wine, wherein let it soak; wash it often, and wring it between your hands; then melt it again, and pour it into fresh wine, and order it as before; this done seven times, every time putting it into fresh wine, then add to every pound of wax four ounces of the powder of red-brick finely bruised, put it altogether in your retort or glass well luted; then set the retort in an earthen pot, filling it round about and beneath with fine sifted ashes or sand, and set the pot with the body in it on a furnace, and so distil it with a soft fire, and there will come forth a fair yellow oyl, which will congeal in the receiver like pap when it is cold; if you should rectifie this oyl by often distilling, it would be too hot, and not fit for use. It is marvellous to behold, at the coming away of this oyl, all the four elements, the fire, air, water, and earth, at one and the same time in the receiver.

Such is the vertue of wax, both in its kind, and altered by distillation; it is also the ground of all cerecloths and salves. The Bee helpeth to cure all your inward and outward diseases, and is the best little friend a man has in the world.

Having gone thro' the vertues of wax, meath, and metheglin, I shall conclude this treatise with the vertues of honey, which, indeed, are many and extraordinary.

Honey is hot and dry in the second degree; it is of subtil

parts, and therefore doth pierce as oyl, and easily passeth the parts of the body; it hath a power to cleanse, and some sharpness withal; and therefore it openeth obstructions, and cleareth the breasts and lights of those humours which fall from the head; it looseth the belly, purgeth the foulness of the body, and provoketh urine. It cureth and bringeth away phlegmatick matter, and sharpneth the stomach of those, who by reason thereof have but little appetite. It purgeth those things which hurt the clearness of the eyes; it nourishes very much, and breedeth good blood; it stirreth up natural heat, and prolongeth life and old age; it keepeth all things uncorrupt which are put into it; and therefore physicians do temper therewith all such medicines as they design to keep long; yea, the bodies of the dead being embalmed with honey, have been preserved from putrifaction. It is a sovereign medicament both for outward and inward maladies. It helpeth the grief of the jaws, the kernels growing within the mouth, and the squinancy or inflammation of the muscle of the inward gargil; for which purpose it is gargarized, and the mouth washed therewith. It is drank against the biting of a serpent, or a mad dog. It is good for such as have eaten mushrooms, or have drank poppies, against which evil the honey of roses is taken warm. It is also good for the falling-sickness, and better than wine, because it cannot arise to the head as wine doth. It is a remedy against the surfeit; for they that are skilful in physick, when they perceive any mans stomach to be overcome, they first ease it by vomit, and then (to settle the brain and to stay the noisome fume from ascending unto the head) they give the patient honey upon bread. In respect of which great vertues, the right composition of those great antidotes, treacle and methridate, although they consist, the one of more than 50, and the other of more than 60 ingredients, require thrice so much honey as all the rest; all which premises considered, 'tis no wonder the wise king, who knew the vertues of all

vegetables and drugs, said, "My son, eat honey, for it is good," Prov. xxiv. 13. The holy land is often, and much commended for flowing therewith; and the Eternal Emanuel did eat it for his food, Isa. vii. 15; Luke xxiv. 43. Honey, if it be pure and fine, is so good in itself, even for those squeamish stomachs which are against it. But, indeed, the vulgar honey may be disliked, as being sluttishly handled, and much corrupted with stopping, and Bees both young and old, and some with other mixtures also.

Honey is most fit for old men, women and children, for such as are rheumatick and phlegmatick, and generally for all that are of a cold temperature; for young men, and those of a hot constitution, it is not good, because it is easily turned into choler; and yet Lobel saith, That honey taken fasting, doth much good to such as have hot livers; and seemeth to say, That our honey is hurtful to none, because it purgeth that evil humour, which other honey in some bodies is thought to breed. All honey immoderately taken causeth obstructions, contrary to its natural quality, and so in time breedeth the scab.

Raw honey doth more loosen the belly, causeth the cough, and filleth the entrails with wind, especially if it be of the courser sort. Being boiled, it is more nourishing, lighter of digestion, and less laxative, as also less sharp; for which reason they use it to knit together hollow and crooked ulcers, and to close other disjoynted flesh. It is also good against the pleurisie, against the ptisick, and other diseases of the lungs.

Honey is clarified by boiling, and that either by itself, or with a fourth part of water or other liquor. But always in boiling skim it, that it may be clear.

By it self you must boil it, till it will yield no more scum, which will be about half an hour, and that with a very soft fire, or in a double vessel, lest by over-heating it gets a bitter taste, and lest it suddenly run over and flame.

With water it is to be boiled an hour at least, even until



the water be evaporated, which may be known by the bubbles that rise from the bottom ; then to make it pure, put to every pound of honey the white of an egg, and afterwards skim it again in the boiling. Towards the end of the boiling you must slacken your fire, for the honey is apt to be set on fire, and to become bitter by too vehement a heat. When your honey is boiled enough, take it from the fire, and that rather too soon than too late ; for if here be any dross remaining, you shall find it on the top when it is cold ; but over much boiling consumeth the spirituous part of the honey, and turneth the sweet taste into a bitter.

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EXPLANATION OF A FEW TERMS USED IN THE FOREGOING.

Page 115. *Spleets*, the cross sticks in a Hive.

- 116. *Cloom*, a cement made to join the bottom of the Hive to the stool.
- 127. *Coul-staff*, a piece of wood, on which the *Coul* (a tub or vessel with two ears) is carried.—BAILEY.
- 131. *Ridder*, a cullender, adapted to run honey.



M E Λ Ι Σ Σ Η Λ Ο Γ Ι Α .

OR, THE

# *Female Monarchy.*

Being an ENQUIRY into the

Nature, Order, *and* Government

OF

B E E S,

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I N S E C T S.

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By the REVEREND

Mr. JOHN THORLEY, of OXON.

---

Illustrated with COPPER-PLATES.

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Μελίσσαις ἐστὶν ἡγεμῶν, ἐστὶ δὲ ἀκολουθία τε καὶ θεραπεία καὶ πόλεμοι καὶ νίκαι καὶ τῶν ἡττημένων αἰσέρεις, καὶ πόλεις καὶ προπόλεις τε καὶ ἔργων διαδοσχὴ, καὶ δίκαι κατὰ τῶν ἀργῶν τε πονηρῶν. Τοῦς δὲ κηφήνας ἀνελαύνουσι τε κολάζουσιν.

Celsus ap. Origen cont. Cels. L. 4. p. 217.

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# ΜΕΛΙΣΣΗΛΟΓΙΑ,

OR, THE

## Female Monarchy.

*The Author, to the Candid and Judicious Reader.*

THE belief of a Deity is necessarily presupposed to all religion, whether natural or revealed. Herein I find the heathen and the Christian fully agreed.\*

And the belief of a Divine revelation is necessary to give it its due influence upon us.† Where the Word of God is not credited, what force can all its arguments have?

The threatenings of the law have no terror, and the promises of the gospel have no sweetness in them to an unbeliever.

If men do not believe themselves concerned in the threatenings and promises; do not apprehend that it is

\* Primus est Deorum Cultus Deos credere. Sen. Heb. xi. 6. Πιστεῦσαι γὰρ δεῖ τὸν προσερχόμενον τῷ Θεῷ ὅτι ἐστὶ.

† Heb. iv. 2.

their own danger which the Scriptures warn them of; their own misery which they describe; and their own interest and happiness which they teach; they can receive no impressions answerable to such a revelation. And final infidelity fixes the soul under wrath.\*

In an age of reigning infidelity, when vice and immorality are under no restraint, but practised with impunity, and without controul, triumphing over all laws, both human and divine; when men not only degrade and villify the sacred oracles; look on the Gospel as no better than a cunningly devised fable, and the most important truths, as the greatest impertinencies; and treat the blessed Author of our most holy religion as a vile and wicked imposter; but also dispute, and even deny the being of a God: a serious essay to establish that first principle of religion, may be of some service to the world.

“In an age so degenerate as the present, so miserably over-run with scepticism and infidelity, not only among sensual men of meaner rank, but even among those who pretend to an uncommon measure of wit and learning; an humble endeavour to fix this first and fundamental truth (however it may be censured and ridiculed by men of corrupt minds and morals,) will not be thought, by the more sober part of mankind, either needless, or out of season.”

And what can more effectually promote the kind design, than a due and diligent attention to the many convincing evidences which Nature, (the work of God), and Scripture, (the word of God), offer in it's favour?

The visible creation is a bright mirrour, wherein men behold and contemplate the invisible things of God.

A large volume lying open to every eye, which is seen and read of all men, or at least should be so; seeing it is wrote in such fair and legible characters, that every man may read; yet how sadly disregarded by the generality of the children of men, who will be left without excuse.

\* John iii. 36.

Who, but a being of infinite perfection, could raise so noble and glorious a canopy, as these visible heavens, beautified and embellished with sun, moon, and stars? Or lay such an area, or floor, as this terraqueous globe on which we tread, and in which we sail; furnished with so great a number of proper inhabitants; situate in the fluid, yeilding air, and supported by no pillars, but almighty and eternal power? An humble and serious view of these, would lead men to the acknowledgement of a supreme Being, who formed both.

“Nature with open volume stands,  
To spread her Maker's praise abroad;  
And ev'ry labour of his hands,  
Shows something worthy of a God.”\*

Not a creature, rational or irrational, animate or inanimate, from the glorious sun, to the meanest insect, but bears it's testimony to this important truth.

“There is no greater, at least not a more palpable and convincing argument of the existence of a Deity, than the admirable art and wisdom that discovers itself in the make and constitution, the order and disposition, the ends and uses of all the parts and members of this stately fabrick of heaven and earth.

“For if in the works of art; for instance, a curious edifice or machine, counsel and design, directing to an end, appear in the whole frame, and the several parts of it do necessarily infer the being and operation of an architect or engineer; why shall not that grandeur and magnificence in the works of Nature, together with that contrivance of beauty, order, use, &c. &c., which is observable in them, wherein they as much transcend the effects of human art, as infinite power and wisdom excel finite, infer the existence and efficiency of an Omnipotent and All-wise Creator?”†

\* Dr. I. Watts.

† Ray, on the Wisdom of God in Creation, p. 32.

“From that excellent contrivance there is in all natural things, both with respect to that elegance and beauty they have in themselves separately considered; and that regular order and subserviency wherein they stand towards one another; together with the exact fitness and propriety for the several purposes for which they are designed, it may be inferred that they are the productions of some wise agent.”\*

Not only the greater, more glorious and majestick parts of nature, sun, moon, and stars, but even the very meanest, evince the necessity of an eternal Being.

“The meanest of creatures, in the judgment of Pliny, that great naturalist, are as perfect in their kind, and as much art shown in their formation, as the greater; nay, and I may add much more.

“In forming such things, such nothings, what curious art, what amazing power was necessary, there being in them such inextricable perfection.”†

The creatures are so many mirrours, wherein we may see God; the meanest having a beam of God’s majesty.‡

And afterwards he adds, I cannot conceive it unworthy the greatest mortals to contemplate the miracles of Nature, since the meanest, and most contemptible creatures express the infinite power and wisdom of the great Creator, drawing the minds of the most intelligent to the first cause of all things, teaching them both the power and presence of the Deity in the meanest insect.

The minutest things in nature were appointed to some particular ends and purposes; and the Deity is as conspicuous in the structure of a fly’s wing, as he is in the bright globe of the sun itself.§

And did we but contemplate the great variety of insects, their exact order, just proportions, perfect policy, &c.,

\* Wilkins’s Nat. Rel. ch. vi. p. 78.

† In magnis siquidem corporibus—in his tam parvis, atque tam nullis, quæ Ratio, quanta vis et inextricabilis perfectio? Plin. lib. ii. c. 2.

‡ Purc. Epist. Ded.

§ Nat. Delin. Transl. from the Orig. Fr.



which proclaim the Divine wisdom in their creation, they must be objects worthy of our notice.

And if what is obvious to our observation, so much charms an ingenious mind, how much more would those charms concealed from our eye and reason (once unveiled) excite our admiration?

“Though their minuteness at first view may seem a just argument for that contemptible idea which the vulgar entertain of them, yet he that views them with due attention, and reflects on the art and mechanism of their structure, wherein is collected such a number of vessels, fluids, and movements, into one point, and that oft times invisible, cannot but discover an All-wise Providence therein.”

My reason assures me there is a Supreme Being; an infinite and eternal Mind; the original cause of all beings, and on whom they necessarily and constantly depend.

And it is against reason as well as revelation, to say there is no God, when we behold the heavens which are the work of his hands.

If this principle be true, and confirmed by two such unexceptionable witnesses, it necessarily follows that religion is a most reasonable service; and the misery of those who never own God by their prayers, nor inquire after him, must be inexpressible, and beyond the power of thought.

There is good reason for a man to quit his estate, if he cannot keep it with the favour of God. And a man may easily answer for not saving his life, if he could not do it without wounding his conscience, and losing his soul. A man's poverty may not be his own fault, and sometimes may be both his duty and his choice; but what can justify that man, who neglects heaven; despises immortal glory, and wilfully destroys his own soul?

The reasonable part in man most strongly opposes the principles of an atheist. And serious inquiries would surely lead men to a Deity.

This appears a principle wherein all men have agreed in

all places and ages. Numerous testimonies might be produced.

"There is no nation so savage and barbarous, as not to believe the existence of a deity, and by some kind of service, to express their adoration of him.

"There is not a nation so entirely lost to every thing of law and morality, as not to believe the existence of God."\*

Whence sprang all the idolatry and polytheism in the world, if not from hence? Nations on earth may be found without cities, schools, dwellings, garments, coin, &c.; but where is a nation to be found without it's gods? Nay, rather than have no altar, they will set up one to an unknown God.†

They greatly differ in their rites and modes of worship, institutions and customs; but all worship some deity or other.

Nature itself has impressed the notion of a God on the minds of all men.‡

"Both the hopes and fears of men, lead them to a Being above them. Do we not find men in matters of difficulty, and in times of danger naturally running to God? For instance, the priests of Baal,§ and the mariners in the storm.||

"And when the messengers of death arrest them, and bring them tidings of a future world, how are they terrified with apprehensions of that Deity they have so much derided?"¶

The consciences of men bear witness to the being of a God. There hath he established the knowledge of himself.

There is a conscience in man, in every man; therefore there is a God, who is lord of conscience, and to whom alone that empire belongs.

\* Nulla Gens usquam est adeo extra Leges Moresque projecta, ut non aliquos Deos credat. A. Sen. Epist.

† Acts xvii. 23.

‡ In omnium animis Deorum notionem impressit ipsa Natura. Cic. de Nat. Deor.

§ 1 Kings xviii. 26.

|| Jonah i. 6.

¶ Sir C. Wolf, of Atheism.

I conclude the argument with the testimonies of a few inspired writers, which make it canonical.

Job, for antiquity and integrity, justly demands to be first heard: "Ask now the beasts, and they shall teach thee, and the fowls of the air, and they shall tell thee; or speak to the earth, and it shall teach thee, and the fishes of the sea shall declare unto thee. Who knoweth not in all these, that the hand of the Lord hath wrought this?"\*

Deplorable indeed is the state of apostate man, when he is sent to such creatures as these for instruction; to learn God's power, and his universal empire, that wise Providence which guides and governs them all.

The royal Psalmist tells us, "the heavens declare the glory of God; and the firmament shews forth his handy work. There is no speech nor language where their voice is not heard."† From all these the being of a God is most evident to the whole world. And what he says of the sun, moon, and stars, those majestick parts of Nature, may as truly be affirmed of the most contemptible insects.

The royal philosopher and preacher send us to the very ants for instruction. "Go to the ant, thou sluggard, consider her ways, and be wise; who having no guide, overseer, or ruler, provideth her meat in the summer; and gateth her food in the harvest."‡

So degenerate is the state of man, that the very insects shame and condemn him, tho' he hath reason and conscience to direct him to a diligent improvement of present opportunities.

Finally, St. Paul has delivered it as an oracle of Divine truth; "that the invisible things of God from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead; so that they are without excuse."§

"Through faith we understand that the worlds were

\* Job xii. 7, 8, 9.

† Prov. vi. 6, 7, 8.

‡ Psalm xix. 1, 2, 3; viii. 3.

§ Rom. i. 20.

framed by the word of God ; so that the things which are seen, were not made of things that do appear.”\*

*Query.* “Can there be matter without a maker? Or motion without a first mover?† Or can there be an effect without a cause? Could this glorious fabrick of heaven and earth be reared by chance? Could the sun, moon, and stars have any light, but from the Father of lights? Or could the earth be hung upon nothing, but by Him who upholds all things by the word of his power? Is it not demonstrable, that something must needs have been eternal? For nothing produces nothing?

“Or can there be any excellency in the effect, which is not some way or other in the cause? Therefore, since so much power, wisdom, and goodness, shine forth in the greatness, order, and usefulness of the several parts of creation, and their aptitude and tendency to the beauty and perfection of the whole; if so much that is unsearchable in the meanest creatures; and since in the enumeration of causes it is absurd to run *in infinitum*, you must needs come up to a first Cause, eternal, and of incomprehensible perfection.”‡

The works of creation being such full and bright displays of the wisdom, power, and other perfections of the Deity, demand the most diligent and serious attention of all men, and ought to be the subject of their daily and most delightful study.

If the arguments from Nature and Scripture do demonstrate the being and perfections of the Deity; convince men of the natural and indispensable obligation of moral duties, and persuade men to religious practice; and if what is proposed and urged in the following history prove effectual for the preservation of millions and myriads, of such excellent, exemplary, and useful creatures, the author will

\* Heb. xi. 3.

† Manlove of Immort. p. 117.

‡ Primum mobile.



freely acknowledge any pains employed in the composure amply and abundantly recompensed.

It is not material, neither would it be of service, to tell the world, what led me at first into such an acquaintance, though very remarkable, with these little creatures, whose wonderful parts and properties are so many evident proofs of the infinite power and wisdom of the Creator.

They have ever since been an agreeable amusement to me, and the delightful employment of my leisure hours.

But as I never was ambitious of being an author, chusing rather a silent passage through the world ; no solicitations or importunities could have induced me, had not justice to the publick, with tenderness and pity to these excellent and profitable creatures, annually destroyed by their owners, in such multitudes, without any distinction, or the least compassion, determined me to write ; which will be admitted as a sufficient apology for this publication.

Had such a design been formed a few years ago ; or had not the subscribers impatience to see it in print hastened it to the press, (contrary to my inclination and purpose,) it might have appeared much more correct, and to greater advantage.

I hope, therefore, the candid reader will the more freely excuse what defects are found in it ; and forgive the author any involuntary mistakes, who promises to recant upon the first conviction.

I have carefully perused several of our English writers of the greatest esteem, obviated many of their errors, and collected what I apprehended most material and useful in them, which the reader will find inserted in the following pages.

Provided the reader will but diligently attend to, and pursue the directions given in the latter part of the book, for preserving the lives of these delightful, profitable, animals, at the same time that he puts himself in full possession of the treasure they have with so much pains

and labour gathered together, he will assuredly find, what the title page promises, in every particular perfectly accomplished; without the least reason to complain of any abuse or imposition.

And would but the Bee-masters and mistresses in Great-Britain and Ireland unanimously enter into the measures here recommended, a few years practice and experience would undoubtedly show, how much this way of management would promote, not only their own private advantage, but the riches of the kingdom; and there would be less occasion for such large importations of honey and wax every year from Russia, Barbary, or other remote parts of the world.

But if neither private nor publick interest, separately or in combination, can influence and persuade, I conclude it would be altogether ineffectual and vain to try other arguments with the indolent, stupid and unthinking part of mankind; who though they are placed a degree above yet are in many respects inferior to the very brutes themselves.

Yet after all, that a design and labour so compassionate and just, viz. the publick prosperity and preservation of these most valuable insects, may be acceptable and successful, not only through the British dominions, but in all it's travels through neighbouring kingdoms, and to the most distant parts of the globe, is the earnest wish, and the humble expectation and hope of,

Courteous Reader,

Thy very faithful Friend,

And most humble Servant,

JOHN THORLEY.

*From my Study at Chipping-Norton,  
in the County of Oxford,  
November the 24th, 1743.*

THE  
HISTORY OF BEES.

## CHAP. VI.

## SECTION I.\*

## THEIR LANGUAGE.

As to the time of second swarms, we, generally, fix it to a day or two, and know when to expect them, by means of those distinct, peculiar, and musical notes, which are always heard two or three days before they rise.

Bees certainly have a language among themselves which they perfectly understand, tho' we do not, or at best, very imperfectly. Eight or nine days after the prime swarm is departed, one of the young princesses, addressing herself in a very humble and submissive manner to the Queen-mother, petitions for leave to withdraw, and erect a new empire, with a select body of the populace.

The regent for a time seems silent, and for a day or night there is no answer, nor any grant given; however the young princess, bent on a crown and kingdom, continues her suit, and at last succeeds. The second night you may hear the queen, with a very audible voice (being an eighth) giving her royal grant, and proclaiming it, (as by sound of a

\* Edit. 1744, p. 144.

trumpet) thro' the whole kingdom. Her voice is a grant, her silence a denial. And the day following, the weather being tolerable, you may expect the swarm.

It is delightful to attend to those peculiar and musical sounds or notes, being an eighth chord, which is truly harmonious. Dr. Butler has taken pains to show us the compass the song contains in the gamut, or scale of musick; the queen composing her part, or bass, within the four lower cliffs; and the princess hers, a treble, in the four upper cliffs. The swarm ready to come forth, the notes are louder, quicker, and more constant. When the greater part of the swarm is out, the musick is at an end, and we hear no more. Sometimes the royal grant is revoked, and then all the royal issue are slain.

As every general rule has an exception, I must tell my reader, that the second day of June, 1716, after a swarm was come out, that very evening, and the two following, they gave notice for a second swarm, which rose the fifth day, when I joined them to the first. That night, and the next, they called as before, and rose twice; I returned them both times, at each taking a Queen from them. A few days after, they rose a third time, settled, yet went home again. Finally, they rose a fourth time, when I took two Queens from them, putting them back to the old stock, after which they came forth no more. I mention this as being very singular, and what I never observed before, nor since.

I very perfectly remember, tho' many years ago, I heard these previous notices given for a first swarm, which are exceeding rare (that being the only time I ever took knowledge of them) and in a colony too; where placing my ear close to the top of the uppermost box, I could very easily and distinctly hear the least noise, and what was acting about the throne. And just as the swarm began to rise, there seemed to be the greatest lamentation among the branches of the royal family. Notes of woe expressive of the deepest sorrow, as tho' they were taking an eternal farewell of one another. It was really in some measure moving and affecting.



I could resemble it to nothing better, than to the nearest dearest relations, and most loving faithful friends taking a final leave of each other, with the tenderest, most affectionate embraces, and with floods of tears. But to return.

With the second swarm, two of the royal princesses go forth very often, and sometimes three, in hopes to gain a kingdom. That princess, who is so happy as to get the throne first, is proclaimed Queen, and crowned; the rest are all slain, as I have found them the next morning.

It is very seldom I keep these second swarms, well knowing they seldom answer any good purpose, except two or three are joined together. Besides, the old stocks greatly suffer thereby; for which reason I frequently return them, knocking them out before the old stock. I would advise others to do the same, which would not a little help the old stocks, and in the end turn to the advantage of the owners. And taking their Queen from them, they would not be so apt to rise again.

To put two casts together has little difficulty in it, especially if they come the same day; it is only at night fixing the mouth of one of the Hives upwards, and placing the other directly upon it, when one smart stroke with your hand will beat the whole body down into the under Hive, which you must presently set again upon a cloth, that they may settle and compose themselves. After which put them in their place.

But so many and various are the circumstances about the swarming and hiving of Bees, that it is impossible to give directions in them all. Common prudence will direct in many cases, and the rest must be learned by observation, and by practice and experience.

In hiving swarms, if you are afraid of their stings, you may secure yourself by a thin veil over the face, or by washing it with the sweet liquid used in dressing the Hive.

In a very hot season, when the Bees are more apt to strike, I have, tho' not often, put on such a veil; but I have seldom been stung, unless accidentally I happened to crush one.

The last swarm I had a summer or two ago never settled at

all, but crossing a wide street, they fled over the houses, and entering in at the side-piece of a back building, they were quickly out of sight of the spectators, (it being market-day,) who all concluded them to be past recovery. I likewise thought the same.

But that night I began to think whether it might not be practicable to regain them, and in short, determined the next day to make a trial; upon the owner's leave, which was easily obtained, I employed a mason to make a breach in the inside of the wall, close to the side-piece, and near to the place of their entrance, but discovered nothing of them, neither gained the least intelligence.

The next day, being Friday, I sent for a plaisterer, supposing they had concealed themselves under the slates, and met with an agreeable place of retreat; he removed a considerable number of the slates, but with no success at all, there was nothing to be seen or heard of them. Both the breaches were immediately repaired and made good.

They were not in the wall, nor were they under the slates and within the cieling; therefore, in all probability, they had found a passage into the funnel of the chimney, and had chose that for their habitation, of which I intended to make trial the next day; when, having collected a large quantity of combustible matter, fit for such a purpose, I set it on fire, which presently brought them to light. No sooner did the smoke begin to fill the chimney, but first we heard a strange uproar and confusion, and presently considerable numbers came down into the room thro' the fire and the smoke, and some perished therein, and the rest were let out at the window, but the main body escaped through the old passage, settling on the outside wall, whence we got them with some difficulty into an Hive that evening, in which they prospered for some years, producing several swarms.

I conclude this section with a very memorable event, not to be buried in oblivion, or passed over in silence. In or about the year 1717, one of my swarms settling among the

close twisted branches of some codling-trees, and not to be got into an Hive without more help, my maid-servant, hired into the family the Michaelmas before, being in the garden, very officiously offered her assistance, so far as to hold the Hive while I dislodged the Bees, she being little apprehensive of what followed.

Having never been acquainted with Bees, and likewise afraid, she put a linnen-cloth over her head and shoulders, concluding that would be a sufficient guard, and secure her from their swords. A few of the Bees fell into the Hive ; some upon the ground ; but the main body of them upon the cloth which covered her upper garments.

No sooner had I taken the Hive out of her hands, but in a terrible fright and surprize, she cried out, the Bees were got under the covering, crouding up towards her breast and face ; which immediately put her into a trembling posture. When I perceived the veil was of no further service, she at last gave me leave to remove it. This done, a most affecting spectacle presented itself to the view of all the company, filling me with the deepest distress and concern, as I thought myself the unhappy instrument of drawing her into so great and imminent hazard of her life, which now so manifestly lay at stake.

It is not in my power to tell the confusion and distress of mind I was in, from the awful apprehensions it raised ; and her dread and terror in such circumstances may reasonably be supposed to be much more. Every moment she was at the point of retiring with all the Bees about her. Vain thought ! To escape by flight. She might have left the place indeed, but could not the company ; and the remedy would have been much worse than the disease. Had she enraged them, all resistance had been in vain, and nothing less than her life would have atoned for the offence. And now to have had that life (in so much jeopardy) insured, what would I not have given ?

To prevent, therefore, a flight, which must have been attended with so fatal a consequence, I spared not to urge all

the arguments I could think of, and use the most affectionate intreaties, begging her with all earnestness in my power, to stand her ground, and keep her present posture; in order to which, I gave her encouragement to hope, in a little space, for a full discharge from her disagreeable companions; on the other hand, assuring her, she had no other chance for her life. I was, thro' necessity, constantly reasoning with her, or else beseeching and encouraging her.

I began to search among them for the Queen, now got in a great body upon her breast, about her neck, and up to her chin. I presently saw her, and immediately seized her, taking her from among the croud, with some of the commons in company with her, and put them together into the Hive. Here I watched her for some time, and as I did not observe that she came out, I conceived an expectation of seeing the whole body quickly abandon their settlement; but instead of that I soon observed them, to my greater sorrow and surprize, gathering closer together without the least signal for departing. Upon this I immediately reflected, that either there must be another sovereign, or that the same was returned. I directly commenced a second search, and in a short time, with a most agreeable surprize, found a second or the same; she strove, by entering further into the croud, to escape me, which I was fully determined against, and apprehending her without any further ceremony, or the least apology, I re-conducted her, with a great number of the populace, into the Hive. And now the melancholy scene began to change, and give way to one infinitely more agreeable and pleasant.

The Bees presently missing their Queen, began to dislodge, and repair to the Hive, crouding into it in multitudes, and in the greatest hurry imaginable. And in the space of two or three minutes the maid had not a single Bee about her, neither had she so much as one sting, a small number of which would have quickly stopped her breath.

How inexpressible the pleasure which succeeded her past fears! What joy appeared in every countenance upon so



signal deliverance! and what mutual congratulations were heard! I never call to mind the wonderful escape without a secret and very sensible pleasure. I hope never to see such another sight; tho' I triumph in this most noble stand, and glorious victory.

This bold and gallant behaviour, together with the memorable escape, immediately formed her into a perfect heroine, inspired and fortified her with great courage, consimilar to these bold, daring, and undaunted animals. And ever after she would resolutely undertake the most hazardous services about them, while she remained, for some years, in my family.

She is now living at little Rissington, in Gloucestershire, to attest the truth of this relation.\* As are several others, who were eye and ear-witnesses of the whole affair.

"I now their numerous progeny relate,  
And all the wonders of the female state;  
Full fifteen thousand Bees one hive supply  
\*       \*       \*       \*       \*  
And what I know incredible will seem,  
They're all the offspring of one fertile Queen."

*Dinsdale's Poem on Bees.*

April 30, 1737, I had a swarm, which swarmed again June the 22d, the same year.

Keep your Hives as full of Bees as you can, for poor weak stocks will but disappoint you. And thus will you have little or no occasion for feeding. So much for the growing numbers both of Bees and stocks.

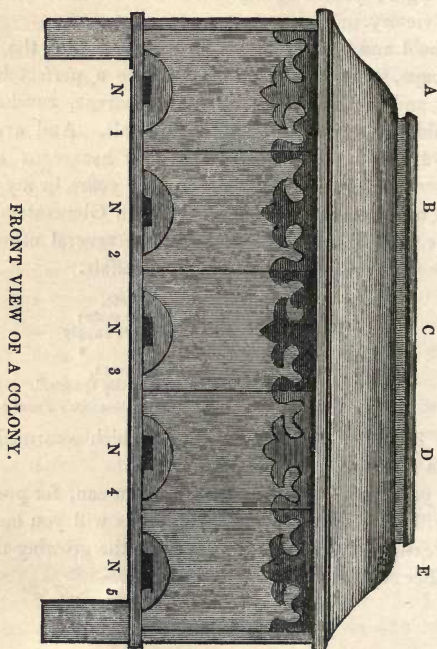
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## CHAP. IX.

DIRECTIONS FOR THE RIGHT MANAGEMENT, AND BEST IMPROVEMENT OF BEES IN COLONIES.

Mr. Jeddie first contrived this method, for which he had a patent from King Charles. Many more, and much greater,

\* Anne Herbert.



FRONT VIEW OF A COLONY.

**ABCDE** The front view of a Bee-house for five colonies, each to be painted of different colours.

**NNNNN** The doors or entrance into each colony.

**12345** The ledges where the Bees light when they return from the field, and when they come out to view the weather.

are the advantages arising from Bees kept in colonies, than can be gained in the common way of Hives. For instance:—

The certain preservation of so many thousands of these noble and useful creatures; which surely should not be esteemed the least. Thus you every year reap the delicious fruits of their indefatigable and faithful labours, and yet have all their lives secured.

Once I took a box, with every cell in it full of honey, and most of all sealed up; wherein I found only two common Bees, and one drone.

Another advantage is their strength (which consists in their numbers) and by consequence their greater safety. By this means they are better able to defend themselves against their enemies, the robbers, and preserve both their lives and fortunes.

Yet I have known, tho' not often, colonies in good state, as well as Hives, invaded, but not vanquished. A little assistance has put them out of danger.

A third advantage arising to the owners in this method, is their wealth and riches, by means of their united labours. This necessarily turns to the greatest profit of the proprietor.

I have in some summers taken two boxes from one colony filled with honey, and yet sufficient store left in the other two boxes for their maintenance, each box weighing forty pounds; and allowing ten pounds for each box, with the wax, &c., there must be sixty pounds of honey for the Bee-master; which at 6*d.* per pound, is 1*l.* 10*s.* But it really is of more worth, because of the goodness and superior excellence of the honey, the far greater part thereof being pure virgin-honey, and perfectly neat and fine.

Besides all this, the liberty and pleasure of viewing them and inspecting them at all seasons, summer and winter, even in the busiest times of gathering, with the greatest safety.

Neither do they require, as the Hives, a constant attendance in swarming times.

This method, so compassionate, and yet so useful, con-

tributing both to profit and pleasure, must appear greatly preferable to the other, and far more eligible.

It might be added, they are also effectually secured from wet and cold, mice, and other injuries.

I had not been many years conversant with Bees, before common report informed me that Dr. Warder, who kept Bees in Hives and colonies, made no less of them than 50% per annum; which was a very great inducement to pay the Doctor a visit the first opportunity, in hopes of gaining a farther insight into them, which might turn to my advantage.

Not long after, being in London, I rode to Croydon to consult the Doctor; and learn, if possible, his way of management, which was so very profitable.

I went directly to the Rev. Mr. Davis, the Doctor's son-in-law, where I was courteously received, and treated with a great deal of civility. Having told him my design, he very readily accompanied me to the Doctor's house, when to my great disappointment, I found he was not at home; nevertheless I had a full view of his apiary.

The front of his colonies made an appearance not at all agreeable, being painted with lions, and other creatures, which I looked upon as foreign to their improvement. And when I came to examine his Hives, but especially his boxes, I found them so contrary to common report, as proved a much greater disappointment.

To the best of my remembrance, I saw not above two boxes in any one of his colonies; the rest were single, and not in very promising circumstances.

But I ought to tell my reader this view was in September, after the colonies and Hives were reduced both in numbers and riches; so that I saw them at a disadvantage.

Neither did the position of many of his Hives please me. In short, by the best judgment I could form upon the whole, all the annual profits of his apiary could not amount to ten pounds.

I afterwards drank some of his mead, of several years old, which was very good. At night I returned to the city, as



wise as I left it, greatly disappointed in my expectations. And found how I had been imposed upon by common report.

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## SECT. I.

### THE FORM OF THE BOXES, WITH DIRECTIONS HOW TO MAKE THEM.

Deal, being spungy, is most proper, and sucks up the breath of the Bees sooner than what is more solid; yellow dram-deal is the best, thoroughly seasoned.

An octagon, being nearest to a sphere, is the best form; since as the Bees in winter lie in a round body in or near the center of the Hive, a due heat is conveyed to all the out parts, and the honey kept from candying, which in a square would not be so effectually prevented, and is many times prejudicial to the Bees, and sometimes proves their ruin. Thus much for the materials.

The dimensions of my boxes, and which I would, on so long a trial, recommend to others, are in depth ten inches the inside, the top-board a full inch; and the breadth within twelve or fourteen inches.

Any gentleman, who chuses boxes of a larger extent, may order the depth a full foot, and the breadth within sixteen inches, not forgetting to make the house proportionable.

I have tried boxes containing a bushel and more, but found them not to answer the design like those of a lesser size. The larger are not so easily managed; they are much longer in filling, so that it is later e'er you come to reap the fruits of their labours; the first year you must not expect it, perhaps not the second either, nor will the honey be so good and fine.

The best and purest honey is what is gathered the first five or six weeks, which is worth one shilling a pound. And in boxes of less dimensions, (planted as hereafter directed) pro-

vided the season be at all favourable, you may take in a month or little more, a box full of the finest honey, and in an extraordinary season the same colony will spare you two boxes, reserving what will be sufficient for their own support.

For the top of the box, an entire board would be best, or else two boards very firmly glued together, and a full inch thick when planed, and at least an inch more in breadth than the dimension of the box, which, in the management of the colonies, you will find to be an advantage; the edges underneath may have a little mould, merely for ornament's sake.

In the middle hereof must be a hole five inches square, for a communication between the boxes, covered with a sliding shutter, of deal or elm, running easily in a groove, over the back-window. The eight pannels or squares nine inches deep, and three parts of an inch thick when planed, are to be let into the top so far, as to keep them in their proper place; secured at each corner with plates of brass, and at the bottom cramped with wires, to keep them firm; since the heat in summer will try their strength.

A glass window behind, fixed in a frame, with a thin deal cover, two small brass hinges, and a button to fasten it. Here you may inspect into your colonies, and see their state, employment, prosperity, and improvements, with pleasure and safety at any season.

Front doors to your colonies, and two glasses to one box, I am sensible are of so little service, and attended with so many inconveniences, that I utterly dislike them, and never use more than one, which I find well enough answers the design. Those who are otherwise minded may have more.

Two brass handles, on each side one, are necessary to lift up the box or boxes, fixed in with two thin plates of iron, near three inches long, to turn up and down within the box, and put in three inches beneath the top board, which is nailed close down with sprigs to the other parts of the box.

Those who chuse a frame within, to which the Bees may fasten their combs, need only use a couple of deal sticks of an

inch square, placed across in the box, and supported by two pins of brass, one an inch and a half below the top, the other two inches below it, by which means the combs will quickly find a rest. But if at the first plantation an Hive is put into the house, together with a box, there will be no occasion for such supports.

One thing yet is wanting to perfect the work, viz. a passage for the Bees to go in and out, four or five inches in length, but in depth less than half an inch. Now we are in readiness for a house.

Any gentleman, &c., may have a box compleat, or an exact pattern, at the Golden Lock and Key, facing the Mansion house, or at the Author's, in Chipping-Norton, Oxon.

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## SECT. II.

### A DESCRIPTION OF THE BEE-HOUSE FOR SIX COLONIES.

In keeping Bees in colonies, a house is necessary, or at least a shed; without which the weather, especially the heat of the sun, would soon rend the boxes to pieces.

Your house may be made of any boards you please, but deal is the best; but let the materials be of what sort you please, the house must be painted, to secure it from the weather.

The form and dimensions of the house are these; the length thereof full twelve foot and a half. Each colony should stand a foot distant from the other.

The height three foot and a half, to admit four boxes together. If only three boxes be employed, two foot eight inches.

The breadth two foot on the inside. The four corner posts to be made of oak, and well fixed in the ground, that no stormy winds may overturn it; and all the rails of oak, supported by several uprights of the same, before and behind, that they may not yield, or sink under six, seven, or eight hundred

weight, or upwards. The floor of the house, (about two foot from the ground,) should be strong and smooth, that the lowest box may stand close to it.

This floor may be made with boards or planks of deal the full length of the Bee-house; or, which I prefer, with a board or plank to each colony, of two foot four inches long, and fixed down to the rails; and that part which appears at the front of the house may be cut into a semicircle, as a proper lighting place for the Bees, which plane down, that the wet may fall off. When this floor to a single colony wants to be repaired, it may with ease be removed, and another placed in it's room, without disturbing the other colonies, or touching any other part of the floor.

The interspaces may be filled with other pieces of boards, or planks of an equal thickness, which will last for many years. I only propose this, leaving the reader to his choice.

Upon this floor, at equal distances, all your colonies must be placed, against a door or passage cut in the front of the house.

Only observe further, to prevent any false step, that, as the top-board of the box, being a full inch broader than the other part, will not permit the two mouths to come close together, you must cut a third piece of deal of sufficient breadth, and place it between the other two, so close that not a Bee may get that way into the house. And fixing the said piece of deal down to the floor with two lath nails, you will find afterwards to be of service, when you have occasion either to raise a colony, or take a box of honey, and may prove a means of preventing a great deal of trouble and mischief.

The house in this forwardness, you may cover it to your own mind, with boards, fine slates, or tiles; but contrive their position so as to carry off the wet, and keep out the cold, rain, snow, or whatever might any way prejudice and hurt them.

The back-doors may be made of half inch deal, two of them to shut close in a rabet cut in an upright pillar; which may be so contrived as to take in and out by a mortise in the bottom rail, and a notch cut in the inside of the upper rail,



and fastened with a strong hasp. Place those pillars in the spaces between the colonies.

Concluding your house made after this model, without front doors, a weather-board will be very necessary to carry the water off from the places where they settle and rest.

Good painting will be a great preservative. Forget not to paint the mouths of your colonies with different colours, as red, white, blew, yellow, &c., in form of a half moon or square, that the Bees may the better know their own home. Such diversity will be a direction.

Thus your Bees are kept warm in the coldest winter, and in the hottest summer greatly refreshed by the cool air, the back doors being set open, without air-holes made in the boxes.

This is another advantage of the colonies above the Hives.

From this pattern it will be easy to project an house for two, three, four, or any other number of colonies.

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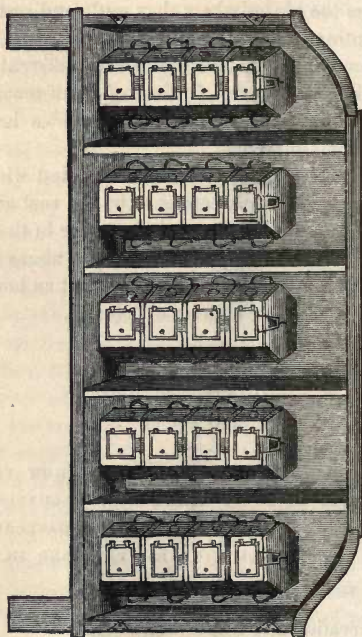
## CHAP. X.

CONTAINING FULL AND PLAIN DIRECTIONS, HOW TO PRESERVE THE PRECIOUS LIVES OF THESE MOST VALUABLE AND SERVICEABLE INSECTS, WHEN YOU BECOME MASTERS OF THEIR TREASURE, AND WHOLE ESTATES; PROMISED IN THE TITLE PAGE.

The preservation and improvement of Bees in colonies, has been no secret, since Mr. Geddie's happy invention. And how effectually to promote the said ends in the way of common Hives, is the kind design of this chapter. From the long conversation I have had with these very wonderful creatures; their inimitable excellencies, and many commendable qualities mentioned before;\* together with their great usefulness to mankind, I am become one of their greatest admirers, and a

\* Chap. I.

INSIDE VIEW OF A COLONY.



An inside view of a Bee-house, containing five whole colonies : with the doors that cover the glass windows ; the sliders, to cut off the way between the boxes ; and the handles to lift off the boxes.

publick (may I prove a prevailing and a successful) advocate for them. Most solemnly protesting against all that notorious injustice, and inexcusable ingratitude of their cruel and merciless owners; who, not content with all their treasure, collected with infinite pains and many perils, devote them to destruction, without any distinction, or the least pity and compassion.

Not unlike so many bloody ruffians and murtherers, who, not satisfied to rob others of their substance, do sacrifice their lives, their dearest possession; for which they are the just abhorrence of mankind. A righteous man regardeth the life of his beast.\* And is no regard due to these creatures of God, which are so excellent in themselves, and serviceable to men? Was Balaam rebuked only for beating his ass?† What censure do those deserve, who thus destroy such multitudes of innocent useful creatures, and most faithful servants? Are they righteous, who are thus cruel and barbarous? or do they act consistently with their own or the publick interest?

When, therefore, the following pages will make it appear with how little trouble, and without any expense, the owners may come at their riches, with safety to their lives, those who shall hereafter doom them to the common death, must be altogether without excuse.

The method I have pursued with so great success for many years, and now recommend to the publick as most effectual for preserving Bees in common hives, is incorporation, or uniting two stocks into one, by the help of a peculiar fume, or opiate, which for a time will put them entirely in your power, to divide and dispose of at your pleasure. Yet know that dominion over them will be but of short duration, therefore you must be expeditious in the operation.

But before you enter upon action, and that you may proceed prudently, with safety and success, it will be necessary to premise and observe as follows, viz.

You must know the Queen or commanding Bee perfectly

\* Prov. xii. 10.

† Numb. xxii. 28.

well, which you are immediately to search for among the multitude, to apprehend and imprison, returning her no more to her beloved and most loyal subjects. Search among the Bees which you destroy by brimstone, whereby you may learn to know her.

No new swarms or stocks should be thus united, except very late ones, and casts which have not gained a sufficient quantity of honey for their winter-store. Such I always unite to save their lives.

Hives or stocks, which have swarmed once or twice, consequently reduced in their numbers, are the fittest to be joined together, which will greatly strengthen and improve them.

Nevertheless, if you have a stock both rich in honey, and full of Bees, which you are desirous to take, it is but dividing the Bees into two parts, and put them into two other hives, instead of one.

I must add one precaution more under this head, *i.e.* examine first that stock to which you design to join the Bees of another, whether there is honey enough in it to maintain the Bees of both ; it should be full twenty pounds in weight, the heavier the better.

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## SECT. I.

### OF THE MATERIALS, OR MANNER OF OPERATION.

The way thus prepared, I must now lead my readers into an intricate path, to which, I take it for granted, they are perfect strangers. And tho' it hath many windings and meanders in it, yet having travelled it myself so often, and with so much safety and advantage, I doubt not but to conduct others thro' it to their satisfaction, provided they diligently observe the following directions.

I am first to inform them what the materials are, and after that the manner of operation.



The narcotic, or stupifying potion, is only the fume of the *fungus maximus*,\* or larger mushroom, commonly known by the name of bunt, puckfist, or frogcheese; it is as large, or larger than a man's head. I had one of these brought me the last summer unripe and white, which weighed some pounds; but when ripe, of a brown colour, and turning to powder, they are exceeding light.

Shepherds and herdsmen, &c., frequently find them in the fields, and will supply you with them towards the latter end of the season.

When you have procured one of these pucks, put it into a large paper, pressing it down therein to two thirds, or near half the bulk, tying it up very close. Put it into an oven some time after the household bread is drawn, letting it continue all night. When it will hold fire, it is fit for your use in the manner following.

With a pair of scissars cut a piece of the puck, as large as an hen's egg (better at first to have too much than too little) and fix it to the end of a small stick, slit for that purpose, and sharpened at the other end, which place so that it may hang near the middle of an empty Hive. This Hive you must set with the mouth upwards, near the stock you intend to take, in a pail or bucket. This done set fire to the puck with a candle, and immediately place the stock of Bees over it, tying a cloth round the Hives, which you must have in readiness, that no smoke may come forth. In a minute's time, or little more, will you with delight hear them drop like hail into the empty Hive: when the major part of them are down, and you hear very few fall, you may beat the top of the Hive gently with your hand, to get as many out as you can. Then loosing the cloth, lift it off to a table or broad board prepared on purpose, and knocking the Hive against it several times many more will tumble out, perhaps the Queen among them, as I have often found her lodging near the crown. She often falls one of the last.

If she is not there, then search for her among the main

\* *Fungus pulverulentus*.

body in the empty Hive, putting them forth upon the table, if you discover her not before.

During this search you must proceed after the same manner with the other Hive with which these are to be united. No sooner are those Bees composed and quiet, and you have found and secured the Queen, but you must put the Bees of both Hives together in one, mingling them thoroughly together, and sprinkling them at the same time with a little ale and sugar putting them among the combs of the latter Hive, and shake them down in it. When they are all in, cover it with a cloth bound close about it, and let them stand all that night and the next day shut up, that a Bee may not get out. Some time after you will be sensible they are awaked out of sleep. The same night would be best to put them in their place, and if you had another garden, wherein to fix them, I would chuse it myself, and recommend it to others.

The second night after the union, in the dusk of the evening, loosing the string, move the cloth from the mouth, taking care of yourself, and they will with a great noise immediately sally forth; but being too late to take wing, will go in again; then putting in two pieces of tobacco-pipes, to let in air, stop them close in as before, and keep them so for three or four days longer; after which you may leave the door continually open.

But in getting away the cloth you must use discretion and caution, since they will for some time resent the affront and offensive treatment.

The best time of the year for union is after the young brood are all out, and before thy begin to lodge in the empty cells, which they do in great numbers in cold weather and winter-time, tho' Mr. Rusden denies it.\*

As to the hour of the day, I would advise young practitioners to do it early in the afternoon, that having the greater light, they may the better find out the queen. The few Bees left

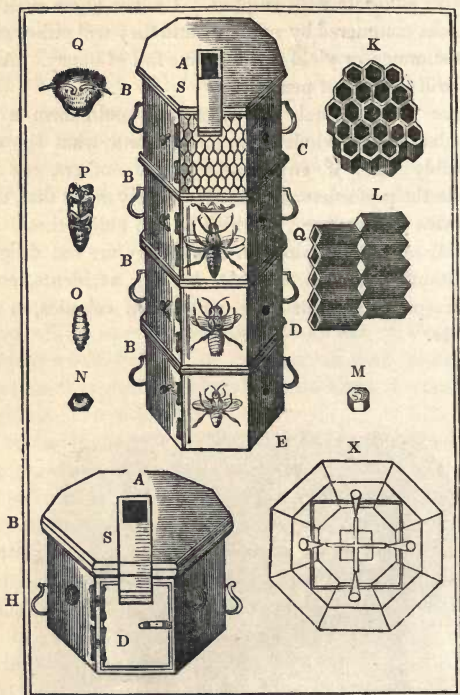
\* Rusden's Discov. p. 33.

in the Hive suffocate with sulphur. I never knew such combined stocks conquered by robbers ; and they will either swarm the next summer, or yield you an Hive full of honey. A little practice will make you perfect.

As one view of such an operation would form a more perfect idea of the whole transaction, than what the ablest pen possibly can ; if any gentleman, or others, are desirous to see the performance, the author freely offers that, or any other service in his power, in which he can oblige them.

If the directions contained in this history are but diligently and constantly observed, I durst, barring accidents, engage for the prosperity of your Bees, whether in colonies, or common Hives.





- B An entire colony of four boxes.  
 A The square hole for communication between the boxes.  
 S The sliding shutter.  
 C The appearance of the cells through the glass.  
 Q The queen. D The drone.  
 E The labouring Honey-Bee. H The handles.  
 K A view of the cells when open.  
 L A view of the cells reversed.  
 M The egg at the bottom of the cell.  
 N The young worm.  
 O The worm converted into a chrysalis.  
 P The chrysalis at the point of transformation.  
 Q The fore-part of the head magnified.  
 D The doors to cover the glass.  
 X The section of a box, showing the frame, with four pins to fasten it.



SYDSERFF'S

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ON

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BY R. SYDSERFF,

LEIGH ON MENDIP.

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M.DCC.XCII.



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SYDSERFF'S

TREATISE ON BEES.

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THE PREFACE.

SOME years ago I met with an old treatise on Bees, which mentioned many kings and queens in one and the same Hive; and also related, that males and females are found among the working Bees, with many other strange absurdities, which I think unnecessary to be repeated in this place.

From that time I was desirous of seeing a treatise which should be every way instructive, easy, and practical, and confined entirely to matters of fact; but I was at a loss where to find it, and made many enquiries, without effect, for that purpose.

For the instruction of my own children, I determined, after some consideration, to write down what I had proved and believed to be true, from my own experience, without any intention that it should be seen by them, or any one else, until I was taken from them. But before I began to write, I met with a compendium of natural philosophy, with which I was highly entertained and delighted; and the

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rather, as the greatest part of it was on the subject of Bees, and contained many circumstances which I had before proved, and believed to be strictly true.

On this account I have extracted it, almost verbatim, unless where he tells us that the Bees are as kind to a strange female, and shew the same respect to her as to their proper sovereign, which certainly is a great mistake. But of this I am ready to acquit the translator, who perhaps had neither opportunity nor leisure to try the experiment, having work of greater importance always on his hands. Mr. Reaumier, therefore, must have propagated the error, as one who pretended that he had tried it.

When I had wrote about thirty pages, I laid it by inclosed in a book, without thinking any more about it; but some time after, a person, opening the book, saw it, and, unknown to me, took it away. He shewed it first to one, then to another, till it was no longer a secret. Being under many obligations to different persons, I was under a necessity of lending it from one to another. Most of those who had then seen it, earnestly intreated me to get it printed; this was a measure I could think nothing of. I was then desired to write it over again (as much of it as was lost), and finish it, which I promised to do, but postponed from time to time, until I was importuned by the Rev. Mr. Watkins, of Leigh on Mendip, for that purpose. On assuring him that I would get a book and do it, he then gave me one; telling me, at the same time, that now I had no excuse for delaying it. Though I fully intended to do it, it was still put off from time to time, until the latter end of the year 1788. I was then seized with a putrid fever, and soon became insensible. Being given over by the physician, and nothing but death appearing probable, it lay much on my mind in the interval of my senses, and I was determined (if I should be spared) no longer to put off the business till to-morrow.

Having thus informed the reader by what steps this treatise has arrived to its present state, I have only to add, that



there is not, in the whole book, one page, nor even a line, which I do not know, or have not reason to believe to be true; but as part of it may appear strange to ignorant persons, who know nothing of the nature of Bees, the several facts are attested in the leaf immediately preceding the first page of the work, by persons who were eye-witnesses to the same, whose characters are too well known to admit a doubt of their truth and reality.

As the principal object of this treatise is to promote the instruction and good of others, I have only to say, that if in any thing I am mistaken, I shall be glad to be set right; for the more we know of those industrious and profitable insects, the Bees, the more we may be perplexed—but we shall be led to admire and adore their wonderful properties and œconomy, though no man can search them out to perfection.

ROBERT SYDSERFF.

LEIGH-ON-MENDIP,

*July 14, 1792.*

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*P.S.* Any gentlemen whose Bees have omitted swarming until the latter end of June, and are desirous of increasing their stock, may have swarms taken out of any old Hive, by Mr. Sydserrf, the author, which shall do as well, or better, than those which come forth of their own free choice. In like manner, Bees are taken out of hollow trees, walls, or any other places, on the following terms, if not farther than four miles from his house.

	<i>s.</i>	<i>d.</i>
For taking a swarm from an old Hive .....	5	0
Out of a hollow tree, or other place of danger .....	2	6
Taking the honey and comb without hurting the Bees...	1	6
For a common swarm from a bush or tree .....	1	0

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*Chapter III.*—The particulars of the Queen or Mother Bee, with various practical Experiments to prove the Loyalty of her Subjects.

*Chapter IV.*—On the Breeding of Bees, Wasps, and other Insects, with Directions for making yourself known to Bees, and to prevent being stung.

*Chapter V.*—Of the Swarming of Bees, and the Methods of discovering when they may be expected, with other matters.

*Chapter VI.*—On the Driving of Bees, with necessary Instructions for that purpose.

*Chapter VII.*—The manner of Bees' Working, and when and in what manner only they ought to be removed.

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[*Chapter X.*—Of their Outward Senses, and their Internal Faculties.]

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*This is to certify, that we whose names are hereunto subscribed, having carefully inspected the following pages, do declare the same to be authentic :—*

Pages 5, 6, 15, 27, 40, 67, 85, 86—R. SYDSERFF.

— 8, 9—WILLIAM TAPP.

Page 17—JOHN EDWARDS.

— 24—BENJAMIN BUDGETT, M. MILLARD.

— 25—MARY CHRISTIE, E. FURFITT.

— 25—JOHN STEEDS, jun.

— 30—M. HOLDER.

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— 66—D. HORTON, JOHN WEBB.

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— 50, 51—JAMES NOKE.

Page 59—ABRAHAM POTTER.

Pages 80, 81—JOHN SEASON.

Page 82—ZEBEDEE BEACHIM.

— 94—WILLIAM ASHMAN.

SYDSERFF'S  
TREATISE ON BEES.

CHAP. I.

AN ANATOMICAL DESCRIPTION OF THE COMMON OR WORKING BEES,  
AND OF THE EFFECTS OF THEIR STINGS.

AMONG the variety of insects, there are none can compare with the Bees. Whether we consider their curious form, their indefatigable labour, their admirable work, in building their cells, &c., we must be forced to acknowledge the infinite wisdom which directs their unerring steps, and has made them fit to be an emblem of art, industry, and frugality to mankind.

The Working Bee is about three-quarters of an inch in length, having a very large head, with large eyes, covered over with a horny membrane; this is the occasion of their being so dim-sighted when they first fly abroad, and that they take so much pains at the door in rubbing and wiping their eyes, that they may the better discern their way forth and back again. The horns, which grow a little above the

eyes, are about the length of a wheat corn, in each of which are two joints, one in the middle, the other near the end, by which they can put them forth to the full length, and draw them in close to the head, when they please, and are the instruments of feeling, which do greatly help their dimness of sight.

In the mouth are the teeth, which meet in a different way from those of other creatures : not one over the other, but side-ways, like a pair of pincers ; with these they lay hold of robbers, and bring forth their dead, bits of old comb, and whatever is offensive to them.

The tongue is much longer than the mouth will contain, and is so doubled underneath, and reacheth a good way down the breast ; it is divided into three parts, whereof the two outermost serve as a case to cover the third, which being the chief, the Bee, in its work, putteth forth beyond the other, and draweth in again, as it please ; and this third part is likewise divided into three, so that there are five in the whole.

The Bees have also four wings, by which they can fly into any part of the earth with the greatest swiftness. In the same manner, they are enabled to fly back again with their loading, until their incessant labour hath worn out their wings ; which happens, with some of them, when they are about thirteen months old ; for this reason none live more than fifteen months, the decay of their wings being the cause of their death ; for, although they may be able to fly with their ragged wings from the Hive, when they are loaded they cannot recover the Hive again, but drop on the ground, and can rise no more. This is very easily proved, by observing the old Bees in the months of July and August, when they fly from the Hive, and when they return. The old Bees are easily known, not only by their ragged wings, but also by the colour of their hair ; *for Bees are all over as hairy as a dog.*

The Bee has also six legs, and stands fast upon four,



while he useth the other two to wipe his eyes, his wings, his tongue, or any other part which is not perfectly clean ; they serve also to convey the farina which is thrown out of the mouth to the thighs. In the spring this may sometimes be seen, when their little legs are chilled with cold ; but in hot weather it is done so instantaneously that it cannot be seen with the most acute eye.

The Bee is doubly armed against its enemies, and makes use of its fangs in laying hold of strange Bees, wasps, &c. ; also in killing the drones (of which more hereafter). This little insect, if possible, will get hold of their wings at once ; but if not, it will pinch and hold them by the legs (unless they are too strong) until another Bee comes to its assistance. The stranger now must hope for no mercy ; they immediately take him fast at the root of the wing, and then it is in vain for the poor prisoner to make any resistance, *for they will never let go their hold until the wing be broken.* He is then thrown down on the ground to shift for himself, as they well know that he will never fly more. Sometimes, in the struggle, the poor captive is desirous of extricating himself by putting forth all his strength, and is like to get free ; *then the Bee will strike with his poisonous spear, so that often he killeth and is killed with the same stroke.* The reason is, that if the sting chances to hit the breast or shoulder, it is left behind with part of the entrails, which are fastened to it. But if the sting hits any other part, though some die presently, almost as soon as they receive their death's wound, others more gradually expire, by first losing the use of their wings, and then tumbling on the ground like mad things, until they die also ; others run away, drawing one or both of their hinder legs after them, or doubling their nether part toward the ground, or turning the same awry to the left or right side ; but as many as are thus wounded, within an hour after will not be able to move out of the place, and within two hours will be quite dead.

After the same manner do they deal with the drones, about the end of July; *but some of the drones do not presently complain, flying lustily away, but returning no more, for they soon drop to the ground and die as the other Bees.*

The sting of a Bee is very curious; it is a hollow tube, within which is a sheath, or two sharp barbed or bearded spears, somewhat like the barbs or beards of fish-hooks.

*These spears in the sheath lie, one with its point a little before that of the other; one is first darted into the flesh, which being fixed by means of its foremost barb, the other strikes in too, and so they alternately pierce deeper, until the sheath follows, so that the poison is conveyed into the wound.* When the barbs or beards are thus lodged deep in the flesh, the Bees leave their stings behind them, not being able to withdraw their spears into their scabbard, and the Bee loseth his life within an hour after he loseth his sting, and some within ten minutes.

With respect to the poison which is left in the wound, from more than thirty years' experience, I have the greatest reason to believe that THE STING OF ONE BEE SERVES TO MOLIFY, PREVENT THE SWELLING, AND IN EFFECT, CURE THE STING OF ANOTHER. Innumerable instances have I known, which have confirmed me in my belief; two or three I will set down here, for the reader's information, which, I think, may serve for the whole.

In the year 1761, my brother, John Sydserrff, who was then a child in coats, went into my father's bee-garden, where a Hive of Bees lay out very big; the child having a stick in his hand, hooked down part of the bunch, when the Bees immediately fell on the child, and, for want of thought, he made no attempt to run from them, but stood still, crying vehemently. At that time I was at work in my father's chamber, and, calling to my mother-in-law to know what the child cried so violently for, she ran to see, and no sooner came into the garden, than I heard her exclaim so

loudly that I could not hear the child's cry. I ran as quick as possible into the garden, and saw the mother running about and grasping the child in her arms, endeavouring to save him from the furious Bees. On seeing me she cried out, "The child is stung to death;" and as she also was stung very much, so I did not escape being stung in several places, only in taking the child from its mother and running with it into the house. Many Bees followed us; and, I believe, more than a score were seen flying up and down the glass of the window, on the outside, in less than half a minute. I found several Bees entangled in the child's hair, and to prevent their stinging him, I pulled them out in a hurry, Bees and hair together.

As soon as I had extricated the child from the Bees, my next work was to pluck out the stings that were to be found, more or less, from head to foot; but all over the head they greatly abounded. Several I pulled out of the tongue, and thirteen out and off one of the ears. Immediately applying to Mr. Robert Grimstead, apothecary, for advice, he said, he could not tell what could be done, unless I was to anoint him all over with sweet oil. This I did, as fast as possible; but I believe it did the child neither good nor harm. The effect of this disaster was, that he looked pale and appeared to be sick, but there was not the least sign of any swelling. Soon after this he fell asleep, and lay sleeping in his mother's lap for several hours; and about ten o'clock in the evening (to the joy and surprise of his weeping parents) he opened his eyes, and appeared to be perfectly recovered. We all went to rest for the night, and not a single complaint was heard of afterward.

From hence I take the opportunity of observing, *that, if I am stung by a Bee in the face, I generally swell almost blind; if on the back part of the hand, the swelling ascends to the tops of my fingers; but if I am stung by two Bees near the same place, the swelling is not so much; and if I am stung by ten or more Bees, the swelling is very little, or*

*none at all. I would not of choice be stung by them, if it can be avoided, but after I have been stung once, I have no objection against being stung twice ; and after I have been stung twice or three times, I do not mind if I am stung fifty or a hundred times.*

Some, no doubt, will be ready to say, what I here assert is very unreasonable. It may appear so to those who have not proved it ; but if I did not know it to be a matter of fact, I should not relate it. How often have I ascended a tree of such a height that my head would not suffer me to look down, and I have been obliged to take a rope and tie myself on to the tree, for fear of falling ; how often have I then stripped naked to the waist, and put my arm into the tree among the Bees up to the shoulder, and pulled them out by handfuls, in the sight of numbers of spectators !

But, as a farther proof of the above, in 1780, in taking an old stock of Bees, for Thomas Hornor, Esq., in Mells Park, out of an high ash tree, I was stung to such a degree, that my flesh was as tender as if cut with lancets, but without any appearance of swelling ; and as I had to rise the Bees in the garden (which lay out very big), I went the next day to do it, and I felt such a fear of being stung again as I never felt before for upwards of thirty years. This was observed by Mr. Forbes, the gardener, who told me that I was more afraid of the Bees than he was ; which, I believe, at that time was true ; but, as Mr. Forbes was a stranger to what I then felt, it is not improbable that if he had been stung but half so much as I was the day before, he would have been afraid ever to have gone into a Bee-garden more. However, as I expected no pay unless my work was completely done, I raised them up, and was again stung severely from head to foot. *But what was my surprise, when I found these fresh stings to be of very great service ! the pain I felt was removed almost instantaneously, and the tenderness in the flesh very soon passed off.* On



the third day I made new hackles, and plaistered the Bees round, to the satisfaction of my employer; and in doing this also I was stung very much, but these stings had not the least effect on me, and I felt nothing of them but only when pricked by them.

Another proof I shall mention was in 1783, in taking a swarm out of a tree for farmer Luke Ashman, of Leigh on Mendip. After I had handed out the greatest part of the Bees without finding the queen, I was obliged to search every small hole, where my hand would not go, with my fore-finger. By this means the finger was stung to such a degree, that William Tapp, who attended me, did often take out of it three stings at once. When I had done, I asked him how many stings he thought he had taken from the top to the first joint of my finger? He told me they were out of number. I then asked him if he thought he had taken out thirty? Yes, said he, and more than twice thirty. *I must observe, that this finger felt a little benumbed, but no way tender or swelled, nor had it the least appearance of being stung at the first; but for days after black specks appeared in the skin. Upon another of my fingers I was stung by one single Bee, which made it swell greatly, and it was very tender for several days after.*

Another proof I met with in the year 1784, which is the last I intend at this time to mention. It was on the 19th of May, in taking a swarm of Bees out of a high elm tree, for Mr. James Fussell, of Mells, when I was stung on my fingers, and on the back of my right hand, in near twenty places. On this hand there was not the least appearance of swelling, and very little tenderness; but on my left hand, which was accidentally stung by one single Bee, the sting of this one Bee caused my arm to swell to such a degree, that I could not, without some difficulty, take my coat off in the evening. The next morning I had greater difficulty to put it on, and my arm was very tender for several days after. *From these circumstances I formed a*

*resolution never to be stung by one Bee alone unless another cannot be had.*

Many more observations of the like nature have I made the last seven years past to the present time, 1791 ; and can add with certainty, that the more I am stung, the less effect I feel from it. I have farther to observe, that when I am stung in cleaning out the Bees in March, I feel them abundantly more sharp than in the months of July, August, &c. Whether the same stings have the same effect on all bodies, is what I have long desired to know, but have not yet had an opportunity. Many have asked my advice when stung, and I have always recommended THAT ANOTHER STING THEM NEAR THE SAME PLACE, AND ALL WILL BE WELL. One in particular who attended me at times for many years past, in taking Bees out of trees, and other places, when stung in the face, asked me what he should do, and exclaiming he should be blind ; my advice has constantly been, as I have just said, that another Bee sting him near the same place, and he will swell but very little, or none at all. But though, in many respects, he is a man of uncommon boldness, and will climb a tree of any height, and put his hand into the hole of the tree among the Bees, the same as into a bird's nest, yet sooner than take my advice, and make use of my infallible, speedy medicine, he will be content to be swollen almost blind, and go blinking like an owl for near a week together.

But some will say, what you here assert is against all reason : I answer, it is just the same as when a man has taken a dose of poison, for a physician to order another dose of poison, more strong than the former, to be given him immediately, in order to expel what he has first taken.

As to the other internal parts of the Bees, by the help of the microscope, may be discerned the brain in the head ; and within the breast a reddish fibrous flesh, with heart and lungs, the proper instruments for breathing : in the hinder part is a gut, and also the bladder or bag in which the Bee

fetcheth water to mix up the bee-bread for feeding the young ; in this bag also they carry their honey. But for farther particulars we must refer to the working of the Bees, in Chap. VII., hereafter to be mentioned.

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### CHAP. III.

A DESCRIPTION OF THE QUEEN, OR MOTHER BEE, WITH VARIOUS PRACTICAL EXPERIMENTS TO PROVE THE LOYALTY OF HER SUBJECTS.

The Queen or Mother Bee is of a comely and stately shape, brown of colour, as other Bees, about the shoulders, but her hinder part darker ; under her belly she is of a bright red ; her legs proportionable, and of the colour of her belly, but her two hinder legs more yellow. She is longer than a working Bee by one-third part, and much larger, but her body is not so large as a Drone, although much longer ; her head also is in proportion, but more round than the little working Bees. Her fangs are shorter, and her tongue not half so long as that of the working Bees, therefore she cannot work, could she be granted that liberty, but is maintained by the labour of her subjects. Her wings are of the same size as those of the working Bees ; but in respect of her long body, they seem very short, for they reach but to the middle of her nether part. Her tail is more pricked and sharper than other Bees, but her spear or sting is but very small, and not half so long as that of the other Bees. I never knew one of them to sting either man or beast, although I have often tried to provoke them to it, that I might know the efficacy of their poison. Her office is to reign over and direct the other Bees in all they do, to head the swarm, and to raise a new brood. She brings forth ten, fifteen, or twenty thousand young ones in a year, so

that she may literally be said to be the mother of her people. The Bees follow their Queen wherever she goes; and if she be tied by one of her legs to a stick, the swarm will gather in a cluster about her, and, by removing the stick, may be carried any where; or, if you take her by the wings, you may carry them to any distance, and do with them as you please.

If the Queen of any Hive be dead, the Bees will cluster about her as if she was alive, and never leave her unless forced to it. This I have proved many times, of which I shall particularly mention an instance: on the 20th of July, 1789, Mr. Isaac Budgett, of Whatley, had a chick or virgin swarm; the next morning I advised him to force them back again, and, on his telling me that he should leave it to me to do with them as I thought proper, I took a large white cloth and laid it on the ground at some distance from the old Hive, and, by a sudden stroke, forced them down on the cloth. I then carefully inspected them, and as soon as I saw their Queen, with my finger crushed her to death. Immediately I took her up, and went with her into the house, and desired Mr. Benjamin Budgett to tie a string round the wrist of my coat sleeve, and I would bring the whole swarm about my hand.

Mr. Budgett was desirous to try the experiment himself, and by my directions he went with the Queen into the garden. As soon as he came near the Bees, they hastily rose from the cloth and pitched on his arm and other parts. His sister, Mrs. Martha Millard, of Mells, looking out of the door, and seeing her brother covered with Bees, was greatly alarmed, and entreated him to come away from the danger which she thought him in. In his attempting to shake off the Bees, he dropt the Queen, when the Bees immediately left him, and clustered about her again, on the cloth, so close, that I could not find her, until I applied tobacco smoke among them. As soon as I again saw her, I took her up, and held her in my hand as high as I could reach in the air; the Bees speedily arose, and began to pitch on my hand, and running into the orchard adjoining, they still followed me, and clustered them-



selves about my hand. I then went with them, hanging round my hand, to Mr. Henry Furfit's, at the White Horse Inn, which is about a hundred yards distant; going into the house, I sat down in the window-bench, with the intent (as I was sick with the tobacco smoke) to get something to drink to turn the sickness. Mrs. Furfit and Mrs. Christea were breakfasting in the same room, and, on looking round, saw the Bees on my hand; they were greatly afraid, and earnestly desired me to go out of the house; being unwilling to displease them, I readily complied with their request, and went away without drinking.

In my way back to Mr. Budgett's I was met by many people, who all very readily made way for me. When I came into the garden I shook the Bees from my hand, and ran into the house, put the Queen into a beer-glass, and covered her over with a book.

As the Bees had lost both me and their Queen, after a few minutes, the greatest part returned to the old Hive; but as soon as I left the house, in my way back to Mr. Furfit's, many of them again followed me, and, during my stay there, the Bees continued about the house, flying with great force against the window. Some time after, to satisfy them that I had not got their Queen, I went forth; the Bees followed me a considerable way up the road, and after examining me over and over, without finding their Queen, they returned and left me.

The working Bees serve their Queen in every thing. If by any means she is dirtied, all try who shall clean her; and in cold weather they cluster about her to keep her warm. In the time of want, when they die of hunger, the Queen lives to the last. When their food is almost spent, they will starve and die themselves to keep her alive. Sometimes she may be found alive, and to appearance unhurt, when she has not more than ten live Bees about her, and these so stupid that you can scarce tell whether they are dead or alive.

In the time of swarming, if, through the badness of her wings, she falls to the ground, many of the Bees will follow

her, and cluster about her; and if she is not found by the Bee-master, and taken up, the Bees about her will die with her, but never leave her.

I remember a particular instance some years ago, which I shall here relate: my father had a swarm of Bees that lighted on a high plumb-tree, which, after Hiving them with some difficulty, soon returned to the tree again. He took them again, but to no purpose; being soon convinced that the Queen was lost, he looked for her, and found her trodden to death, with a cluster of Bees also killed with the foot. He took the Queen, which he carelessly cast away, and in a few hours after, observing a bunch of Bees on the ground, on inspecting them, he found the same dead Queen among them. In order to prevent the Bees from clustering about her again, he took the body of the Queen, put her on a plain stone, and with his foot crushed her to atoms; but this did not prevent the Bees from clustering together, for they again assembled in a body on the stone, and had they not been often disturbed by putting them asunder, I believe some of them would have continued on the very spot until they had died also.

The same may be seen in whole Hives of Bees. So long as the Queen is well, they are all chearful and busy at their work; but if she droop, they are discouraged, and droop also. If she die, they will never work more, but die also, though their number be ever so great, or they are ever so rich in honey.

On the 7th of July, 1784, I drove a Hive of Bees for Mr. Isaac Budgett above-mentioned: the Bees went so free into the new Hive, that I had no doubt but their Queen was with them, and being in haste, I left the old Hive, with its mouth upward, in the garden. All the day after the weather was very bad, and continued with thunder, lightning, and heavy rain till near midnight. I took the Hive home the next morning, but, on looking into it, I saw the Queen standing in a stupid condition, after being thoroughly washed with the rain, and exposed to the cold all the night. I hastily took her

out of the Hive, put her into an earthen cup, and ran with her to Whatley. As soon as Mr. Budgett saw me, he began to enquire what ailed the Bees, they were so restless; I told him that I would quiet them presently. I took the Queen and put her into them, and in a few minutes they were still, and began to work: although they appeared very disconsolate, I made no doubt they would recover this at the recovery of their Queen. I never observed them more, until I was told by Mr. Budgett's servant that the Bees were dead. On my examination of them, I found many of the Bees alive, but very weak. I searched among them for their Queen, and found her dead. I was convinced that she died through being chilled, or getting some other hurt that night; and within three days after the Queen, all the other Bees died, although they made considerable progress in their work, during the time of the Queen's illness, before her death.

Bees that have lost their Queen might be saved, by putting them into another Hive. There will be no contention or fighting where there is but one Queen, but they will be received with the greatest affection. If Bees lose their Queen in the swarming season, another may be got out of a second swarm, or when two swarms go together. And if the Bees who had lost their Queen be to appearance near dead, (for they presently droop,) as soon as the new Queen enters their Hive they revive immediately; and such joy is among them as cannot be expressed. Their music, at such times, may be heard at many yards distance; and within five minutes they will fly out to work, and within half an hour they will return loaded. When they return with their loading they do not fly hastily into the Hive, as at other times, but will stand at the door and sing, walk a few steps, and then stand and sing again.

On Friday, the 28th day of May, 1784, I had an opportunity of proving the loyalty of strange Bees to a strange Queen. I was informed of a swarm of Bees in a tree, and agreed with the person who found them to pay him 2s. 6d. on

condition that I could take them out. I went and took out several handfuls into a Hive with old comb, but night coming on, and for want of a proper person to assist me, I was constrained to give out without having the Queen; and as I could not take the Bees back out of my Hive without breaking the comb, I took them to my house, with the intent to go for the rest the next day. But the next day other business prevented my going, and I postponed it so long, that the Bees in the Hive, and those in the tree, became strangers to each other; and I had brought them such a distance that they knew not the way back to their comrades. I was unwilling to see them starve and die in such fine weather; I therefore several times turned them up, and let the sun shine full among them, to see if they would fly out; but as they had no Queen to go with them, they chose rather to die. I then came to a determination to save them, if possible, by a new experiment, and to see if I could not raise an Hive of Bees out of them. I knew of several Hives that called for second swarming; I therefore provided a small cup, with a paper cork, and put it into my pocket, to secure the first Queen that offered in a second swarm. In a few minutes after I had provided, (as above,) I was sent for to Mells, to take a swarm of Bees for Mr. Michael Holder, which came out of one Hive, and pitched round another that was calling for second swarming. The calling of these Bees had brought the others to them. I told Mr. Holder that they never could be separated; that the second swarm would come forth within half an hour, and they would go together, which they did, and settled on a gooseberry bush in the garden, where I could have taken them in one minute: but, instead of this, I shook the greater part on the ground, as I was determined to have a Queen, knowing there were three, if not four, among them. As soon as I had found out near where one of them lay, (which I could easily tell within three or four inches, by the governors which always attend on her majesty,) I desired Mr. Holder to go and see if any other of his Bees were coming forth, that we might prevent their going together.



As soon as Mr. Holder was out of sight, I found a Queen, and put her into my pocket. I then Hived the Bees, and returned home as fast as possible. Before I put the Queen into my Bees, I examined them, and they appeared so stupid and so near dead, that I thought it was vanity to try to save them; however, I put the Queen in among them, and, although they were so insensible, in a few minutes they became more vigorous than any of the Bees in my garden.

Greater marks of triumph could not be seen among the English tars when the brave Rodney proved victorious over Count de Grasse, than there were among these little loyal subjects. They soon began to shew their love to their Queen, by fighting for her, and in less than five minutes they began to strike at me, and to bid defiance to all around them. In less than ten minutes they began to fly off to work, and in less than twenty minutes they returned back heavy loaded. They still continued their thankfulness, by standing at the mouth of the Hive with their heavy loadings, singing; and if the subjects of his Majesty King George were so faithful to the best of sovereigns, we need not fear all the powers in the world combined together.

After a few days I removed these Bees to Mr. Henry Austin's, at Vebster, where they continued to work all the summer after; and had not the season proved worse than had been known since the year 1739, I make no doubt but it would have made a good Hive; but in the winter they shared the same fate as most part of the Bees did in Somerset and most other counties in England.

Whenever the Queen goes forth to take the air, as she often does, many of the small Bees attend upon her, guarding her before and behind. They that come forth before her do not very soon fly off, but will run to and again around the door, looking back to see if her majesty be in sight. These make a different noise from what they do at other times. By their sound I have known when her majesty has been coming

forth, and have had time to call persons who have been desirous of seeing her.

As soon as she flies off, the guards which follow her come forth very quick; making the same noise as those which went before. They continue the same sound at their return, by which means you have an opportunity of seeing her majesty return in, as well as come forth. I never knew her stay abroad more than fifteen minutes, and will often return in less than five. The time of her coming forth is in the very heat of the day; and you may be sure of seeing her in new second swarms, but I never saw her come forth out of an old Hive or first swarms.

If you see her come forth one day, you may be sure of seeing her again the next day at the same hour, and near the same minute, unless there be some change in the air. If the Queen is prevented from returning back, and the guards return without her into the Hive, the Bees, which before were quiet, and busy at their work, will in an instant be in a very great bustle, running all over the outside of their Hive with a kind of crying note. Some of them will hastily fly off, and as hastily return back again; seldom flying more than three or four yards distant, as they will not be content, neither abroad nor at home, until they have again found their Queen. But as soon as she is put into them, they immediately change their note, and follow her into the Hive, to congratulate on her happy return.

Bees which have a Queen among them will not suffer a strange female to enter the Hive. If a strange Bee makes the attempt, a kind of council is called, and he is examined, and at last thrown down: but if a strange female makes the attempt, they will lay hold of her like vultures, and tumble her to the ground, and will not let go their hold until they have torn her in pieces.

The guards also which attend on her majesty are easily known from the other Bees, by the crest, tuft, or tassel, which they wear on their heads. They are different in colour, and

in some greater and some less, perhaps according to their dignities. These may be seen to walk in and out of good Hives, several in an hour, in the swarming months; at other times they are not so visible. Many of them may be seen in a swarm; and, in Hives pestered with robbers, they will be seen about the door, walking to and again among the Bees, as if directing them in their fighting.

When I want to find the Queen in the midst of a swarm, I look for these attendants; they may be seen sometimes to run very swiftly all one way, on a sudden they tack about and run the other way, and so to and again, as the Queen goes. By taking up a handful of Bees just before them, you are sure of the Queen; but she no sooner appears than she is again out of sight, as she hides herself among the Bees as quick as possible. But by the same rule she may be found again and again; and, by often disturbing her, she will at last take wing, and the whole swarm instantly follow her, until they pitch again on a bush, or fly entirely away. But this seldom happens.

Many other things are to be seen among them, too mysterious to be explained by any writer whatever. But what has been discovered of this wonderful insect, considered in its threefold relation and species, may well fill our mouths with this ejaculation:—"Is it for the Bees, O Lord, who have no knowledge thereof, that thou hast joined together so many miracles? is it for the men who give no attention to them? is it for those who admire them without thinking of thee? rather is it not thy design, by all these wonders, to call us to thyself? to make us sensible of thy wisdom, and fill us with confidence in thy bounty, who directest and watchest so carefully over those little inconsiderable creatures, in which so many of the wonders of thy creation are combined?"

## CHAP. IV.

ON THE BREEDING OF BEES, WASPS, AND OTHER INSECTS; WITH DIRECTIONS FOR MAKING YOURSELF KNOWN TO BEES, AND TO PREVENT BEING STUNG.

It has been observed, that the Queen is the mother of the Bees: she begins laying her eggs (if she killed her Drones early in the preceding summer) in the beginning of February, unless the weather be very cold, and she very weak. This is about the time of their gathering from the snow drops; though some will lay no eggs until after gathering from the willow.

Close under the honey, at the upper part of the combs at the bottom of the void cells, is the place where she first begins to lay her eggs, which are about the bigness of those that the butterfly leaves upon the cabbage; but they are of a different colour, those of a butterfly being yellow, but those of the Bee are white. She first puts in her head to examine the cell, and, if void, she lays her egg, and so goes on, from one cell to another, until an egg be laid in every upper cell.

She does not descend to the nether cells at the first breeding, as there are no drones to sit on the eggs, and the first brood are raised by the heat of the Bees, which at this season lay in the head of the Hive.

After the first brood comes forth, she does not observe this order; for as the honey is laid up in those cells where the young Bees come forth, in the other void cells she lays her eggs, which, at the first, stick upon one end until they become live worms or maggots. As soon as they are alive they get loose, and lie in the bottom of the cell, round as a ring, one end touching the other.

When this worm is grown so big that the bottom cannot contain it, it then lieth along in the cell until it be grown nearly to the full bigness of the Bee. Before this, the Bee (or worm) is alive and full of motion; but now, to appearance, it dieth, and becomes void of all motion and sense.



The Bees now, I suppose by order of the Queen their mother, seal up the cell, containing the young Bee, with wax; the worm thus lying dead, as it were, gradually grows to the shape of a Bee, but remains perfectly white, as before. It then begins to move again, and to live a second life, and, from thenceforth, it turns brown; but before they are perfectly brown, they eat their way through the wax, and come forth, and fly abroad to work, and all this in about the space of twenty-one days.

The mother Bees are bred in the several palaces of the Queen, after a very peculiar manner, and very different from the other Bees; for as the other Bees first receive the shape of a worm or maggot, and die, she is never turned into a worm at all, but immediately, from her leaving the egg, receives the shape of a Bee, and lives without being inanimated at all.

When the first brood is come forth, after the same manner, in the larger cells, they breed the male Bees or Drones, which I shall treat of more particularly hereafter.

The fruitfulness of the female is the less strange when we consider the number of the males. For though many people will not believe it possible, that one Bee should be the mother of so many thousands, their not believing it is no proof to the contrary.

She is not the only insect that is thus fruitful. We see the like in the small wasp and dorre; the queen or mother of which may be seen commonly flying about in the May month, but, in an uncommon dry spring, I have seen them in April. They now search about for a convenient hole wherein to make their nest; and every one of these is the founder of a nation. She is as far different and as easily known from her subjects as the Queen-Bee from hers; being near twice so long, and twice so big, and of a louder voice.

When she has found a hole to her mind, she begins to work her comb in the formation of a round tent, hanging by the top to the upper part of the hole. This comb at first contains only about six or eight cells, of the bigness and nearly of the

fashion of the Bees' cells. She lays eggs in each of these cells, which, by the great heat of her body, are soon brought forth, much sooner than the Bees.

As soon as they fly abroad they begin immediately to enlarge their holes. Not a wasp comes forth without a large mouthful of earth, and some of them even to admiration. In returning, they load themselves with farina to enlarge their comb; and as fast as a cell is made, the queen or mother-wasp lays an egg in it. Some of the comb is eight or nine inches over, and in every cell are either eggs or young; and as soon as a young one comes forth, another egg is immediately placed in that cell; and so the queen continues laying her eggs, until breeding time is over.

After the first brood, in combs hanging to the first combs with little pins, they breed their drones or male wasps, and without stings as the drone Bees; also about the same time they breed the queens or mother wasps, which, in some respect, are like the small wasp, as to their colour, but not their size.

After they have conceived, as the Bees do, by their drones, they leave both the wasps and drones to the mercy of the winter, which are soon killed by the wet and cold, and they betake themselves to some warm place, as the thatch of a house, a hole in timber, or some other convenient situation, where they continue in a dead sleep, without any kind of food, until the next spring. This is easily proved, since at any time in the winter by taking them into your hand (when you have found them) and blowing your breath on them, or by holding them at a proper distance from the fire, they will wake. In April or May (according to the weather) they will fly about for food, and in search of a hole, as already mentioned.

The dorre also sleeps away the winter, without food, as the small wasp, until breeding time. She then, finding a proper place or hole in the ground, generally among the grass, gets together her stuff, which is brown and brittle, somewhat like

paper, but of a waxey nature. She prepares her cells about the bigness of grapes, lying flat on the ground, one on another, which, at the first, are about six or eight in number. In each of these she lays an egg, and covereth them over with moss, like a bird's nest. As these grow, the cell enlargeth, and when ripe, they eat their way out at the top. These open cells are then filled with honey, and new cells made for the other young, as at the first. Thus they continue to do until about the beginning of August, when they breed their queens or females, and also the drones; and about the end of November the queens go to their winter quarters, and the rest die, and are seen no more.

I may also add, that the ant is not less fruitful, seeing they are all bred by their queen only. She is also as easily known as the Queen Bee or wasp. Her body is much larger and thicker than that of the male or drone ants or labourers. She has also three lucid points on her head, which seem to be three eyes; and has four wings, as the drone; but the drone's eyes are larger than hers. The labourers are neither male nor female, and have no wings at all.

Great care should be taken of the Bees at the breeding season. If the winter be mild, and the weather fine in March, and wet and cold in April, more Bees will die then than at any other season of the year.

The winter of 1789 was the finest that has been known in the memory of man; but the snow and rain which came in April, 1790, caused such a change in the air, though it held but nine days, that more Bees died (ten to one) than died the winter before, in and after the great frost, which held nine weeks.

I have known them die in the month of May; once in particular, on the 6th of May, 1782, for I went to Stalbridge fair on the 7th, which was a very wet morning, when my father told me that he had a Hive of Bees, which he thought in no danger, and which worked well the last week, but were now dead. I asked him how long they had been dead; he

told me that he could not be sure, but he thought not more than three or four days : my answer was, If you cannot tell me the time they died, I will see if I can tell you. I then took up the Hive, and, with a small stick, pulled a few of them out of the comb into my hand, and breathed on them for several minutes ; at last I observed some motion at the second joint of the horns. (In the horns are always the first appearance of life.)

I then took out as many as I could into a warm pewter dish, and held over them a large stick of fire, so that the heat was a little more than that of the sun. I observed, by the horns, as above-mentioned, the most part would recover. Those that were present began to laugh at me, and told me, that miracles had ceased ; but they soon changed their thoughts when they saw the Bees tumble one over another. I then made search for the Queen, who was, to appearance, quite dead ; but she recovered almost as soon as she felt the warmth. I then desired my father to enclose her between his hand, that she might not fly away, while I clarified some honey and put into the comb ; after which, I put the Queen, with her live subjects, into the Hive together, when the heat of the Bees soon brought the others to life that remained in the combs ; and when I left them (on the same day) they worked as well, if not better, than any other Hive in the garden.

Bees, which to appearance are dead, but not actually so, may be brought to life by water as well as by fire ; such in particular as are drowned in their own works, which will often happen in removing Bees from one place to another. On the 8th of June, 1780, Mr. Clothier, in bringing a swarm of Bees from North Cadbury to Leigh, broke down all their works, and the most part of them were killed. I was near eight hours before I could find their Queen ; but after finding her, I put her, and as many of the Bees as I could recover, into a new Hive, and they did well.

The next year, 1781, he killed the greatest part of an old Hive, in putting back the hackle to let the sun shine full



against it, thinking thereby to make them swarm, (although it always has a contrary effect;) the sun penetrating through the Hive, drove the Bees from their combs, which being exposed to the sun, melted and dropped to the stool; the honey ran out in several large streams to the ground; the greatest part of the Bees were killed, but every one of the Bees in both Hives might have been brought to life, unless bruised to death, by putting them into a large pail of water, and after they have soaked for some time, straining off the water through a cloth to keep back the Bees. Then add fresh water to them, and after some time strain them off again, and then lay them in the sun, where they will soon all recover, and fly to their Queen into the Hive. I discovered this first by Bees that had lain in water for more than thirty hours.

The Editor thinks proper to add in this place, in consequence of what has been mentioned respecting the recovery of the Bees at Stalbridge, by breathing on them, what he has universally found to be true. From being accidentally stung by a Bee, when a boy, he had ever shunned approaching the gardens where they were placed; nor did this apprehension of danger vanish till he had almost attained to the thirtieth year of his age. At this time he became acquainted with an experienced practical Bee-master, who lent him Butler's ancient Treatise upon Bees, to which, he believes, the Author alludes in the preface; but his curiosity being hereby excited, he read many other detached pieces, and several professed works, of more modern date, on this subject. These having entirely dissipated his fears, he soon found that the breath is extremely obnoxious to them, and is highly irritating; but that if persons draw in their breath gently, and exhale it moderately, and that not directly against the Bees, keeping the hands, arms, head, &c. steady, and without extraordinary motion, and not fighting with them, as many persons ignorantly do, they may walk as safely in a garden of twenty or thirty Hives, full stocked, as if there was not one.

Those, however, who make use of pomatum and other scents, whether of hair powder, or any other volatile spirit or perfumes, would perhaps do well not to make too free with these insects.

From hence, probably, we may account for the effect of the human breath on these seemingly inanimate little creatures; for whatever excites sensation, whether pleasing or displeasing, but particularly the latter, tends to a restoration of the vital functions, and consequently acts as a stimulus to re-animation, as in the several cases of persons apparently, but not really, dead from accidental causes.

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## CHAP. V.

### OF THE SWARMING OF BEES, AND THE METHODS OF DISCOVERING WHEN THEY MAY BE EXPECTED, WITH OTHER MATTERS.

Soon after the young princess comes forth from her royal cell, the greatest part of the Bees in the Hive, both old and young, join her; only a few remain behind to guard her Majesty, until those which are young in the comb come to perfection, and issue forth to supply the places of those that are gone.

By what natural instinct these Bees are acquainted that they are to stay behind, is known only by the God of Nature; but if one of these is out at the time of the swarm's coming forth, and cannot return in for the throng, he will wait with patience until they are gone forth, but never attempt to go with them: and those that are to go are so intent on their journey, that they will not be hindered by any means whatever. If some of them are so young that their wings will not carry them, they will run out before they are come to their colour, and die on the ground; nay, if you take them and

put them back to the old Hive, they will not tarry, but run out again and again ; but if you take them to the swarm, they will shew a degree of thankfulness, and readily run in among them.

In the morning before they come forth, many of them will go and load themselves heavier than at other times, as if they were sensible of the need there is of making provision for an empty house.

I know of no certain sign of the first swarm's coming forth long before the time of their swarming ; but in the swarming hours, if you see the Bees run hastily up and down the outside of the Hive, or hastily gather together in a bunch on the stool, you may depend on their swarming in a few minutes. They will first fly away from the Hive, and then from the bunch ; and, in the first swarm, particular care should be taken to see the Queen come forth, which you may easily do, by kneeling or sitting down near the mouth of the Hive. She does not often come forth until the greater part of the swarm is past, and then you may see her walk to and again as if she did it on purpose to be seen.

Before the Queen comes forth, there seems to be a kind of regression among them. They will often turn round and look back, and have a quite different sound in the air from what they have when the Queen is out with them ; but no sooner is the Queen gone forth, than the remainder will follow so fast, that they will tumble one over the other.

My reason for seeing the Queen is, because she does often, at her first coming forth, drop to the ground, owing to a defect in her wings ; and if she is not immediately taken up, and put to the swarm, they will return to the old Hive in search of her. If she returns with them unhurt, they will come forth again, (if the weather continues,) a little before the same hour the next day ; but if she does not go back with them, as they have to elect a new Queen, they may not come forth again until the seventh, or perhaps the eleventh or twelfth day, which delay will prevent the second swarm.

Some years ago a man at Coleford came to me for advice in the following case: He told me he had a stock of Bees that swarmed every day, and every day they returned again. I asked him the very time that they came forth that day, that I might know the very time of their coming forth the next day. I went at the time, and the greatest part of the Bees were pitched before she made her appearance; when observing that she had but one wing, I took her to the tree, and put her among the swarm, and they returned no more. Very many instances of the like nature have I known.

But in a second swarm there is no need of seeing the Queen; for if one drops they have another to take her place, as there is seldom less than two, and often three or more amongst them. About the seventh or eighth evening after the first swarm, hearken to the old Hive, and continue so to do every night for a whole week; and if the Bees intend to swarm again, you will hear the young princess, in a begging tone, sing, in more or fewer notes, thus:—



The next princess sings thus:—



The old Queen will then answer thus:—



and from the time of the old Queen's consenting, they do not cease thus calling, for more than six or eight minutes; and near the time of their coming forth, not more than two minutes at a time.

Just before they come forth, the princess comes down on the stool, and thus continues her calling; the Bees follow her, and go up no more. As soon as the Bees join themselves to the young princess, they are no longer looked upon as part of



the old Hive; and those remaining will oblige them to be gone, if the weather should keep them back a day or two beyond their time, "rain or shine." I have known them, when the weather has been very wet, come forth and cluster round the leg, or under the stool. For many years I thought that the second and third swarms did always come forth within fourteen days after the first swarm; but I had in my garden a Hive of Bees that did not call until the eighteenth day, nor come forth until the twenty-third: this was the longest that ever I knew, and something uncommon.

The first night after the second swarm is gone, if any of the princesses stay behind, they will call again; and if the old Queen answers them, and continues so to do until the next morning, they will swarm the third time; but if they are not answered by the Queen, they are all killed the same night, and will be found on the ground under the Hive the next morning. If they go with the swarm they share the same fate; and if a third swarm should come forth, they must the same evening be put to the second, as they are only part of the same.

Before the Bees swarm, a Hive should be prepared, by making it as clean in the inside as possible, and not suffer a hair or loose ragged straw to remain; for nothing is more offensive to the Bees: through the raggedness or roughness of the Hive, the Bees will often leave it, and fly away; but if they continue in it, they will nibble off every straw with their teeth before they begin their work. A small hoop should be fixed to the bottom of the Hive to prevent moths, earwigs, and other offensive insects from lodging under it. Let two small holes be made in the hoops, at a proper distance from each other, but not too high; thus,—



These are called T holes ; and Bees will, for the most part, come out at the one door, and return in at the other, and so will not hinder each other in their work. Let a small stick be fixed across the head of the Hive, about nine inches long, and two more about the middle, across each other.

At the time of the Bees coming forth, let some person make water into the Hive, or wash it round with some chamber-lye, which the Bees will like better than any ale, honey, or sugar whatever.

At the time of their swarming let the Hiver stand in the midst of them ; and when they are pitching let him stand as near the bush or tree as possible, so that all the Bees may see him. When the greater part are pitched, shake them into the Hive, and turn them over on the cloth, and the rest will immediately fly into the Hive ; and if it be within the space of ten yards from the place where they are to stand, let them be removed at once to their standing place, to prevent their playing back to the old place, which they will do for several days after ; but if the Bees have been settled some time on the bush before you hive them, take care not to be in haste with them, but stand as near them as possible for several minutes. If they seem angry spit on them, but never turn from them : and if at your first coming among them one or two should sting you, take not the least notice of it ; for if you are not afraid of them, and stand your ground, within half an hour you may take them by handfuls and put them into your bosom, or carry them in your hand wherever you please, without the smallest danger of being stung.

This has been always my method when I have been called on to take Bees out of forked and hollow trees, chimnies, hollow walls, and other confined places.

In June, 1779, Mr. Samuel Fussell, of Whatley, had a swarm of Bees which pitched round the head of a high yew tree, and which several people had tried, during the whole day after, to hive, but in vain. One man, viz. William Watts, declared, (although a great Bee-man,) that it was impossible for any one to take them.

Early the next morning a messenger came with a horse, with orders for me to take the horse and ride with speed to Whatley, as the master was afraid the Bees would be gone before I should arrive. As soon as I came into the yard, James Noke told me, that unless I was well covered I should be stung to death. While he was speaking to me one of them stung me in the nostril, and another entangled himself in my hair.

This induced me, at that time, to consent to have a crape tied over my face. I then ascended the ladder, and found the Bees in so unsettled and irritated a state, that it was impossible to stand among them in my black visage; the crape was so covered with Bees that I could not see through them, and, as many of them soon found a way into the inside, they stung me severely.

I was glad to come down and get off my covering. I then, with a pipe in my mouth, went to the foot of the ladder, where I was surrounded again with the Bees, but I stood as motionless as the tree. After their examining me over and over, I observed a change in their note, and found their passion was over. I then went up about half the ladder, where they came about me as before, and as angry as ever; but, as they knew me again, their anger was appeased in an instant. I then went up to the swarm, and after spitting many times among them, I took, with my naked hand, several handfuls into the Hive; and observing where their Queen was, I took her in among them. I then took the Hive down on a box-bush, where the remainder of the Bees immediately came to her.

About two years after, viz. in 1781 or 1782, Mr. Fussell had another swarm of Bees, which went into a chimney, where they had been settled three days before I was sent for. I found them near four feet from the top, so that they were out of my reach, until I pulled down part of the wall; in doing which, part of the lime and stone falling among them, exasperated them greatly. This I took no notice of, but stood as

still as possible, until the Bees were acquainted with me. I then filled the mouth of the chimney below the Bees with hay, to prevent their going farther out of my reach, and putting my hand among them, pulled out all the comb that I could find, and laid it under the empty Hive. I then took several handfuls of Bees and put into the same Hive.

My next business was to find out their Queen, which I could easily do by the Bees running to and fro after her in the chimney. I gave them about ten minutes' respite, that they might cluster about her, and then took out a large handful, with the Queen in the midst of them. These I put out of my hand on the outside of the Hive, and saw her walk into the Hive, in the midst of her subjects, in great triumph. The remainder of the Bees in the chimney came as fast as possible into the Hive after her; and in doing this, I do not believe that I killed one Bee, or was once stung by them.

Many have said to me, "I should be glad to keep Bees, and would have some, was not I afraid they would sting me." Such persons shew their ignorance, as would a country farmer, was he to say, I should be glad to keep a dog, and would, but am afraid he will bite me; for a man's own dog will as soon bite him as his own Bees sting him, if he is often among them.

Taking Bees out of hollow trees is attended with greater difficulty, as this is done altogether by feeling. I have taken out whole swarms of Bees, so that a score of Bees have not remained in the tree, and yet the Queen has hid herself in one of the crevices. In getting her out I often have been obliged to make use of tobacco smoke; for if she is suffered to remain undisturbed but for one minute, the Bees would return to her again. I have often taken many of them out, and they have returned again seven or eight times within four hours. At other times, when the Bees have seemed to take the Hive, and I have thought my work to be near done, (after I have been on the ladder for ten or twelve hours, with very little intermission, and almost spent with fatigue,) they have unexpect-



edly come forth from the Hive and returned again to the same tree, at some other unknown hole.

For this reason the tree should be well examined, and every hole well stopped and secured, and if they then leave the Hive they will fly to some bush, or on the ground, as when they first swarm, and then they may be taken with pleasure.

It is of much importance, that those who take Bees out of trees should first lay a good foundation, and well plan their work, for fear of accidents; for it is possible, when in a hurry, to forget the danger we are in.

In the year 1780, I went, in company with William Clothier and Joseph Millard, to take a swarm of Bees out of a high elm tree at Whatley. When I first ascended the ladder I was obliged to return again immediately, for fear of falling, as I did not dare to look down, through the giddiness of my head. For my own safety I took a strong rope, and tied it round my body, under my arms; the other end I tied fast to a strong limb of the tree. After standing several hours on the ladder, without the least notice, the round of the ladder whereon I stood broke off, and I fell from it as far as the rope when extended would permit, and was kept hanging in the air by the strength of the rope. By the assistance of Joseph Millard I was brought upon the ladder again, and though, when I first tied myself to the tree, I was laughed at, had I not taken this precaution, I must, in all probability, have fallen to the ground, and, perhaps, at once have been hurried to an unknown somewhere, without the least warning of the awful change.

Neither is this the only accident that myself and others have been preserved from. When Joseph Millard went with me to take the Bees out of the tree for Thomas Hornor, Esq. (as mentioned before in the first chapter) I desired him first, before we began, to build a firm foundation to stand upon. For this purpose he took two long ash poles, and fixed them to the tree where the Bees were, and to another tree opposite; he then nailed boards across them, so that I could sit and take out the Bees with ease.

After we had been on our stage for several hours, William Clothier came also to us, and did frequently walk on the pole to the opposite tree, and sit to make observations on what I did; but at last, in crossing the pole, it broke short off under his feet, and in trying to save himself he fell with his head downward, and was miraculously preserved by an unseen hand, only by the tips of his toes across a bough of the tree, with his whole body extended. What is very remarkable, he had passed on this same pole many times while Joseph Millard and myself were sitting or standing at our work on the stage; but not half a minute before this accident happened, I stepped off upon the ladder, and Joseph Millard was standing on a limb of the tree.

Had we been altogether on the place, we must have been hurried together where the redemption of the soul would have ceased for ever; but we were all spared, as monuments of God's goodness, as under the place where we must have fallen were several ramosous rocks. May the memorial of it be still on our minds, and lead us to our kind Protector, as this was the motive he had in sparing us!

Whenever a swarm of Bees light on a tree or bush joined to a dead wall, very great care ought to be taken. Let a large white cloth be laid between the bush and the wall, otherwise it will be next to an impossibility to take them. The Queen, as soon as she is disturbed, will enter the wall before the Hive, and the whole swarm will immediately follow her; and, as they cannot lay together as in Hives, for want of room, they will spread the wall, according to the space between the stones. I have known them in the wall for near four feet square, and there is no way of taking them, but only by removing stone after stone. But in doing this many Bees frequently are crippled, killed, and bruised in the ruins; and sometimes the greater part of the swarm is taken and the Queen killed or hurt, and then the whole swarm is destroyed, unless they can find their way back to the old Hive.

Bees taken out of a wall do not take the Hive so kindly as

other Bees; as many of them are blinded and covered with dust, they take a dislike to each other, and will return to the wall, without great care to prevent them, again and again. Particular observation should therefore be made, and let none be put to the Hive that are very dusty, but lay such with the stone on the ground, some distance from the wall, and they will, with their fore-legs, wipe their eyes and clean themselves, and then fly to the Hive.

But you should look well to see if the Queen is among them, and if found, take her, and put her into the Hive as soon as possible, and those in the Hive will soon clean her.

In the year 1789, Mr. Isaac Budgett had a swarm of Bees on a currant bush near a wall, which I hived, to appearance, very well; they stood singing all round the Hive, and I thought my work well done, and left them for the present. On my return to them again, I observed others stand singing on the wall, and then I was sure they had deceived me; and, on taking up the Hive, I found that I had but a very small part of them, and these leaving the Hive as fast as might be. I pulled down part of the wall, and found they were got under the very foundation. After making a large hole, I found there was no way of taking them but with my naked hand, a few at a time. As I removed the stones, Mr. Budgett desired me to desist, as he thought it presumptuous to take them out; I told him I was ready to think so too, but not from any hurt that I could receive from the Bees, as I regarded not how much I was stung, but the greatest danger was of the whole wall falling on my arm, as I had made a way through it; but by taking particular care, I took them all out with ease.

Whenever Bees pitch round the body or large limbs of trees, which cannot be shaken, they may easily be taken with the hand, by putting your fingers expanded through the greatest part of the bunch, and they will come off on the hand, and may be shaken from thence into the Hive; or you may take a smooth stick, and draw it from the bottom, strait through them, as near the tree as possible, and so cut them off at a

stroke into the Hive ; but by no means offer to brush them, for the hairs of the brush will exasperate them to such a degree, that all that are about them will be severely stung, whether man or beast ; but some will object against a brush, and take a goose-wing, which is still worse, for the Bees will sting and leave the stings in the wing as well as in your hand, and as all that sting die, so a whole swarm may be destroyed before you are aware.

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## CHAP. VI.

### ON THE DRIVING OF BEES, WITH NECESSARY INSTRUCTIONS FOR THAT PURPOSE.

AN old Hive of Bees that has stood the whole summer without swarming, will do more work in a clean new Hive in one day, than in a week in the old one ; and those Bees that lay out until Midsummer should not be suffered to remain by any means, as the greatest part of their time is spent in sleep and idleness.

Bees should be drove as near Old Midsummer as possible, and not more than three or four days before or after. If they are drove too soon, the honey is not so good, having so much of the brood intermixt with it, and too many of the young are destroyed, which should supply the places of those that will die of nature. And if they are drove too late, they will not get their winter's store.

But in these respects, especially the last, much depends on the weather. The first fortnight after the 5th of July, should it continue fine and dry, the Bees will do well, and be much richer than when in their old works, and will swarm sooner the next summer ; but should it be wet or stormy they must die. But the loss will be none, except that of shortening the



stock, if burned for the honey when drove, and that when taken will doubly pay for the Bees.

In the year 1787, I drove seven stocks of Bees in one afternoon ; the next morning I drove four more, and took two out of trees, which all did well, and swarmed sooner the next summer than any I knew. The next year, 1788, I drove sixteen in one week, and fifteen of them died ; and the other, viz. Mr. Potter's, of Nunny, was saved with great care and expence. The next year, 1789, although applied to by many, I drove none at all ; as I did not like the condition of the Bees, nor the state of the weather.

Some will object against driving of Bees, because of its cruelty and discouraging them ; but this is a mistake, for the Bees are not discouraged, but are better pleased, and will work more in half an hour after, than before in a much longer time. Bees that have swarmed should not be drove by any means, for these would be greatly discouraged, and seldom thrive after it ; for the company left behind is but small, and their brood, which should have supplied the place of those that are gone, are all destroyed.

The manner of driving Bees is as follows : take a joint stool, or something of the like kind, and fix it on the ground, with its legs uppermost ; and then take the new Hive, and fix the crown of it firm between the legs of the stool, with its mouth upwards. Let the Hive be as near the size of the other as possible ; but if bigger or less, let a flat stick be laid across, to prevent the Hives going the one into the other. Then take the Hive with the Bees, and put it on the other, edge to edge, as near as can be ; and then take a sheet, or large cloth, and put double round the skirt of both Hives, so that a Bee may not come forth : let the Hives be then tied together, above and beneath, to prevent their coming apart, and then be turned over, so that the full Hive may be underneath, and the new Hive on the top. After knocking the full Hive round a few times, the Bees will ascend into the void Hive ; that is, they will ascend out of the full Hive, which

now is lowest, and by the buzz in the upper Hive it may be easily known how your work goes on. At this time I keep my ear very attentive on the Hive, and can often hear the Queen call, sometimes twice, but seldom more than once at a time. As soon as I hear her, I immediately take off the new Hive, and put it on the place of the old one.

During the time the Hives are tied together, I should have observed, that another void Hive must be placed on the stool where the old one was taken from, to amuse those that are out. The new Hive, with the Queen and other Bees, being now put on the stool, those that remain in the Hive among the combs will quickly follow the others gone before into the new Hives, supposing the edge of the old Hive to be fixed to the edge of the stool whereon the new Hive now stands.

It would be advisable to keep the eye fixed on the Bees in their march from the old to the new Hive, to see the Queen; for although she may be heard in the new Hive very distinctly, yet she sometimes will suddenly return into the old Hive again. If she is seen to march out with her subjects, the work is done; but if she can neither be seen nor heard, very great care must be taken in breaking out the comb; for if she do not come forth at first, she will stay behind to the last, and then there is great danger of the whole being lost. For an instance of this, the reader is desired to turn back to Chap. III. to the case of Mr. Budgett's Bees, which were drove in July, 1784.

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## CHAP. VII.

ON THE WORKING OF THE BEES, AND WHEN AND IN WHAT MANNER ONLY THEY OUGHT TO BE REMOVED.

IF the God of Israel inspired Bezaleel and Aholiah with wisdom and knowledge in all manner of workmanship, the God

of Nature has not been deficient in his instructions to the Bees.

The skill with which they build their combs, and adjust their apartments, is inimitable. Soon after the Bees are hived, after driving or swarming, if they like their habitation, they will erect ladders for their work in a very expeditious manner. The manner of making the ladders is this: at the top of the Hive, where they intend to begin their work, several of the Bees will fix themselves with their fore-legs, with their hinder-legs extended downwards; and the other Bees, with one or both of their fore-legs, lay hold of one or both of the hinder-legs of the Bee that is next above it; thus they do from one to the other, until they reach from the top to the bottom of the Hive; and the bottom Bees fix fast hold to the stool with their hinder legs, so that the top and bottom Bees will suffer their legs to be disjoined before they will let go their hold. The larger the swarms are the greater the number of ladders will be, and the Bees that come home loaded, run up these ladders and unload themselves, by taking the wax in their jaws, and after moistening it with a liquor which they distil upon it, they build their cells in a very rough and uneven manner. Other Bees are appointed to make the angles exact, and to smooth the surface; but the Bees which form the cells never polish them, as it always is done by other Bees, who work longer than those that build the walls; polishing not being so laborious a work as building.

As soon as the Bee unloads itself, he sets off as fast as possible for more wax or honey, or both; and he does not return down the ladder the same way he went up, but on the other side, so that the Bees never hinder each other in their work.

As soon as a cell is made, (unless an egg is laid in it,) the Bees fill it with honey: the Bee enters the cell and discharges the honey through his mouth, which he opens wide, moving his head at the same time to and fro. If a drop be ill placed, he sucks it up again, and discharges it anew; and no sooner has the Bee discharged his honey, and is gone, but another

Bee comes, and so on, till the whole cell is filled. That which lies uppermost is always of a different appearance from the rest of the honey, being a kind of cream, which both serves to keep the honey moist, and to prevent its running out by accident.

This crust or cream was not voided last, but was gathering from the first. The Bee which comes loaded to the cell does not at once discharge his honey, but entering into it as deep as may be, thrusts out his fore-legs, and pierces an hole through the crust, and keeping this open with his feet, he disgorges the honey in large drops from his mouth. He then closes the hole; and this is regularly done by every Bee that contributes to the common store.

But every Bee that comes loaded to the Hive does not deposit his honey in the cell; they often dispose of it by the way; and instead of going to any cell, they frequently go to those that are at work, and call them to feed on the honey they have brought; and by this means the Bees are never obliged to intermit their work on the account of hunger.

The manner of their feeding on the store of the friendly Bee, is by putting their trunk into his mouth, exactly in the same manner as they do into the bottom of flowers, which may be seen often at the door at the outside of the Hive.

The combs are carried down from the top to the bottom of the Hive; each is placed parallel to the former, but not touching it, there being a space between for the Bees to walk; these are their public streets, and by means of these they can make use of every cell.

There are likewise alleys cut from street to street, through the substance of the several combs: this is often done in the very center of the combs, in the middle of which stands erect the Queen's palace, stately built, (in some Hives,) near two inches in length. This is cemented together with a kind of glue, so firm, that it cuts like solid timber.

As the Bees enlarge their combs, they shorten the ladders, there being no need of their reaching farther than to the edge



of the comb. The Bees that form the ladder during that time take their rest, and appear to be in a deep sleep, but are soon awaked when other Bees that are tired with hard work want to take their place; then they will let go their hold, and go off immediately to work with great vigour.

How long the Bees work before they tire is not certain, as they give out sooner at one time than another; but they return loaded several times in an hour. I have often tried to prove the very time they take to fetch their loading, but this is variable, according to the weather, and the condition of the Bees. If at any time they have been hindered in their work, they will be more expeditious than at other times. On the 8th of July, 1790, soon after three o'clock in the morning, I stopped in the Bees (as I have often done before) to prove them, and kept them stopped in until twenty minutes after eight. As I was called from them, I left my son to watch them, who, within six minutes, called and told me that one was gone in loaded. I went to them as fast as possible; and as soon as I came in sight of the Hive, I saw two more go in. After waiting about two minutes, three more came; and in about five minutes, or more, almost every Bee returned loaded.

A more remarkable proof I saw in the beginning of April, 1782, when Mr. Daniel Horton removed from Downhead to Marston forest, in the parish of Marston-Bigot. He desired me to accompany the men that were to carry his Bees from one place to the other. I went the preceding evening and tied up four Hives of Bees, in large cloths, that they might be ready to be taken away early the next morning. We came to the place (after carrying the Bees on men's shoulders near nine miles) about eight o'clock; and, on my opening one of the Hives, the Bees were so enraged, that we all were obliged to leave the garden for the present, until their anger was over. In less than a quarter of an hour we went again to open the other Hives, when, to our surprise, we saw the Bees first opened, although in a strange country, so heavy loaded, and so busy at their work, as if they had always stood there.

I then desired Mr. Horton, John Webb, and the other men present, to take notice, after my untying the others, how long it would be before the Bees returned in loaded; which we all did, and saw some of them return in about five or six minutes, many of them in about ten, and all in general, as far as we could judge, in less than fifteen minutes.—As a further proof, see the case in Chap. III. on putting a Queen to my own Bees.

How much honey a swarm of Bees will gain in a day, depends on the largeness of the swarm, and goodness of the weather. If the swarm be very large and the weather very good, and they are no way disturbed by breaking down the ladders, they will gain twenty-eight pounds in about fourteen days, or little more. My father once had a swarm of Bees, which had stood only seven days, and being desirous of knowing how much they had gained, in heaving them up he broke down all their works. To prevent the honey from being lost, he took the comb, honey, and Bees together into a brass pan. After straining it off, besides what was lost, he had fourteen pounds of clear maiden honey.

We need not wonder at the combs thus breaking down, if we consider the above account of the Bees suffering their legs to be disjoined sooner than let go their hold. This is one reason why so many swarms of Bees die through poverty; for if they are often disturbed by lifting them up, if the combs do not break, the ladders must; and this is almost as great a detriment as breaking the combs. The Bees, by this means, fall together on the stool, in a confused heap; and the Bees which return loaded are also put in the greatest confusion, and at such times will run out of the Hive again, as though they did not know their own home; nay, they will often unload themselves without the door, and it is a long time before they can form themselves in order as before the accident.

If Bees are thus treated for several days together, I will engage, if they do not leave their Hive and fly away, they will not be worth one shilling the next St. Paul's day.

In like manner, if Bees that are newly hived be heaved up the same day, after they have formed their ladders, it will make them return to their old Hive, or fly quite away. In the year 1790, Mr. John Parret, at Downhead, had a swarm of Bees well settled in a clean new Hive, which, on my attempting to remove them into the wall where they were to stand, were so greatly disturbed, that they could not be made to settle by any means, until I beat them out into another Hive.

Let this be well observed by every Bee-master, as a matter of the utmost importance, never to suffer any one to touch the Bees in the time of their working, through any pretence whatsoever.

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### CHAP. VIII.

#### ON THE FEEDING OF BEES, WITH INSTRUCTIONS FOR LATE SWARMS, AND THE HIVES MOST PROPER TO BE TAKEN.

It is customary, when the Bees have done working in autumn, to go round the garden, and heave up every Hive, to see which of the Bees will live or die; but this is a custom not less pernicious now than in the time of their working. They foresee the return of winter, and are too well acquainted with the enemies that often invade them not to take particular care to arm and provide against them. To this purpose, they seal the Hive round the skirt firm to the stool, with a kind of glue, which cannot be broke off without great difficulty. If this fastening is once broken, they are in danger of being turned over by the first high wind, and of dying the first wet or snowy night; nor can any plaister or lime whatever make them so firm, when once broken off, as they were before, and the season is past for the Bees to do it themselves. In one minute then, by such an imprudent act, you may undo the work of a whole summer.

But the way to try them is to consider whether they swarmed in proper season, and if the swarm was large; because they may swarm out of season, as they often do. I was informed of one in particular, of the year 1790, viz. Mr. James Fussell's, of Mells, which came the 24th of July. On my asking John Whitcomb, who gave me the information, what he did with them; why, said he, "put them into a Hive, to be sure, what else could be done with them?" My answer was, "You ought to have killed the Queen, and put them back to the old Hive." He then told me, that he knew "neither the Queen nor the Hive they came from."

I mention these particulars for the purpose of shewing how, through ignorance, many old Hives and swarms are very often destroyed; but if, when a swarm comes out of season, the Bee-master follows the method which I took with Mr. Isaac Budgett's, in Chap. III., I have no doubt but the Bees will find out the old Hive, and do well.

The proper way of judging what Hives are likely to live through the winter is this—Go round from Hive to Hive and take off every hackle as still as possible. If the Bees are disturbed, leave them for the present, and when they are quiet, put your ear on the Hive, and give it a sudden stroke, but not so violent as to shake the Hive. Take particular notice what number of Bees there are in the Hive, which is easily known by the noise they make within, as they will buzz altogether, as soon as the Hive is touched. If there is a large quantity of Bees, they will do well, supposing they have but little honey; but if there are only a few Bees, they are in danger of dying, if ever so rich in honey. Two thousand Bees will live the winter on ten pounds of honey, and do better than one thousand will with twenty pounds of honey; and therefore it is not the quantity of honey, so much as the quantity of Bees, which should be looked after. This, as I have said, may be known by hearing of the buzz within, but ought not to be attempted in any other way.

This trial and observation should be made in September,



and where there are but a few Bees, which you can judge of easily from the comparison of the sound, feed them with a match made of brimstone, as by far the shortest and the best way. Not that in such Hives we have any room to expect much honey, unless in very old Hives, which have swarmed themselves out; they, indeed, will sometimes die, and leave large quantities of honey behind them.

Of these a more particular observation should be made, and if there is a sufficient number of Bees let them not be taken barely because of their old age, for there is not a Bee in the whole Hive which is a year old, although the Hive may have stood more than ten; and such Hives seldom fail swarming twice or three times every year. I had a Hive of Bees which I kept near seven years, and then spared them to Mr. Isaac Budgett, in 1783, and this Hive was one of the best in his garden in the summer, 1790, and I do not recollect that ever they missed swarming once a year, and in general twice, and often three times.

Bees, which are designed to be taken, should stand until all the young are come forth, and if any remain they should be separated from the sealed comb, otherwise the honey will be but of little value. In the mean time, care must be taken to prevent their being robbed by the wasps, by making the T hole very small; but if the wasps have begun robbing them, the sooner they are taken the better, for they will never leave them more; and Hives that have been once broken up, as above-mentioned, will be greatly pestered with them.

If the Bee-master shall have been so imprudent as to break them from the stool, the wasp will follow his example, and break the sealed combs. Strange Bees will follow the wasps, and, unless they have cleared away all before the cold prevent them, they will return again in the spring, and take away what was left.

A Bee-garden which has been pestered with robbers once, will be followed with them for many years after; and if such Bees are not burned in the fall, they will, it is ten

to one, leave their combs in the spring, as we have before treated.

But many persons, who have but one Hive, are determined to save them, cost what it will; and to these I would recommend this method: Take a hollow trough, with knots at each end, fitted to the T hole, and fill it with honey or coarse sugar clarified with sweet ale, to prevent its getting thick; let it be put into them in the evening, so close that a Bee may not pass out or in, and taken out again in the morning. And let this be done every night, so long as they continue to carry it up. This should be done in September and October, and let the trough remain in, close stopped, until two hours after sun-rising. All the day after the T hole should be stopped so close, that not more than two Bees can pass at once.

In the months of March or February, if the weather be very fine, all Hives, rich and poor, should be broke from the stools, and cleaned well out; and all the moth-eaten comb cut off. The Bees after that will work with more vigour; for if not done, they will have to bury their dead, and to clean themselves, which will be great hinderance to their work.

When the Bees are thus taken up, you may easily see if they stand in need of more help; and if they do, feed them as before, but with more care; for instead of letting the trough remain two hours after sun-rising, it should be taken out one hour before sun-rising. The Bees, at this season of the year, cannot help telling what they have at home; and as they will invite all the Bees in the country to take part with them, every prudent measure should be taken to prevent the evil consequences of such intelligence.

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## CHAP. XI.

ON THE PROBABLE PROFIT OF BEES, AND OF THEIR INCREASE,  
WITH SOME OF THEIR MEDICINAL PROPERTIES.

NOTHING will tend to greater profit than Bees, considering the little expence which attends them, as shewn by the following estimate:—

Suppose, for instance, a swarm of Bees at the first to cost 10*s.* 6*d.* to be well hackled, and neither them nor the swarms to be taken, but to do well, and swarm once every year, viz. for the time which those I sold to Mr. J. Budgett have stood, as above-mentioned, what will be the product for fourteen years, and what the profits, if each Hive is sold at 10*s.* 6*d.*?

<i>Years.</i>	<i>Hives.</i>	<i>Profits.</i>		
		£	<i>s.</i>	<i>d.</i>
1	1	0	0	0
2	2	1	1	0
3	4	2	2	0
4	8	4	4	0
5	16	8	8	0
6	32	16	16	0
7	64	33	12	0
8	128	67	4	0
9	256	134	8	0
10	512	268	16	0
11	1024	537	12	0
12	2048	1075	4	0
13	4096	2150	8	0
14	8192	4300	16	0

N.B. Deduct 10*s.* 6*d.* what the first Hive cost, and the remainder will be clear profit; supposing the second swarms to pay for Hives, hackles, labour, &c.

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My readers must not conclude from this estimate, that I mean to affirm, that every Hive of Bees will produce so

many, or pay so much; but I will confidently assert what I have known and do know, that many have thus paid in proportion, according to the time they have stood. Most men, however, are of such a covetous disposition, that they want their profit every day, and therefore cannot be prevailed on not to burn their Bees every year, and thereby suffer their stocks to increase.

In the autumn of 1790, I had great reason to blame a woman for thus murdering her Bees, and expostulated with her, how much she was mistaken. "What!" says the woman, "would you desire me to let my Bees stand, and pay nothing?" whereas, if she would have patience but for a few years, in all probability she might get a guinea, where she now gets a shilling.

Others have said to me, "I burn them, that I may be sure of them; for should a bad season come, they may die." But suppose the farmers through the country should reason in this *wise* manner, and should kill all their cows to be sure of them, for fear a bad distemper may break out among the horned cattle, and they may die. I need not point out the absurdity, or enlarge upon its evil effects.

I knew a woman some years ago that always kept thirty good Hives every winter, and at the end of every summer did always burn them down to thirty, making it a rule constantly to leave the very best; and she very seldom lost one in the winter. By the help of these Bees, and the little endeavours this old woman could otherwise make, she was enabled to maintain herself and family comfortably.

But many Bees are lost for want of care. If the hackles are bad in the winter, and the wet comes to the Hive, they will dry no more until the return of summer. The Bees which thus lie in the wet die, though the Hive is full of honey. But the Bee-master may thank himself for this; because, if they are kept dry, and preserved from the enemies already described, no weather will harm them, and they will pay in proportion as before-mentioned, whether many or few.



As a proof of my assertion, I will relate the first rise of Mr. John Parrett's Bees, at Downhead, before-mentioned. A swarm of Bees flew in between the tiles, and settled in the ceiling of the Rev. Mr. Watkin's house, at Leigh, which I took out with my hand, and put into a Hive, and then placed them in his garden, in 1786.

In the next year, 1787, they swarmed, and I bought the swarm, but spared it again to Mr. William Ashman, at Mells. In 1788 he had two Hives, and in 1789 he had four Hives, and the last year, 1790, he had nine Hives.

I should have observed, that Mr. Parrett had an old Hive of Mr. Watkins, in 1787; in 1788 he had two Hives, and in 1789 he had four Hives; but these were stolen altogether, otherwise, there is no doubt, but he would have had as many, if not more, than Mr. Ashman.

There are instances of more than double the number above-mentioned, in four years; and I have known some that have paid more than these. Many years ago, Mr. Joseph Tite, sen. of Stalbridge, applied to my father to get him a swarm of Bees, who bought one of J. Ford, at Road's-House, for 10*s.* 6*d.* which, in about four years, were increased abundantly more.

He then burned them down to six, and made a large barrel of mead, besides preserving a quantity of honey; and this he did every year, so that he could enjoy himself and treat his friends with mead and metheglen, preferable to the best of wines, at a less expense than he could purchase small beer.

Burning of Bees pays more in general than those that are sold. If a Hive be ever so good, it is seldom valued at more than 10*s.* 6*d.* while alive, although it may have in it near fifty pounds of honey, for no man will buy one to keep, unless he knows it to be heavy and good; and if heavy, the honey and wax of one Hive will pay near as much as three live ones.

But this is not considered by all Bee-masters at all times; neither will every one leave a certainty for an uncertainty; and, according to the old proverb, prefers one half guinea in hand, to two in the Hive. Neither are the Bees every year

alike for goodness, but may be double as heavy in one year as they are in another; though the profit is much the same every year.

When Hives are heavy and good, in general, the honey will sell in many places for less than sixpence per pound, and the wax for less than a shilling; but when they are light and bad, the honey will sell for more than a shilling, and the wax for more than two shillings; and as at such times more Bees are burned, ten to one, than in a plentiful season, the covetous Bee-master immediately thinks this to be the time to make something of his Bees, while honey sells well.

Others think, that when Bees are light, if they do not burn them they will die in the winter, not considering, that the same kind Providence which provides for man and beast, takes care also of the insects; for I never knew a bad season for Bees, but the following winter was always in their favour.

This may also be often observed in the summer season, if the weather be wet and bad in the months of May and June, when the flowers are in their prime, and the Bees have been able to get honey; to make up that deficiency, they have been provided for in much the same manner as the children of Israel were, and honey has been sent them so plentifully from the clouds, that in the latter end of the summer it may at times be seen in full drops on the oak and other leaves. Thus the Lord opens his hand and satisfies the desires even of the Bees, as well as every other living thing.

But all Bees are not thus favoured. Some swarms which come in July, and bad weather follows, have no opportunity of getting combs, and to such the honey dews are of no advantage, because they have no cells to put it in, and therefore they must die for want. Let this, therefore, be attended to; and if you desire your Bees to live and pay well, never suffer a Hive to swarm after the first of July, but raise them up with a small hoop as already mentioned, and they will pay more by standing thus, than by swarming.

The utility of the Bees is still greater. By what has been observed above, it is plain that we gain only food and raiment, and yet these are very considerable advantages. But we may ask, "Is not the life more than meat, and the body than raiment?" They are salutary and efficacious also as a medicine. How many lives have, to appearance, been prolonged by the Bees? If Bees, when dead, are dried to powder, and given to either man or beast, this medicine will often give immediate ease in the most excruciating pain, and remove a stoppage in the body, when all other means have failed.

I have, therefore, for many years past, desired persons when they have killed their Bees, to preserve as many as possible, in a clean paper, which have been found at times to be of great service. I have been often applied to for dead Bees; and in some particular cases, in order to save life, I have gone and put my hand into my Hive and took out as many live Bees as necessary, and killed them.

I was once applied to for some Bees by Thomas Padfield, who had a cow near death. I took what were wanted out of my Hives, and a person present blamed me for thus destroying my Bees. On my asking him whether he would have been willing for me to have done it, supposing it had been his own cow: his answer was, "I would sooner give a guinea for a Hive of Bees, and kill them all, than lose a cow worth five or six." From hence I observe, that a man who would kill a whole Hive of Bees to save his own cow, and would not kill a score to save his neighbour's, cannot be said to "love his neighbour as himself," or to "do unto others as he would that others should do unto him." But there are many who call themselves neighbours, who neither "fear God, nor regard man."

From hence, I would recommend to all that keep cattle to keep Bees also; but if a man have no cattle, or even family, it would be advisable, for his own safety, to have one or more Hives; who knows how soon nature may be stopped, and how far a man may send for relief, and be denied? But many will not try the Bees until every thing else has failed; and then

we need not wonder if this fail also, when nature's resources are exhausted, and the parts to be operated on are destroyed.

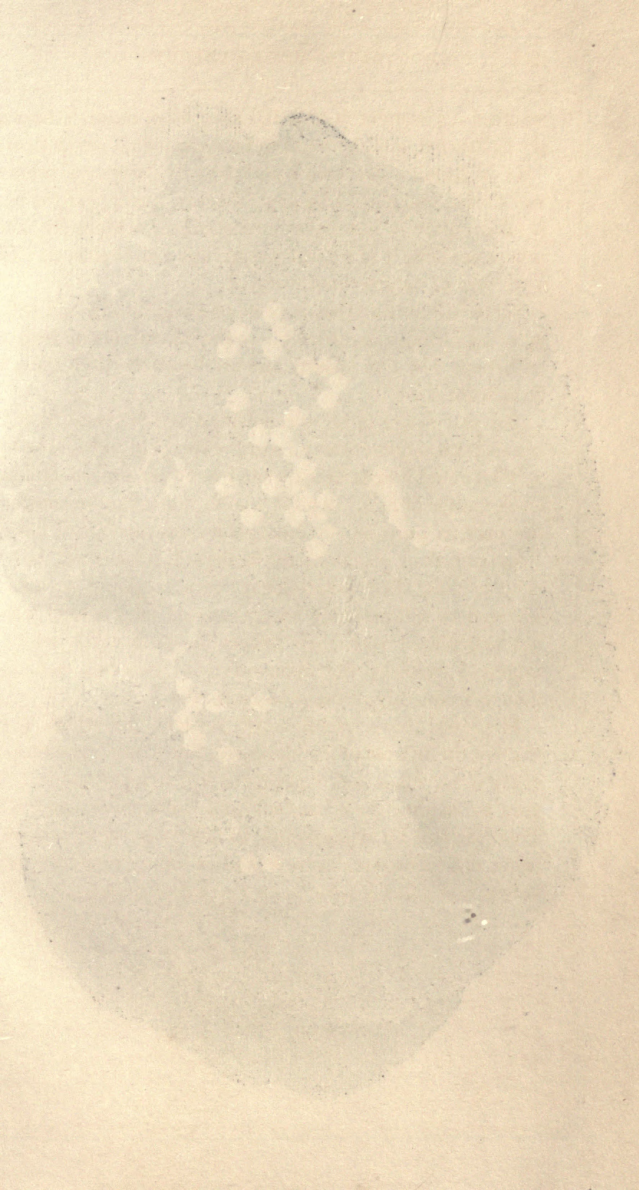
It is certain that honey and wax are also very profitable and useful, and should be kept in every family. If the honey is taken, after it has been well clarified, moderately, and at proper seasons, it is a great preservative of health, as well as a restorer of nature when decayed.

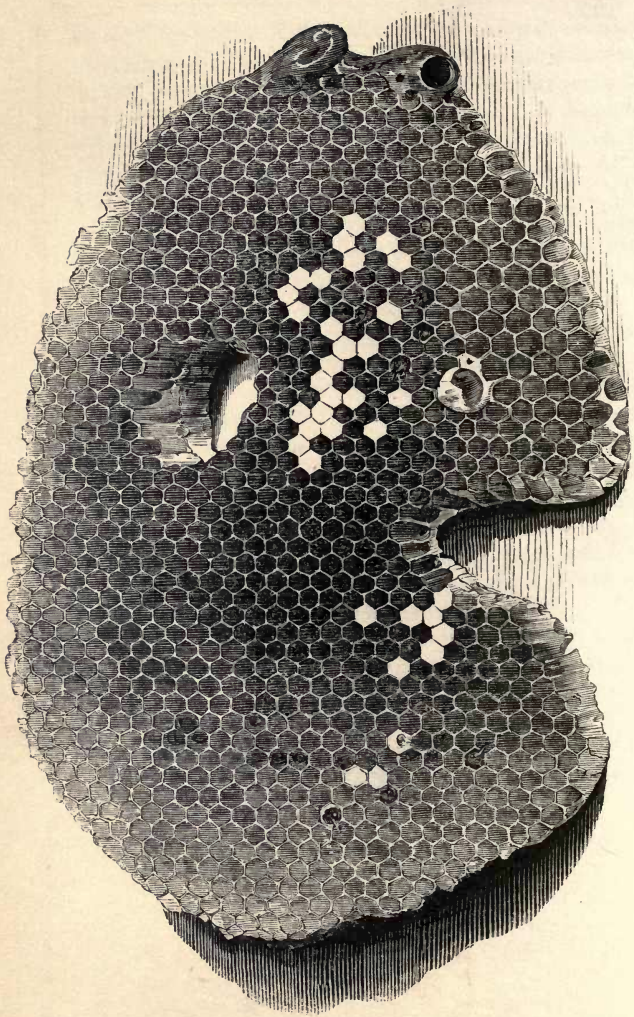
Some will affirm, that it prolongeth life itself, and will tell you that in those countries where the inhabitants do feed daily on honey, they live longer, and are healthier than those who do not use it.

But as I desire to be as concise as possible, and do not see it needful to enumerate the many cures said to be done by it; neither would I write down what I have not proved, and know to be matter of fact. And it would, moreover, be contrary to my present purpose, to enlarge on the medicinal effects of Bees and their produce; for as these instances will be sufficient to shew their great efficacy as a medicine, so many of my readers will probably be of that part of mankind who are not acquainted with their effects in other cases, which are usually known by the name of "old women's medicines," though frequently of the greatest service.

Hoping I have satisfied my readers, for which I have exerted the utmost of my slender abilities, and communicated every observation and experiment worth mentioning, I have only to request their candour and indulgence; and if this Treatise shall be instrumental, in any respect, to benefit and profit my fellow-creatures, I shall be amply rewarded for the labour and pains I have taken for that purpose.







COMB, SHOWING DIFFERENT KINDS OF CELLS.

LETTER TO COTTAGERS.

PART II.

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Natural Theology of Bees.

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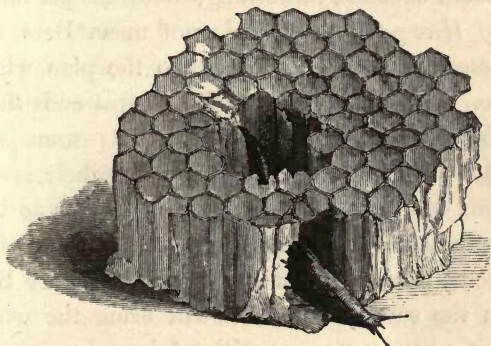


A

# Short and Simple Letter to Cottagers,

FROM

A BEE PRESERVER.



GOOD PEOPLE ALL,

WHEN a man writes a letter to any one whom he has, or has not known beforehand, and it is taken very kindly, what is he likely to do? Why, write another, to be sure, if he has got anything more to say on the matter. Now this is just my case; about three years ago I sent to my friends, known and unknown, A SHORT AND SIMPLE LETTER about

Bees, from a Conservative Bee-keeper, and I have still plenty more to say. I have found, up to the present time, twenty-four thousand friends (for so I call all my readers;) nay, I should think each Letter has been read by at least one person besides the man who bought it, and this would make near fifty thousand, and a pretty good sized Swarm this is. I have met but one or two—I will not call them enemies, but strange Bees *who got into a wrong Hive*—of course I do not mean Bees, but Bee-masters, who did not take to the plan which I like. Now you all know what great odds there are betwixt Bees on different days; some will fly into your face—“buzz,” and leave their stings in your eye for a very slight offence; (for no Bee ever stung from the beginning of the world without some cause;) either you crushed another Bee, when the smell which rises will bring the whole swarm upon you; or, without knowing it, you breathed on them, which they consider a mortal affront, I know not why. Or you went near them on a blowing showery day, when you had better keep clear of them, and they are always cross; or for some other cause which the Bees know better about than I do. Now Bees lose their stings whenever they use them. They die in revenging themselves. All the worse for them, but they have no means of knowing better. In their

death they teach us a lesson, which I have taught you elsewhere. But as for the man who suffers by the sting, and so is often afraid of meddling with the Bees again, he does not die,—far from it. The pain goes off in a moment, and the swelling in a day or two. I have always tried to put my own rules in force when these Men Bees, as I may call Bee-masters, come buzzing about my ears. I told you (page 98,) “Many remedies have been given for a sting; above all, pull the sting completely out, as it is barbed like a fish-hook, and will work into the flesh. Then squeeze the poison out.” And again, “Never blow on them; they will try to sting directly, if you do. If they come all about you, making the noise which you will soon learn to know as a sign of anger, go quietly away, and put your head into a thick shrub, if any is near.”

This is a good way to treat angry Honey Bees; I have tried it, and found it so. It is a good way, too, against Men Bees; and this I know, not only because I have tried it, but on the word of a wiser and better book than my own: it is the way of the Bible. The Bible tells us to give none occasion of offence; that “A soft answer turneth away wrath, but grievous words stir up anger;”\* it teaches us when “We are reviled, to revile not again.” We know that God Himself has given us the

\* Prov. xv. 1.

BIBLE to be the cure for all evils, and what is more to my present subject, He who gave us the book has told us what it is like. "The judgments of the Lord are true and righteous altogether. More to be desired are they than gold, yea, than much fine gold; sweeter also than honey, and the honey-comb."\* Now what do I mean by all this? I will tell you; and, as the plan has answered well with me, I would advise you to try it. One of the best cures for a Bee sting is to put a little honey on the wound. The Bee makes the antidote for her own poison, just as every hedger and ditcher will tell you that there is no cure for the bite of an adder like his own fat. In this case the old saw,—

#### Kill and Cure,

holds good. Now for the mode in which I have treated Men Bees. Whenever one made an ugly noise at me, I walked away; I held my breath; that is, I did not write an angry answer. Whenever I chanced to get stung, I pulled the sting out, and PUT A LITTLE HONEY ON THE PLACE; that is, I satisfied myself that I was right, and allayed the smarting pain by that PURE HONEY I was speaking of just now. And when a number came buzzing about me all at once, I put my head into a bush, and brushed

\* Psalm xix. 9, 10.



them off by the leaves : that is, I sent them a few leaves of writing paper to explain what I meant, and mostly found that this sort of “ soft answer turned away wrath.”

In this second Letter, I do not intend to talk much about the care to be had of Bees, but to tell you some facts about them, their ways and *instincts*, which is a hard word I shall explain directly. This will, I hope, please you, and teach every one who keeps Bees how to set about watching them ; and if every Bee-master would do this for a few minutes of his spare time every day, and for a few hours every month, and so for a few days every year, and would write down plainly what he sees at the very time, we should not long be in the dark on so many matters touching our Bees. They live close to us in many of our gardens, and it is a shame we should know so little of their goings on.

Now there are two sets of persons in the world—one party I have heard called EYES, the other NO-EYES. The last set of men walk out in the world as if there was no creature in it but man, and hardly any man beside themselves ; they turn all their thoughts in upon themselves. They have no time or wish to care for any other. They are selfish, and I need not tell you whether they are happy. EYES, on the contrary, see everything,

and only give *themselves* a due share of thought. When they walk out in the beautiful world, they sing to themselves, or act as if they sung these sweet lines:—

"Farewell, farewell, but this I tell  
To thee, *Bee-master, blest,*  
He prayeth best who loveth best  
Both man and bird and beast;

"He prayeth best who loveth best  
All creatures great and small;  
For the great GOD Who loveth us,  
HE made and loveth ALL."

COLERIDGE, *Ancient Mariner*, (altered for the purpose.)

They often read the parables of Christ, Who drew lessons from the clouds of the sky, the trees of the forest and the garden, the fowls of heaven, and the blade of corn or grass, as well as the weeds which grow with it until the harvest. They read the Old Testament too—and there in the Proverbs of Solomon they see that he, the wisest of men, learned a lesson from the little ant; and so they are ready to hear what the Bee has to say—that near relation of the ant. Nor is the Bee left quite out of the BIBLE. We read, in Ecclesiasticus,

The Bee is small among the fowles, yet doth its  
fruite passe in sweetnesse.\*

Now I am not going to preach a sermon to you, though I think the BIBLE is the book to take in

\* Ecclus. xi. 3. Old Translation.—Ed. 1603.

hand, even when you go to watch your Bees, or study any of the beautiful things which are about our path, and only wait for us to find them out. This is our best text-book in this, as in all study:—when our hearts are full of the pleasant songs of the BIBLE, we shall be able to learn the proper lesson which every sight brings to our eyes, and every sound to our ears. We shall see “all the works of the Lord,” from the “sun” and “moon” down to the “fowls of heaven,” (amongst which we see the Bible reckons the Bee,) “praising the Lord, blessing Him and magnifying Him for ever.”\* We shall hear all nature joining in this glorious hymn; and when we come to the verses which call upon “the servants of the Lord, the spirits and souls of the righteous,” “and the holy and humble men of heart,” to join with the angels in blessing the Lord, praising Him and magnifying Him for ever, we shall, I hope, be ready to take each one his own part, with voice, with heart, with soul.

Before I go on to the very strange facts about Bees and their instinct, which I have to tell you, I must say one word more of the way in which we should study what is called *Natural Theology*. This means the nature of God as seen through His works. Take the BIBLE, and read it through;

\* Book of Common Prayer,—Canticle of the Three Children.

study it carefully, with prayer to God for the light of His Holy Spirit; and then, with its pages in your hand, and its spirit in your heart, turn to the book of nature. You will then see the same God, Who speaks to you plainly in one book acting in the other, and showing loving mercies over all His works. But many men have gone to learn from what they call NATURE, before they have learned of GOD. They have done as sillily, as if a man were to read a book backwards, or take the last volume before the first; and we all know what sad work he would be sure to make of it. It is, for another reason, the wrong way to begin. Human life is short—short because of death, the wages of sin; and how that sin and that death came into the world, I need not stop long to tell you. It was because man would learn of the devil, and not of God; it was the fruit of the forbidden tree, which was pleasant to look at, and good for food, and a thing to be desired to make one wise. It was the pride of false knowledge by which man fell.

Man's life is short, and the book of nature is a long one; IT WOULD TAKE MAN AN ETERNITY TO TURN OVER ALL ITS PAGES, AND SO I TRUST WE SHALL HAVE MORE TIME IN HEAVEN TO READ THIS BOOK. But what I would say is this—HE WHO PUTS OFF THE STUDY OF THE BIBLE TILL HE HAS



GOT TO THE END OF THE BOOK OF NATURE, TAKES THE WRONG END FIRST; AND MANY, I FEAR, WILL NEVER GET TO THAT END, AT WHICH THEY SHOULD HAVE MADE THE BEGINNING.

It is very true that St. Paul tells us that "The invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and Godhead; so that they are without excuse."\* But how many lessons did the heathen, of whom St. Paul wrote, learn from the book of nature? Some of them worshipped thousands of gods, dead men, the sun and moon, beasts, serpents, cattle, nay, even monkeys, cats, and onions;† they made gods of their lusts and evil desires; and so their forms of worship were filled with the most gross acts, which I will not name, as it is painful even to think of them. Others were content with two gods, one good and kind, and the other evil and spiteful. They worshipped both. They prayed to one, to do them good; they gave offerings to the other, to bribe him, as it were, not to do them evil. In many parts of the world this worship, the worship of devils, is still kept up. Nay, more, in some parts of India, the devil alone is worshipped, though his servants believe in a God. But He, say they, only wishes them good—and as

\* Rom. i. 20.

† See Juvenal, Sat. xiv.

He is powerful, will do good to them without their asking. The devils, they well know, seek their hurt; and so, instead of praying to God to destroy the works of the devil, they hope (vain hope!) to make him their friend.

Now why have I said all this? To teach you how to look at all nature, and your Bees among the rest. I indeed most truly believe, that although every insect that breathes has more pleasure than pain, and so "blesses the Lord," yet there are many things, even about Bees, which by the light of the BIBLE are quite plain, but which, without this Lantern in a dark place, are indeed dark. For instance, you know how the working Bees turn out the Drones in the autumn; they do not sting them and put them out of their pain at once, but pinch them with their hard mouths. When the poor Drones try to enter the Hive again, they push them out by main force, and bite their wings, so as to hinder their flying. These poor miserables fall down to the ground, and cannot rise again. I myself in the autumn of 1837, when there were a great many wasps about, saw some of these cruel robbers fasten on the poor Drones, and whilst they crawled about on the ground, and strove in vain to escape, ate the soft part of their body while they were still alive. This cannot, at all events, be very pleasant; and

I killed as many of the wasps as I could. All we can hope about is, that these Drones, and the Bees who lose their stings and then die, do not feel pain so sharply as we do.

Now you will say that this is a painful and dark page in the book of nature; but does not the Bible throw some of its own light on it? I verily believe it does; though it is not the first object of the Bible to teach us natural history. Look to these six verses of the Bible:—"For I reckon that the sufferings of this present time are not worthy to be compared with the glory which shall be revealed in us. For the earnest expectation of the creature waiteth for the manifestation of the sons of God. For the creature was made subject to vanity, not willingly, but by reason of Him who hath subjected the same in hope, Because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the WHOLE CREATION groaneth and travaileth in pain together until now. And not only they, but ourselves also, which have the first-fruits of the Spirit, even we ourselves groan within ourselves, waiting for the adoption, to wit, the redemption of our body."\* Now I may be wrong; I very likely

\* Rom. viii. 18—23.

am, here as in many other things; and I shall be very glad to submit my judgment to any learned doctor of our Church, whom I am bound to reverence and obey. But till I find any decided judgment on this point, I cannot but think that these verses teach more of the condition of beasts, as well as of men, as it is in consequence of the fall, than all that the wit of men has ever found out. It seems to me to bear especially on that pain which we often inflict heedlessly, but seldom, I trust, willingly, on dumb beasts as well as on our fellow-men; still more does it bear upon the pain which one brute beast often suffers at the hands, or rather I should say at the feet and mouths of his fellows. I could not explain this in the least, without turning to the Bible; but when I do so, much is plain. I there find in the first chapter of Genesis these verses:—"So God created man in His own image, in the image of God created He him; male and female created He them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree,



in the which is the fruit of a tree yielding seed ; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat : and it was so. And God saw every thing that He had made, and, behold, it was very good. And the evening and the morning were the sixth day.”\* There was no pain then in the world, for there was no sin or death. Sin, pain, and death, all came into this world of ours together, or rather into God’s world, for He made it very good, full of life, gladness, and peace. Beasts at first did not eat one another. Man harmed them not, and they had no fear of man ; nor was this tameness, we may be sure, shocking to Adam, for it was the fruit of confidence and love. He had delight in the beauty of every, the smallest living creature. He knew more about them, about Bees among the rest, than I, or the wisest men of our time ever can know. He knew more than King Solomon himself. The wisdom of Solomon is thus spoken of in the Bible :—“ And God gave Solomon wisdom and understanding exceeding much, and largeness of heart, even as the sand that is on the sea shore. And Solomon’s wisdom

\* Gen. i. 27—31.

excelled the wisdom of all the children of the east country, and all the wisdom of Egypt. For he was wiser than all men; than Ethan the Ezrahite, and Heman, and Chalcol, and Darda, the sons of Mahol: and his fame was in all nations round about. And he spake three thousand proverbs: and his songs were a thousand and five. And he spake of trees, from the cedar-tree that is in Lebanon even unto the hyssop that springeth out of the wall: he spake also of beasts, and of fowl, and of creeping things, and of fishes. And there came of all people to hear the wisdom of Solomon, from all kings of the earth, which had heard of his wisdom.”\*

I wish I myself had been to hear the wisdom of Solomon, for I have many things about Bees to ask him which I am sure he could tell me. God has not handed down to us any book which Solomon wrote about Natural History, but He has given us his Proverbs. I only wish men would read them more, and what is still better, as well as harder, act upon them. For they might be the best manual to every Christian gentleman, as I doubt not they were, and still are, to many a Jew.

Solomon's wisdom, we know, came from God;

\* 1 Kings iv. 29—34.

but he was a fallen man, fallen even at his birth by nature, and still more afterwards by his own wilful sin; so his wisdom, though God's good gift, profited him not as it might have done. Adam's wisdom was pure; it, too, was the free gift of God in the state of innocence; he studied the wondrous works of God, not for vain glory, as we often do, but that he might be led to love, praise, and worship their Maker and his Maker. "And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof. And Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field."\*

We know from the Bible that the Bee is called in Hebrew דְּבוֹרָה (Deborah,) "*She that speaks*," and the Bee's speech is both as sweet and as wise as that of her namesake Deborah, whose wondrous song of victory is written in the book of Judges for us to read. This name Adam gave to her at the first, as he did to all the other beasts which God brought to him. He knew that the Bee was able to speak many a wise saying, to the man who is willing to learn at her school, and so he gave

\* Gen. ii. 19, 20.

her this name. But Adam's knowledge was not gained by cruel experiments; as ours too often is; for when he named all the beasts, I verily believe he did not so much as brush the down off a butterfly's wing.

Again; it is certain that Bees will live in a state, which would kill any other live thing, under the sun. I was clearing away the moths from one of my Hives, a very old one, as recommended (page 91), in my first Letter, when I saw an insect, which I knew not what to make of; I caught it, and it crawled briskly over my hand. It had been a Bee once, though it could then hardly be called more than half a Bee. Some insect had gnawed away all one side of his abdomen or tail joint, had cleaned out all the entrails, leaving it only a mere shell; had bitten off three of his legs, and both his wings, and had begun to gnaw into his body beneath his wings. And yet this Bee ran about my hand, and ate some honey which I gave it, though it had no stomach to put it into.

I have said there is a family of EYES, and a still larger family of No-EYES. Now I am going to speak of a great friend of mine, (I do not mean that I ever saw him, and yet I love him, though he is dead and gone,) who, one would think, could not help belonging to the family of No-EYES, and yet, as I shall show you, he was the father of the



other family of EYES, for he found out more about Bees than any man that ever lived. His name was Hüber, of Geneva; he was quite blind, and how think you that he managed to watch his Bees? Another man lent him his eyes; that is, he narrowly watched the Bees day by day, told his friend what he saw, and then the poor blind man thought it out in his mind.\*

Now do you know how wax is made? Nobody did before Hüber found it out. I dare say you think it is made of the yellow and red stuff which the Bees carry into their Hives on their hind legs. This has no more to do with wax than sugar-plums have to do with an apple pie; it is only used to feed the young Bees with: but I shall tell you more about this presently. Wax is really made of honey. The Bees can, we know not how, make their Hive very hot all of a sudden; so hot, that a room like it would be very unpleasant to you or me: but the Bees are then in prime working order; they hang like a curtain from the roof of their Hive, and keep quite still for hours and days together. They have two stomachs, like cows; in the first stomach, the cow

\* See Hüber's most kind and feeling testimony to his servant's and friend's services, quoted in the Preface to his "*Nouvelles Observations sur les Abeilles*," translated in the Appendix to this Letter.

and the Bee, when they are feeding, put the one grass, and the other honey : if the Bee wants to make wax, she shifts some honey into her second

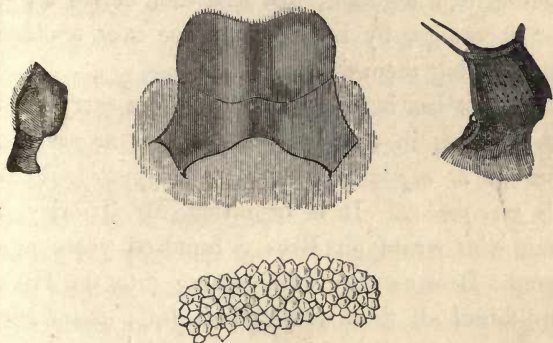


stomach, which is a regular "INSIDE POCKET," just like that into which men put their breakfasts

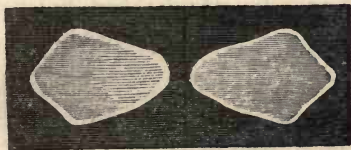


and their dinners. But the Bee does not use all the honey on herself; she does not wish to grow fat and lazy. For who ever saw a fat Bee in summer? Mind, I say in SUMMER, and I shall tell you why presently. But most of it oozes out slowly, through six little pouches called wax-pockets, they are underneath the Bee, in her tail-joint, three on a side.

If you have a little glass window at the back of your straw Hive, you may often see these little scales just peeping out from the folds of the wax-



pockets. I myself have watched one of them for half an hour together; it grew longer and longer, and was just ready to fall, when the Bee hid himself in the crowd. They often shake themselves very sharply, as if they were in a passion; but I am sure a Bee never did anything so wrong; they



only do it to help the wax out of their pockets. Take a bit of one of these small scales on the point of a needle: burn it, it smells like wax;

taste it, it tastes like wax ; IN FACT, IT IS WAX. I give you a cut of it magnified many times. With these little plates the Bees build their combs by gluing them together, just as a tiler makes a roof for a cottage, by laying tiles one over another, and pinning them down.

Now it has been said that the Bees carry these little plates in from the flowers, *but no one ever saw one in a flower, or caught a Bee putting it into his wax-pockets.* It is true that Mr. Thorley, a man who wrote on Bees a hundred years ago, caught Bees as they were coming into the Hive, and found all their wax-pockets full ; *and I have done so myself.* But this proves nothing ; doubtless these Bees left the cluster where wax was being made, when the fineness of the day tempted them out to gather honey ; and no doubt the Bees asked the Queen's leave before they left their post. But this does not prove that the plates of wax are found in the flowers. Suppose a pastry-cook and confectioner were, directly he had finished making sugar-plums, to run over to his friend, the baker, and get an apple pie from the oven for the children's dinner, NOT HIS OWN, and I were to stop him in the street with the tray on his head. Were I, on looking in his trowsers pockets, to find there six pounds of sugar-plums, how would this, I ask, prove that he is in the habit



of getting his sugar-plums at the baker's? He may have had the sugar-plums in his pocket, days, or months, for all I can say to the contrary. Now apply this to the Bees. The BEE is the CONFECTIONER of the flowers; she gets her HONEY ready made from them, as the confectioner does his SUGAR from the West Indies. She makes her WAX from the PRODUCE, just as the CONFECTIONER does sugar-plums from the RAW SUGAR. The WAX in the Bee's WAX POCKETS is the READY-MADE SUGAR-PLUMS, which are not bought at the baker's, but may be kept in the confectioner's pocket a long time, just as the Bee keeps a stock of ready-made wax in hers (as I shall soon show you). The BAKER'S SHOP is that sort of TREE whose flowers give POLLEN, or BEE-BREAD, which the Bee carries on her legs, just as the confectioner did the apple-pie for his MARRIED SISTER and LITTLE NIECES, that is, for the QUEEN BEE and YOUNG GRUBS. The BEE-HIVE where honey is turned into wax is the confectioner's BAKE-HOUSE, where he makes up the REFINED SUGAR into SUGAR-PLUMS for good boys and girls.

Now I will tell you how Hüber found all this out. He took a swarm of Bees the day they rose, shut them up in a close Hive, and did not give them anything to eat. In twenty-four hours he stupified the Bees, and found six combs already begun.

“These,” said he, “were formed by means of the honey they had in them when they swarmed.” “No,” said the other party, “they were made of that stuff” (which, I say, is Bee-bread,) “which they carried with them from the old Hive.” “Was it?” said Hüber. He did not contradict them in words, but showed them it was not so. He put the Bees back into the Hive, fed them with sugar melted in beer; and in twenty-four hours after, a new set of combs was begun. “Oh,” said his enemies, “these were made from the pollen they had left.” “Well,” he answered, “we shall see.” He kept on feeding the Bees in the same way for very many days, and never let one go out, and every day fresh combs were formed, which every day he took away. It was quite impossible that the Bees could have carried enough with them when they left the parent stock to make all this comb. Indeed, a swarm of Bees does not weigh more than four pounds in all, and the wax which Hüber took was many more.

Thus Hüber found out about the wax plates. Mr. Thorley, indeed, was puzzled by seeing them in the pockets of the Bees when flying home. Now I myself have lately found out something on this point. On the 1st of January, 1840, I took a Bee which had died a natural death, and had, certainly, not made, or wanted wax for some

months past, for she belonged to a Hive which was put into winter quarters, and had certainly done no work since September. On dissecting carefully this Bee (that is, cutting it up to see how it was made) to my great surprise, and, at the same time, joy, I found a plate of wax in her wax-pocket; I could hardly believe my eyes at first, but I showed it to a person older and wiser than myself: he said I was right, and was pleased with what I had found out. The part of the Bee was immediately put into spirits, and may be seen by any one who will take the trouble of going to the College of Surgeons, in Lincoln's Inn Fields, where he will meet with every kindness, and may spend a happy morning in looking over JOHN HUNTER's glorious collection of things relating to Bees as well as men, FOR JOHN HUNTER THOUGHT NOTHING TOO LITTLE OR TOO GREAT FOR MEN TO NOTICE. He was only second to FRANÇOIS HÜBER in what he found out. This, I believe, sets the whole matter of wax at rest; if a Bee can keep it three months or more in her wax-pocket (and if this Bee had not died, she would have kept it through all the winter till it was wanted in the spring, FOR A BEE WASTES NOTHING), surely we must not wonder that she should carry it out with her when she goes to "gather" honey in a "shining hour."

Now I promised to help you to understand what

is meant by "instinct;" and I will do so as far as I am able. The matter is a hard one, and so I will first shortly state in words what it means, and then give you some few examples, which will help you to the true sense of it better than a world of talk. When we have a whole class of creatures or things which we want to describe *as a whole*, because we have not time or power to go fully into each, we give what we call a definition, that is, a string of words, which goes round them just as cord would the things themselves, if bound all together. The worst of a definition is, that as it must be true of all, it falls far short of giving a full account of the best and highest in the class, as it must be true as completely of the worst as the best. If it is to be true of all, it must fall short of some. Now look at a Bee; it has a most wonderful stomach, which enables it to turn part of the honey it swallows to poison, to give its sting force against its enemies;—part to wax, to build its cells at will;—part it stores up, as a provision for the winter, in these cells;—and with the remainder its own body is nourished. Now this we call vital power. It is the lowest kind of instinct, the instinct of the parts of the Bee, not of the whole Bee itself; and yet men generally limit instinct to this, its lowest kind. Again: look at it when it is building its cells; all is order, all is beauty; no Bee has to serve an



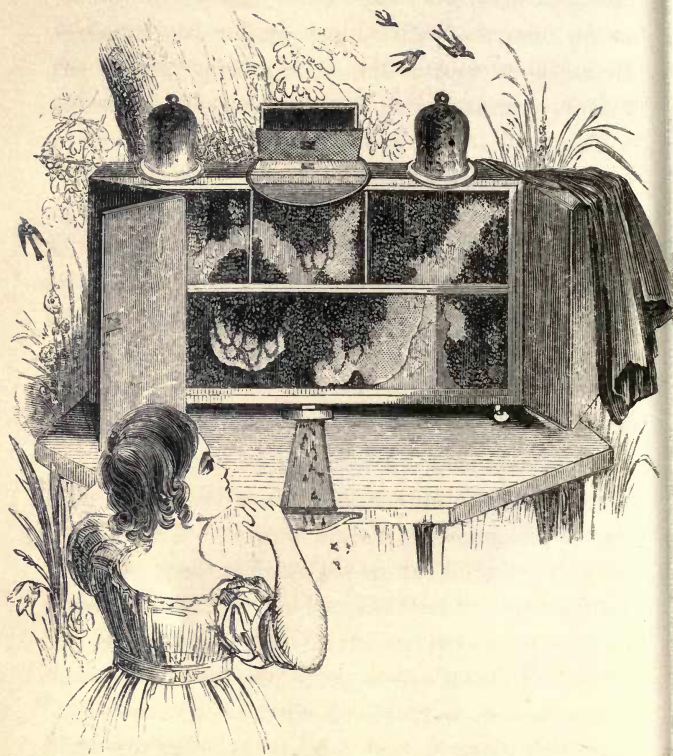
apprenticeship; but on the first day of its life can build a cell as well as the most aged Bee in the Hive; and what is more, every generation of Bees builds its cells just as their forefathers did, and have always done from the beginning of the world. They at once do that which, as I shall show when I come to talk of the comb, the wisest man who ever lived cannot improve upon in thought, far less in practice. Let him who thinks himself wiser than a Bee try to make a piece of comb, or even a single cell, and he will soon find that however great he is in his own conceit, he will make but a poor hand at this kind of work. A wren's nest is the most wondrous thing I know, next to a Bee-cell. A crow's nest is, perhaps, the most commonplace of all birds' houses. I know some good folk who, when children, thought it would be a nice thing to build a nest for themselves; but they made no more hand of it than you would, if you were to try to build a Bee-cell. If you do not believe me, only try. The instinct by which Bees build their cells, and birds their nests, is the second kind of instinct, which I will call instinctive mind.

Once more: read then, I beg you, the stories I am going to tell you about Bees; you will there see those same Bees acting in circumstances in which they never were placed before; nay, in which no Bee, perhaps, was ever placed.

They act in these cases, shall I say, by instinct? If you please; but something more must be meant by the word than is usually so done. Some of these facts can hardly be traced up to the desire implanted in all things by God, of preserving themselves and their young. And I would ask the man who can say that all beasts act by blind instinct only, to draw the line where instinct ends and understanding begins. I am sure I know men who have less of this instinctive mind than my Bees have. I will give you one or two examples of the way in which this instinctive mind shows itself in Bees; and let the man beat it who can:—

I. Hüber put a dozen Humble Bees under a bell-glass, along with a comb of about ten silken cocoons (which are the cells in which the young Bees are bred), so unequal in height as not to be capable of standing steadily. To remedy this, two or three of the Humble Bees got upon the comb, stretched themselves over its edge, and with their heads downwards, fixed their forefeet on the table on which the comb stood, and so with their hind feet kept the comb from falling. When these were weary, others took their places. In this painful posture, fresh Bees relieving their comrades at intervals, and thus, each working in his turn, did







these affectionate little insects support the comb for nearly three days, at the end of which they had prepared sufficient wax to build pillars with; but these pillars having accidentally got displaced, the Bees had recourse again to the manœuvre, or rather *pied-œuvre* (the first is a French word for work of the hands, the last for work of the feet; Hüber was a Frenchman); till Hüber, pitying their case, fixed the comb for them.

II. I myself saw what I am going to tell you. This and the two next stories will, I hope, prove my right to belong to the family of EYES, though, without strong glasses, I am nearly as blind as poor Hüber was. I have a Hive called the Observatory Hive (because in it I can observe or watch all the Bees do),—as Hüber would say, *mark all their manœuvres*; it is made of two plates of glass placed in a frame, just one inch and five-eighths in the clear; this gives them room to build one comb and no more, so I can see every Bee at work, and not even the Queen herself can long hide from me. I put a swarm in, and they built a comb, which, by a sudden jerk, was broken off from the top. I knew the Bees were not strong enough to lift it up into its place, so I was curious to see what they would do, and I watched them narrowly. They first held the broken piece of comb in its place, just as

Hüber saw their first cousins the Humble Bees do; they next made wax, and fixed the broken comb firmly in its place; they then went on to saw off, with their sharp and strong jaws, just enough of the comb which pressed against the glass, to let themselves pass. One poor Bee had got pressed between the plate of glass and the comb; they very kindly began to saw away the comb in that place which set the poor Bee soonest at liberty; they might have begun any where else, but instinctive kindness led them to begin where they did. This they did more evenly than I could have done for them, the size of their bodies being the rule by which they worked. A razor could not have cut sharper. Last of all, they lengthened the cells on the other side, so that the whole comb was the same thickness as before, though made of long cells on one side, and short on the other.

Another time, I saw a Bee in the same fix, for he had slipped down with his feet to the glass, and his back towards the comb, so that he could not get a firm hold, to exert that power which was needful to set him free. Another Bee saw his hard case, and went straightway to succour him, laid hold of his hind legs with his jaws—tenderly, no doubt; but I am sorry to say, he did not stand by him till he got free.

III. I had a strong stock in a straw Hive; on the top of this I put a large glass, which they soon filled with comb, as I kept the light quite out. This glass had a flat wooden top, with holes to put bell glasses on; these, of course, I could take off whenever I pleased, and so drop anything into the Hive. I one day took a single flower of stock, which, I should think, weighs as much as twenty Bees; this I popped through the hole into a party of them who were hard at work. They were, of course, rather surprised to see this large flower tumbling in upon their heads; they seemed to say to themselves, "*Hilloa (Buzz), where does this come from? It has no business here; but as it is very certain that it has not grown larger whilst it has been in our Hive, we can turn it out of the hole, through which some spiteful fellow has dropped it in upon us.*" *Hilloa*, translated into the Bee tongue, is, I am sure, *Buzz-buzz*; but I am sorry I am not sufficiently versed in Bee speech to set down therein the rest of what they said. I must, therefore, be content with plain English. But I am sure, from what they did, that I understand them, nevertheless. "*Spiteful fellow,*" said the Bees. (Now I was not really spiteful, I only wanted to show how clever my Bees were.) "*We will not take the trouble to carry it all through the Hive to our proper door-way, and so disturb all the Bees who*

*“are hard at work, but we will carry it again to the upper chamber, from whence we all saw it drop, and there turn it out, as it has no business here.”* No sooner said than done. They seized it with their strong jaws, carried it up into the bell glass, and worked it round and round, trying to find the hole through which it had come. But I had been before them there, as I had put the bell glass back into its place. They could not find the way out, and after a time the flower dropped down again into the Hive; they would not be so beat, and pulled it up again at least a dozen times, till I, like Hüber, pitying their hard case, took the bell glass off again, and merrily did they fly away with the hated flower; they then went round to the front entrance, and, I have no doubt, told the Queen all they had done, but, I am sure, did not *boast what great Bees they were.*

I saw, whilst all this was going on, what gave me a great idea of the strength of the Bee,—one alone, who had a strong gripe of the flower, dragged it up the side of the glass, whilst six others were hanging on to it.

IV. I moved the middle box of one of Mr. Nutt's Hives, into which a swarm had been put about a week, when most of the combs broke short off at the top, and fell down in a mass on the bottom



board, covered with Bees. The Queen remained clinging to the top of the box, among the few combs that were left. I was very sorry for this, as it was a mere piece of curiosity which made me lift up the box: I wanted to see how the Bees had gone on with their building. I soon made up my mind what to do; I put the middle box by the side of the broken combs, and gently brushed the Bees towards it with a feather. I straightway had the pleasure of seeing them march away in a regular sort of battle order, and, with a buzz of triumph, they joined their Queen in the middle box. I then examined the combs; I found them with a great deal of honey in them, the fruit of one week's hard work, and what was worse, a large number of eggs, which the Queen had laid, and grubs just hatched. I should have been sorry if my folly had weakened the Hive by killing these poor grubs, so I set the broken combs on end, by the side of the middle box, as neatly as I could, and covered them all over with a thick cloth. When I looked at them the next morning, I saw, to my great joy, that these Bees, like Hüber's Humble Bees, had fixed the broken combs in their new position by pillars of wax. I saw them clustering thick on the combs, and expected, that as they were such good nurses, they would stay by the grubs and keep them warm till they turned to perfect Bees.

The next morning, when I looked at them, I found the combs quite bare of Bees, and in my heart I began to blame them for deserting their helpless young ones: but I was in too great a hurry; the Bees were WISER THAN I AM, AND KINDER THAN I THOUGHT, for they had not only taken all the honey out of the broken comb, BUT HAD CARRIED EVERY EGG AND EVERY GRUB INTO THE MIDDLE BOX, where, doubtless, in due time, they turned into perfect Bees, quite ignorant of the change of nursery which had happened in their childhood. How in the world they managed, with their hard jaws, to carry a thing so soft as a Bee's grub, I never, to this day, have been able to find out. God, who gave them the instinct which led them so to do, doubtless did not leave them without the means of carrying out their good purposes.

V. I will now give you a story of swarming time. I noted it down on the same day, as it throws great light on the Love, strong in death, which the Bees show to their Queen, and the limit of their power, to make a fresh one from a Worker Grub when the old Queen dies. I had a stock which passed well through the winter; and in the spring was very healthy and strong. In the beginning of June, I hourly looked for a swarm. One glorious day they rose at eight in the morning;

some of them formed a cluster on an espalier pear tree, but they would not settle at all kindly: many remained hovering about the Hive. I looked on the ground, and there beheld a cluster of guardsmen, who always attend the Queen; I should rather say of Amazons, for the Queen's guards are all of the gentler sex. I moved them softly with my finger, as though I loved them, which I do better than old Walton did his frog, and soon found

*Her Dread Majesty;*

I placed her on the back of my hand, and held her by the pear tree, where about one-third of the Bees were collected; they soon found her out, and left the tree for my hand, on which they hung, in a long cluster, like a bunch of grapes; it was quite curious to see how the Bees, on the back of my hand, stood in a circle round about the Queen without pressing upon her, just as they are shown in the wood-cut at the head of my first Letter: they let her move about wherever she pleased, never turning their tails upon her, but walking backward as she walked forward, like the court ladies at the Queen's drawing room; whilst the vulgar herd, loyal subjects, though not courteous, hung in a cluster underneath. I held my hand steady, and thus carried all the Bees round the garden. Had the swarm been com-

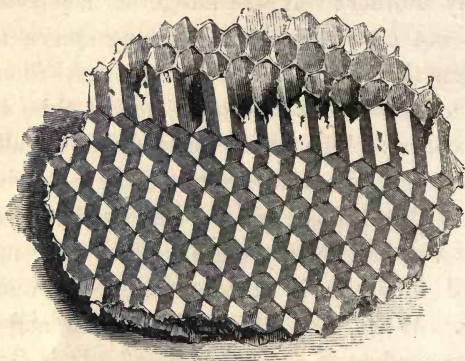
plete, I should have shaken them off at once into a new Hive ; but a great many Bees, who had doubtless been ordered by the Queen to meet her at the pear tree, (and I have no doubt the place where a swarm clusters is always settled beforehand,) when they found she did not come to the "*trysting-place*," as the Scotch would say, (that is, the place where they *trusted* to find her,) had returned back to their Hive : so I placed the Queen upon the lighting-board, she immediately went into the Hive, and the whole swarm followed at her heels. I consoled myself with the good old proverb, BETTER LUCK NEXT TIME, and hoped the Queen would chime in with, TRY AGAIN. In a few days she did try again, and they went to the old pear tree ; again the swarm went back, and I then began to think that there was something the matter with the Queen, which hindered her flying at first, and had perhaps since caused her death. I waited patiently for them to make another Queen. In about ten days they rose and went to the same tree ; a cluster remained on the ground ; when it was opened, the Queen was found there, but DEAD. She was stiff and dry, as if she had been dead a week, or even more, and so the Bees, when they swarmed, must have carried her out with them ; just as you may see them carrying out the Workers who die in the usual way. Now



I would not have believed this without sifting the evidence very closely, even had I seen it written in a book. The Bees must have carried the dead Queen out with them, as the pear tree was twenty yards from the Hive. Why, said I to myself, did not the Bees make a new Queen, as I believed they have the power to do? This, I am free to confess, rather shook my faith in what Hüber had taught me. For why did the Bees swarm out with this dead Queen, instead of taking their oath to obey another? It was altogether a puzzle; so I did not give this stock a young Queen taken from another Hive, which I might have done, in order to be certain of saving it, but let things take their course. The stock seemed strong all the summer, but did not work very well; they dwindled away in the autumn, and were all dead before the winter was half over, though when I took up the Hive I found in it at least twenty pounds of honey. What then caused their death, and their strange conduct in swarming time? It is clear to me that the old Queen had received a hurt some time back; from that day forward she had laid no more eggs, and so, on her death, they were unable to get a new Queen to fill her place. This fully explained to me the whole matter; and I hope shows you HOW BAD IT IS TO THINK A MAN WRONG WHO HAS STUDIED A MATTER MORE THAN YOU HAVE.

*Had I blamed Hüber first, I should have had to have blamed myself afterwards.*

VI. Look at the cut of the Honey Bee's comb ; each cell is a perfect pattern of neatness, beauty, and skill ; it serves most admirably as a nursery for the young Bees, and afterwards for a honey-pot, in which they may store their food for the winter. THERE ARE NO BUILDERS SO CLEVER AS THE HEAVEN-GUIDED BEES. Man's art rises and falls ; he some-



times builds well ; oftener very badly ; but the Bees know none of these changes, they have no seasons of decline in their art. Just observe how the cells are built ; they are six-sided, what is called regular hexagons ; every old woman in the land will be none the worse for learning this word, as it is the pattern to which she cuts her patch-work, when she makes

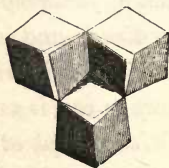
a good quilt to keep her old bones warm. It is one of the few shapes which will fit together without leaving any spaces. Square or three-sided bits will indeed do so, if the three sides are cut equal; but the six-sided bits look far neater. Old women have found this out by trying: but the Bees know it without trial, AS THEY WERE TAUGHT IT BY GOD; (I give you this hard word and explain it, because it will save me much trouble in what I have to say; and you will, I trust, give me credit for not having over-burthened your memories with what an old poet once wittily called regular waggon-filling words.) Now the top of the Bees' hexagon is made by joining three four-sided pieces cunningly together, like the roof of a house, though our houses being square, have generally four ridges instead of three. Did the Bees go by our rule they would make six ridges, but they have been taught to make only three. They give a lesson to man *by following God's teaching, without asking any questions; and, as I shall soon show, they find the benefit of this child-like mode of action, which, I am sorry to say, is more followed by Bees than by men. We oftentimes laugh at it, though it is the rule of the Bible.* And what is the use of this style of building? Hold up a piece of fresh comb, which has never had any honey in it, to the light, and you will soon see; the point at the bottom of every cell comes exactly

in the middle of six others, so every bit of space is saved; the cells are all closely packed together, and thus, *like a loving family, strengthen and support each other*. François Hüber asked one of his wise friends, "What must be the pitch, so to speak, of the roof of a hexagon, to give the greatest strength with the least waste of room, whilst as little stuff is used up as possible? He did not tell his friend why he asked the question, or give him any hint that the Bees had answered it before him. His friend worked the matter fully out, and sent Hüber the answer; to his great joy he found that his friend had come to the same result as his pet Bees; and so Hüber, the Bees, and this wise man, were, no doubt, greater friends even than they were before.\*

Some people have been silly enough to say there



\* The angles of the parallelogram or four-sided figure are these:— $109^{\circ} 28\frac{1}{2}'$ —and  $70^{\circ} 31'$ . This, which is the result of an exact mathematical calculation, agrees within a second or two of the actual work of the Bees. The subject is fully entered into in Hüber's second volume, pp. 33 and 191, ed. Paris and Geneva,



1814. I am indebted to this work for the figures, the rest are from original designs.



is no wonder in all this. For, say they, a regular hexagon is the shape which a number of little soft balls will take, though they be rounded at first, when squeezed close together; we see this is so in the little sacksful of water of which plants are made up; if you take some corn and put it on end in a vessel, and then make each grain swell by pouring hot water upon it, they will, if they are packed closely together at first, force each other into this shape. Now this is all very true; *but no people talk so much nonsense as those who refer all the beautiful works of God which they see round about their path, to what they are pleased to call nature.* Ask them what *nature* means, and they are posed; all they can say is, that things are so, because they are; and I trust this wise answer will satisfy you as little as it does me. All things that we see are indeed so, because God has willed that they should so be. He might have made them otherwise, if He pleased, *but He has not*; and so we should rest satisfied with it, whether it regards our Bees or ourselves; and if we must search further into the matter, should only look for traces of His wisdom. *And we shall mostly find, if we look at His works in a humble spirit, that His wisdom, as well as His kindness, is over all His works.*

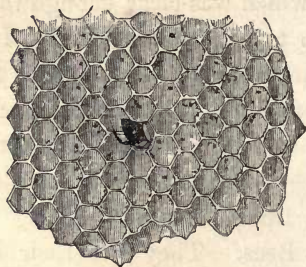
Now after all that I have said of Bees' instinct, you cannot doubt that they have it in no low

degree; but they have also memory, of which I will give you one striking instance. I was living in a town where I knew some few Bees were kept, and I chanced to have some coarse comb, from which the honey had drained; so, instead of being greedy, and squeezing out all I could get, I determined to give a feed all round to such Bees as chose to accept my invitation to dinner. This invitation I gave by opening the window, and setting the honey on the sill. In about half an hour some foragers found it out; they helped themselves, and carried back the good news to their sisters in the Hive. In the course of the morning my room literally swarmed with Bees, and I need not tell you, as they are grateful creatures, that they did not meddle with me, but, as I sat at my books, repaid me for my treat with their sweet music. In the afternoon they were satisfied, at least for the day, and dropped off, one by one, without committing any excess. There is nothing strange in all this, but now comes the wonderful part of the story: I, myself, got up next morning, some time before Bees are usually stirring, and, as I went to my window (it was in September) to see the first rays of the sun in the eastern sky, I was much surprised, and not a little delighted, to see a number of Bees, who had remembered and been grateful for their dinner the

day before, waiting for me to let them in to a similar breakfast. As some of the honey was left, you cannot doubt but that I complied with their wish, which was clear enough to me, though they had no tongue to express it. I opened the window; the room was soon filled; they cleared the combs of honey, and then went orderly away. They haunted my windows for several mornings after, though I had no more honey to give them. This is, I think, a pretty strong instance of MEMORY in Bees. They left their Hive earlier than usual, by an hour or two, for it was not a fine morning, because they REMEMBERED their treat of the evening before. They were philosophers enough to know, that like causes produce like effects. My love to Bees had given them their dinner the evening before; so, as they had not any reason to think that I was differently minded towards them, they came for their breakfast to the same place.

I hope all men who keep Bees, and have a little window at the back of their Hives, have often watched these little architects, while building their cells; they do not, as some people have falsely imagined, form each cell to the shape of their own bodies, but they work, as a carpenter would say, to a knife edge. I have given you a cut of this, and I hope you will repay me by

placing it side by side with a piece of comb, and then you will see how exactly done to the life it is. The way in which the clever Bees



roof their cells, saves for them one-fifteenth part of the whole stuff which would be used, if they



perversely, out of their own heads, so to speak, took to any other shape. They stick the plates of wax on roughly enough, and then draw them out right and left till the whole comb is finished. The cells which are sealed down do not suffer the entrance of the least portion of atmospheric air. If kept in the



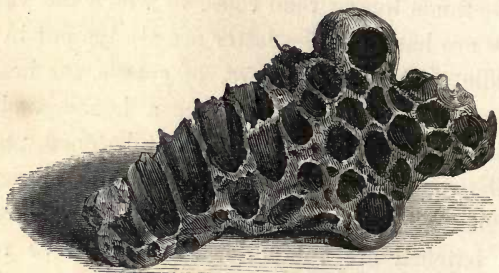
comb, hermetically sealed, honey will keep good for I know not how many years. If it were exposed to the air, or even stored up in pots of larger size, it would soon ferment and spoil. This is in itself a great good which comes from the combs being divided into a number of small cells. Those cells in which they intend to store honey are often made much longer than those in which the young Bees are hatched; the latter are always put in the middle of the Hive, where, of course, the heat is far greater: you will often see a honey-comb in which Bees are never meant to be hatched, placed at the very outside of the Hive, and so filling up all the vacant room. The cells in which the Drones are hatched are much larger, as well as more clumsily built, than those for Working Bees. It is very curious to mark the way in which a piece of Drone comb runs into that of the Workers.



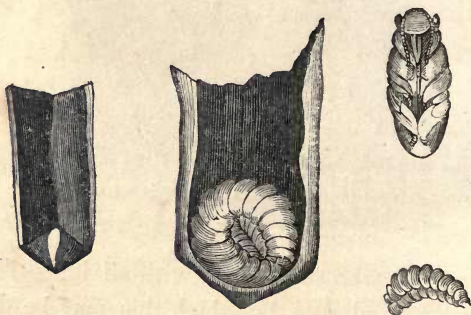
Any man who should try, with all his skill, to find out a fixed rule, by which this may be done,

would certainly fail; but the Bees do it at once, whenever need is, by what I have called the law of their instinctive reason.

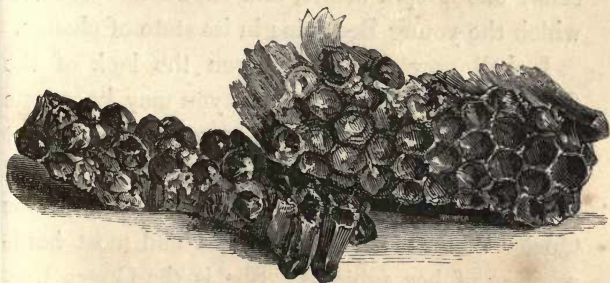
The cells of the young Queens are of quite a different shape, as is shown in the wood cut. They are generally stuck on the edge, but sometimes on the middle or bottom of the comb.



The Queen lays her eggs each in the proper cell, — Drone cell, or Worker cell. The Drone's egg is quite different from that of the

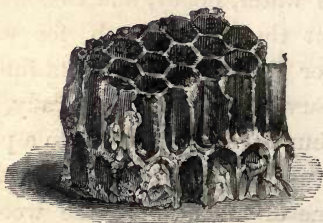


Worker and Queen. The egg is first a small colourless speck, fixed at the very bottom where the three pieces of four sides meet. The egg hatches in about four days, and then the grub lies curled up in a clear fluid with which the Workers feed it. This fluid is sweet to the taste; is made, I believe, of water, honey, and Bee-bread. They do not stint the young grub, for what young thing, boy or Bee, can come to its full growth, if it is half-starved? When it is ready, at the end of twenty-four days, to change into a perfect Bee, they cover up the cell, as it wants feeding no more. Some of the cells in the wood-cut have young grubs in them.



Now we all know the odds there are between eating what is called virgin honey-comb, in which no Bees have been hatched, and that which looks black to the eye, from the silk web and the dirt which the young grubs leave in it; this, as I have

said in my last Letter, is what makes comb grow old. I never could find out why the Bees do not clean it away, but the fact is certain ; and unless you cut out some of the old combs, every four or five years, your old stock will gradually dwindle away. I have given you an exact cut of some

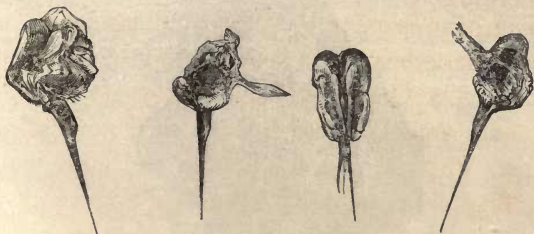


cells ; one is split across, and shows the silk web which the young Bee spins in its state of change.

I shall now describe to you the look of the Queen and Worker Bee, that you may know one from the other, and take more interest about them. The Queen Bee and Worker are different in many respects ; more different than our gracious Queen Victoria, and the poorest and most hard-working of her subjects. She is the Queen Bee, and they the Workers. Now both the Queen and the Working Bee come from the same egg, *just as Kings and Queens are but men and women, liable to the same temptations, needing the same grace, as the meanest of their people, though they are set by God to*



*rule over us, and doubtless have power from above given them to perform their high duty.* Take a Queen Bee and a Worker; place them side by side—how great are the odds betwixt them! the Worker has strong jaws for building the cells, the Queen's are hardly to be seen; the Workers have a long proboscis, to suck honey from the flowers; the Queen has a short one, just enough to supply her with food, which the Bees give her freely. The Workers have wings reaching almost to the end of their bodies; the Queen has short ones, though her body is so much longer and heavier; they are crossed over the middle of her body, and are what an old writer would call her signature, *Φωνῶντα συνέτοισιν*. The hind legs of the Workers are studded with rows of stiff bristles,\*

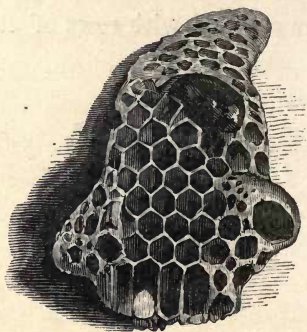


whilst the legs of the Queen Bee are quite smooth. The Workers have a sharp and poisonous sting,

\* See cut of Workers' legs, facing p. 290.

to fight against all their enemies *and those of the Queen*; the sting of the Queen is short and more deeply-seated in her body; she seldom uses it. The Queen Bee lays 30,000 eggs, (*rex non utitur*,) in a year, to keep up the numbers of the Hive—a pretty large family, and they all teach a lesson to us, by the great respect they pay to their Mother. The Workers, though females, are quite barren, and cannot lay one.

François Hüber, whom I will call *King of the Bees*,\* proved quite plainly that the Bees have the power of breeding up a new Queen out of the egg of a common Worker; he found that if he took away the Queen from a Hive in which there were grubs,



not above three days old, the Bees are able to turn a working grub into a Queen, as soon

\* King of Thebes.

as they find out the loss of the old one. They pull to pieces the six cells, which abut upon that which contains the young grub intended for their future Queen: on this ruin they build a royal palace, quite different in shape. The long cells are the royal nurseries.

I do not believe they pour the Queen's food in upon her, as I have told you they do that on which the worker grubs live and grow. And why? If they did so, it would run out again; for the Queen's nursery is like a bottle hanging with its mouth downwards: so when she wants food she cries for it; and there is, I have no doubt, some kind nurse always ready to give it to her.

They feed the young grub on a stronger sort of food, and in eighteen days she comes out as a perfect Queen. A Worker takes four-and-twenty days, and a Drone twenty-two. Now a stock which is strong has always a great many young Queens half grown, to take the place of the old Queen, should any accident happen to her. One of these young Queens is always wanted at swarming time, to take the throne which the old Queen leaves vacant, and others lead off casts; those that are not wanted are put out of the way by the Queen Bee herself. If you look closely before the mouths of your Hives in June and July, you may pick up plenty of dead Queens. I myself have found ten

in the front of one Hive. The old Queen is always very jealous of these royal grubs, and tries to get to their cells to destroy them. Not like our Kings and Queens, but more like the Grand Turk, who sometimes orders a dozen of his sons to be bowstringed in one morning. But the Worker Bees seem to know when a young Queen will be wanted to take the vacant throne. When the old Queen is almost ready to lead off the fresh swarm, which she always does, they stand in her majesty's way, and like regular policemen, prevent her going with her murderous purpose near the royal chambers where the young Queens are. But when swarming time is past, they let her go freely to them. She sticks her sting without any pity into the young grub, which is straightway torn by the Worker Bees out of the royal cell. But before they carry the young grub out of the Hive, they suck all the sweet food which was inside the young Queen; this you will allow is carrying the old proverb,

**Waste not, want not,**

to the fullest extent. But if the Queen were to try to stab a common Worker Bee, her sting would stick fast in the fine silk web which every grub spins round it, and she would lose both it and her life together. But from the shape of



the royal cell, which is long and pointing downwards, the Queen grub cannot spin a perfect silk web as the Worker does; and so a hole is left, doubtless on purpose, through which the Queen gives the fatal stab.

You may all know that cloudy days and windy weather stop a swarm after it is ready to rise, for several days. In this case the young Queen, though she is ready formed, is not allowed to eat her way out of the cell, and crawl out into the body of the Hive, where she would immediately get murdered by the jealous old Queen; as fast as she tries to bite her way out, so fast do they plaster on fresh patches of wax; they, however, let her make a little hole in the middle, through which they feed her; they keep her in her nursery,



for she would certainly be killed if she came out, and these her nurses know what is good for her better than she does. It is just so with little children: happy are they if they submit, without being forced to give in, as the young Queen is forced to keep in; they can understand what is

right, whilst the young Queen cannot. This is a lesson which grown men may learn as well as little children, who are "small men and women." Lay your ear close to a strong stock on a fine summer's evening; you may hear a clear shrill sound, PEE-EP, PEEP, PEEP, and then an answer in the same words, but in a gruff note. The young Queen seems to say, "Let me come out;" and the old Queen to answer, "If you come out, I will give it you;" just as a spoilt child cries when it sees its elder brothers and sisters going down after dinner, whilst it for its good is kept in the nursery. I never knew any lady so cruel as to quiet her darling by putting an end to it at once, though a pet is often right troublesome when let out of its nursery before its proper time. Nor did I ever know a child so fractious as to bite through its nursery door, though I have known many kick very lustily at it. If you listen closely, you will find that this sound, or rather the Bees who are making it, travel round from one part of the Hive to the other. I myself have no doubt that the shrill note is made by a young Queen who has escaped from her cell, whilst the gruff note is made by the old Queen, who is chasing her round and round the Hiye, and would immediately put an end to her *peeping* and her life together, if the Workers did not prevent her. Look out sharp for

a cast next day, as they are pretty sure to rise the first shiny morning.

François Hüber saw by the eyes of his servant (for, as I told you, he was blind himself,) two young Queens hatched at the same moment; there was a most dreadful fight between them, and it ended in the death of one.

The young Worker when first hatched comes out to dry itself in the sun. You may see many on the lighting-board at breeding time. They are much smaller than the old Bees, though quite formed. Now a chicken when it leaves the egg is all damp, and the hen dries it by the warmth of her body, and then picks its feathers out. The sun dries the young Bee, who also comes damp



out of her cell; and you may see the old Bees picking out the hairs which stand them in the stead of feathers, as a North-countryman would say, *fetting* them. They then most times wheel for a moment round the Hive, as if to make sure of its place, and then dart off in the clear sunshine for their first load of honey, without needing any one to show them which are good and which bad

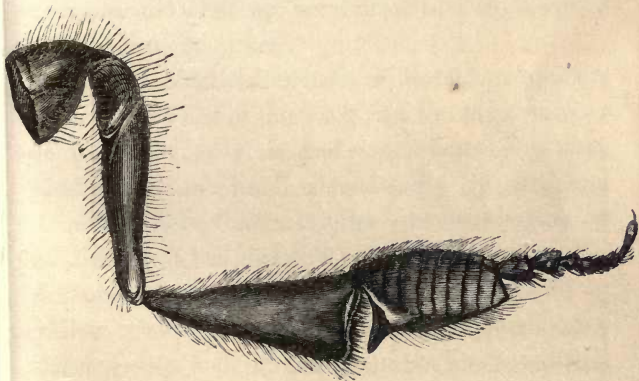
flowers. Now is not even a Worker Bee a wonderful creature?

But the Queen Bee is the most wonderful beast under the sun. A common Bee, as I told you in my last Letter, only lives one year. No one knows how long the Queen Bee lives, though I hope some day to find out. Now all good Bee-masters can tell a Queen among ten thousand; indeed I have often picked her Majesty out in less than a minute from a whole swarm, which was lying stupid before me.

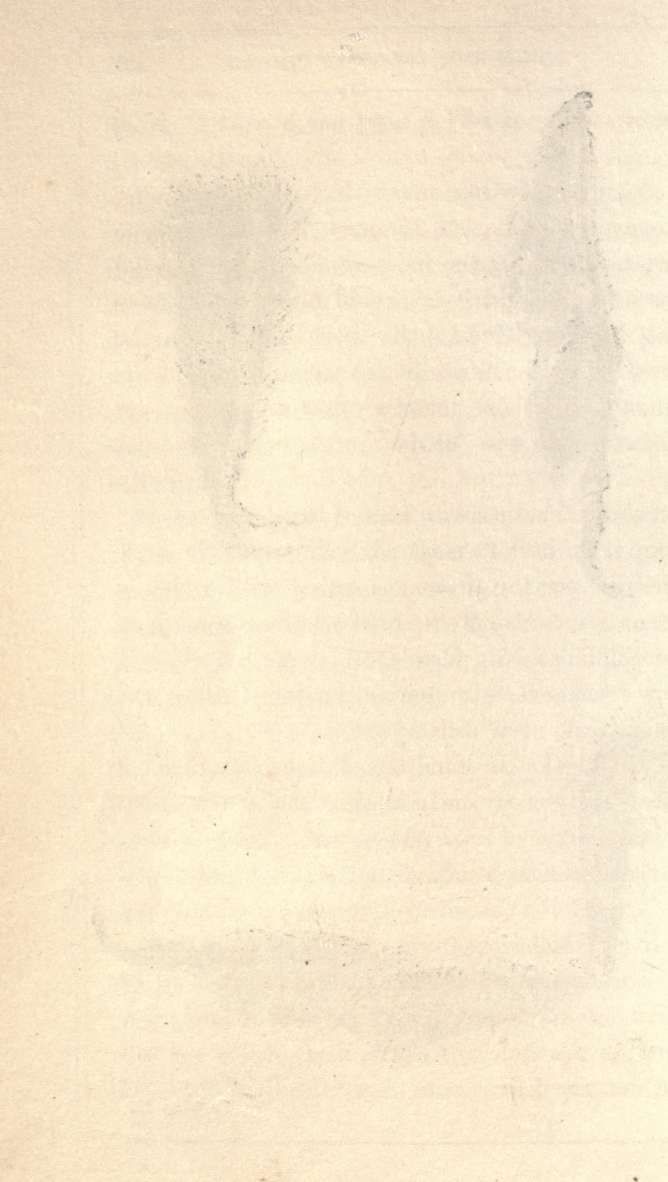
I have given you an exact wood-cut of the hind leg of the Worker. Now the Queen's hind leg is quite smooth, for she was never meant to carry burdens,—she could not if she tried; the Worker's leg, on the contrary, is covered on the inside of the middle joint with rough bristles, as strong, when compared with the Bee, as the scrubbing-brush is to the hand of the maid-of-all-work who holds it. It is a most beautiful thing to look at through a strong magnifying glass. The wood-cut is of course much larger than life; indeed a Bee to which it would fit would be as large as a rat.

The use of the bristles on the inside of her hind legs is to roll the flower dust, or, as it is called, pollen, which she gathers from the flowers, mainly with her mouth, into round balls; she then sticks these pellets into two hollows which are on the





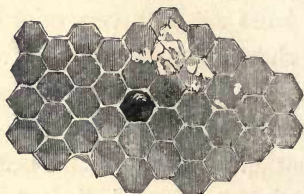
*To face p. 293*



outside of the same joint, on her hind leg. Now if any one was to try to roll stuff like Bee-bread between two boards, upon which hairs, wrapping one over another, are fastened, he would not be able to do it, for the hairs would get all twisted one into the other—he would make a fine mess with his dough and hairy boards. But on the Bee's leg the hairs are both very stiff, and, at the same time, so short, that they do not wrap one over another,—one row of hair ends before another begins, so when the Bee rubs them up and down one against another with a bit of Bee-bread between them, it forms into a round ball, just as the loose hairs do on the dressing-brushes with which a groom cleans his horses; or if you want something else to liken it to, a pair of boards by which a dairy-maid makes up her butter into little round pats, will do very well.

I have looked at hundreds of Bees' legs under a glass; every one of them has just the same number of hairs, viz., *ten rows, and sixteen hairs in a row*: that makes one hundred and sixty in all; and I quite believe that every Bee since the beginning of the world has had this number of hairs on her leg, and no more. No one has been better off or worse off in this respect than her neighbours. Most people, and, still worse, most books, will tell you that the hairs are to carry the Bee-bread on;

but it has nothing to do with it, unless the hairs on one side can make the Bee-bread stick on the other. The rough jacket which a baker wears in cold weather has just as much to do with making his pies stick to the tray which he balances on his head.



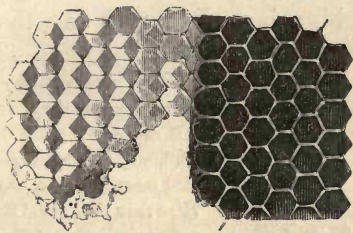
When they first begin to make a comb, they fix on the top a little heap of wax, such as is shown in the wood-cut; then work this with their jaws until they make a little hollow where the top cell is to be. They then form two others a little below it, one right and left; they then go on *pulling out* the rough wax, which they stick on. A very



curious proof fell in my way that the cells are made on this *pulling-out system*, just as an idle boy



pinches a piece of bread-crumb to any shape he likes; and not by laying each scale in its place where it is to stay, as a tiler does when making a roof. In one of Hüber's Leaf-Hives, one of the bars was so broad that a piece of my old comb, which I put in as guide-comb,\* was not wide enough to fill the whole space. They lengthened it, and as it had been used for breeding in the old Hive, the cells were now too deep for the young Bees, and it was only used to store honey, and looked just like the wood-cut when I took it out of the Hive. The old part was quite black; the



tops of the cells, being the new wax, quite white; but just where they joined, it was all streaky,

\* You may not know what I mean by a guide-comb. I will tell you. In some sort of Hives, Hüber's Leaf-Hive, for instance, it is needful to make the Bees build in one direction; we may do this, by fixing a piece into the Hive before we swarm the Bees into it, in the same line as we wish them to build the rest. They will mostly put them side by side in regular order. When a new swarm is put into a Hive which is not lumbered up by cross sticks,

which shows the Bees stuck the new wax into the thick rims of the old cells, and then drew out old and new together.

Now I must not forget to say something about the poor Drones—the fine gentlemen of the Hive. I think that you will confess, from what I have said above, that the case of Mr. Drone is rather hard. What does a woman do who henpecks her husband, when anybody else takes a part in the quarrel, even if it be on her side? However much they may have hated each other before, they both seem to understand each other, and then set upon the unfortunate intruder, and pick him to pieces for his pains. Let every one, then, beware

(which are never any use, and spoil the combs when you take them out,) they will, I think, generally build across the Hives, the combs running from back to front. This mode of placing them seems to let them, when they come in with honey and Bee-bread, carry their

load more easily to any part of the Hive than they could do if the combs ran cross-ways. I have turned up many dozens of Hives, and most often found the combs in this fashion. One, however, I once saw, so curious, that I give you a cut of it. It seems to me that two casts, or at least two Queens, must have been put into this Hive. Each seems to have begun to build in



their own corner, and when their combs met, they built a party wall between them. I should like to have seen the battle between the two Queens.

of interfering in a family quarrel, unless he be fully sure of the parties. The Bees, instead of defending the poor Drones from their natural enemy, the wasps, look on with perfect composure, whilst the poor Drones are being tortured as I have described, p. 244.

All manner of absurd things have been written about the Drone. I have got about sixty books on Bees, and not above one or two have written common sense on the subject; they have copied one from another, and never taken the trouble to join THE FAMILY OF EYES. I have watched the Drones for many years very attentively, and I will freely give you the result. I will tell you, in the first instance, the facts I have seen, and what I have drawn from them. The Drones are hatched just before the new swarms rise; very few go off with them. I for a long time thought that none did; but I am free to confess that I was wrong. They do not fly out early in the day, but about two o'clock they go out to take the air, and make a fine buzzing, which joins very prettily with the milder hum of the Bees. Many people kill the Drones directly they see them; but they are quite wrong, as the Bees know best when they have done their duty, and so we may leave to them the unpleasant task of killing them, though they do not do it in the most merciful way.

Why do the Drones stay in the Hive all the morning? Most of the Bees are then out gathering honey, so the Drones have to stay at home to keep up the heat of the Hive by their great fat bodies, just as a gadding wife leaves her husband to look after the children, while she is out taking her pleasure. I do not believe the Drones feed the young grubs, as some have said, for they have no proboscis at all to put into the deep cell; and the young grub is curled up in the bottom of it. Indeed it is so short that they cannot feed themselves. You may often see the Workers putting their proboscis into the Drones' mouths, and giving them honey. Their jaws also are quite small and weak. I have said that very few Drones go off with the new swarm; they are not needed there, as the old Queen Bee leads out the colony, and is ready to lay eggs—in fact, does lay them the moment the combs are built.

I will now give you one or two scraps out of the Note-Book\* I keep about Bees, that you may see how I jot down rough notes about them; I would advise you all to do the same.

“June, 1837.—I saw the Bees working at the bean blossom. The ants were sharing the honey

\* For further extracts from the Note-Book, see Appendix.



with them through the holes which were pierced at the bottom of the upper side of the corolla, or white part of the flower. There were mostly two holes, one at each place, under which you will find honey if you pick the flower carefully to pieces. These holes, no bigger than that made by a pin, become black in a short time. I at first thought that the ants made the holes, and that the Bees profited by their work. I watched the bean plants narrowly for hours; at last I saw a Bee come to a fresh flower, and pierce it with the horny case of his proboscis, and then suck away. You may fancy that I was not a little glad at seeing this.

“A large swarm was put into Hüber’s Leaf-Hives, May 28, 1836. A piece of comb insecurely fastened, or broken off by some jolt in moving, fell on the floor. I left it in the box, and it was used over again by the Bees; the cement by which the scales of wax are joined, not having set to such a degree as to prevent their using the old comb. They never can work old comb over again when the scales are hardened together.

“May 30, 1836.—I saw the bottom board completely strewn with the small glittering scales of wax. These may be seen even in a common straw Hive, as they work out at the door by the motions of the Bees, and the flapping of their wings. They are most plentiful towards the morning, which

seems to show, *that the wax falls from the wax-pockets of the Bees in the night*, when the real work of building the combs goes on much less, if it is not stopped altogether. I saw the Bees pick up these scales.

“One of the Workers coming in laden, dropped one of her balls of Bee-bread, and yet flew perfectly well, which shows they are able to balance themselves even with half a load.”

In the Isle of Wight the people have a notion that every Bee goes down to the sea to drink once a-day. Water is needful for them in the breeding time, and they will drink water with salt in it, and like it better than the freshest brook that runs. It is very curious to see how eagerly they will flock by thousands to the drinking-troughs in April, May, and part of June; and then their thirst seems to be quenched all of a sudden, for not a Bee will be seen at the drinking-trough. The reason seems to be, that they do not want so much water after the main part of the young brood is hatched.

I am often asked which way a Bee-hive should face, east, south, or west? For the most part, south-east is the best aspect. But the great heat of the sun should be kept from the Bees in summer by some sort of shade. The following fact, which

I have heard from a Bee-master in Germany, will serve to show that in some places one aspect is best, and in some another. In most German villages the number of Hives which each cottager is allowed to keep is settled by the law of the place. This is done that the whole country may not be overstocked, but that there may be an equal distribution of Hives in all good Bee districts. If a man has more swarms than he is allowed to keep in his own garden, he sends what he has to spare to some friend, where the lawful number is not full. By this means less honey is wasted than in England, and no one place overstocked and the Bees starved in middling years. An old man, who had long kept many Hives, found that he did not get so much honey from his Bees as in years past, before so many people round about him took to Bees. He did not despair, but set his wits to work, and so hit on this plan. He shifted all his Hives, which had before stood nearly south, round to due east. Now what was the use of this? The sun came on his Hives an hour or two sooner by this move, and so his Bees were out, and had secured a large share of the morning honey, before his neighbours' Bees were stirring. The Bee is a bird, and the proverb says—

**Early Birds pick up Worms.**

Men-Bees would do well to remember this.

*Always have your bed-room to the east, if you have a choice.*

A Mahommedan will never tread on a piece of paper, but, wherever he sees one, stoops to pick it up. He fears that perchance the name of God, or some verse of the Koran (his sacred book) may be written upon it, and this he holds would be defiled by the sole of his foot. He thinks that at the day of judgment, all men, who shall then be saved, will have to pass along a red-hot iron bridge, sharp as a knife edge, and be thrown over the burning fiery gulf from this world to paradise. All the pieces of paper which they have, during their lives, saved from being trodden upon, will then fly and place themselves under their bare feet, as they pass along the burning bridge. Now I am, I trust, a true Christian, and so, of course, do not believe in this Mahommedan fable. It is, however, a very pretty story, and teaches a lesson which we should do well to learn—

#### **Reverence for holy things.**

I, however, have long been in the habit of looking to see what every piece of printed paper contains before I tear it up, and some very odd scraps of knowledge I have thus picked up. Some bird skins, which had been sent from America, were



being unpacked in a museum, and as I was looking at the waste paper in which they were wrapped, this letter met my eye:—

“ *Extract of a Letter from James Low, M.D., Secretary of the Society, to T. R. Beck, M.D., one of the Counsellors:—*

“ DEAR SIR,—Since I have been in the country, my attention has been particularly arrested by the ravages of the *moth* among our Bees. To the history of the insect I have nothing to add: I could not, however, avoid noticing how furiously the Bees attack, and how expeditiously they destroy, their formidable foes in the *nymph* state. It occurred to me that a different mode of constructing our *apiaries* would more effectually destroy those already formed, and, to a certainty, prevent their ravages or propagation in all new Hives. The mode proposed is, to have the plank or floor of the apiary, on which the Hives generally rest, movable upwards and downwards; a beam on the centre of the roof, on the underside, extending the whole length of the building, furnished with staples or hooks, and firmly secured. Let the Hives be made of hard, seasoned wood, and well white-washed with lime externally, and furnished with a hook or staple in the centre of the top. It is well known that the temperature of Bees is

great, and that pure air is so essential to their health and existence, that ventilation forms the whole of the duty of a considerable portion of the labouring Bees. By the mode now proposed, that portion of their labour is considerably lessened; the whole of the bottom of the Hive being open, when suspended by its hook to the beam above, and the floor lowered four or five inches. In cold weather, the plank, which can now be easily cleaned, is to be raised against the bottom of the Hives, and, when sufficiently warm, it may be again lowered. The deposition of the ova of the tinea is thus effectually prevented; and a more plentiful supply of pure air secured to the legitimate occupants of the Hive. I suspended two Hives in this way, and, as far as I could judge, much to the delight as well as advantage of their tenants. There seems to be a very considerable saving of time also in the entry and departure from the Hive, as the Bees are not sources of interruption to each other, as in the ordinary and contracted entrance. This position of the Hive, along with the unceasing vigilance of the Bees, most effectually secure them against the inroads of this, as well as every other species of insect.

“I know not whether any person has noticed the ant (*formica*) among the pests of our apiaries. On raising one of the Hives above-mentioned from

the door, I was surprised at the discovery of a most numerous colony of ants, between the bottom board of the Hive and the floor, and not less delighted at the slaughter which the Bees instantly commenced against this apparently new but not unknown enemy. They were all soon either killed



or dispersed. The object of the ant is, unquestionably, the honey, as their depredations in this way are familiar to most house-keepers. Against

this enemy, also, should it prove a common one, the suspension of the Hives, in the manner proposed, will prove an undoubted security.

“Yours with respect, &c.

“JAMES LOW.”

“T. R. BECK, M.D.

*“Charlton, Saratoga County, May 14th, 1816.”*

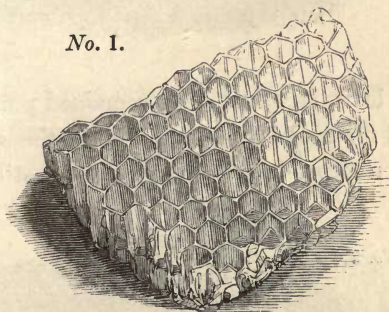
I have given you a wood-cut of this sort of Hive, as it is spoken of in this Letter. I intended to try it myself, and hope many others will do so too, and, what is more, write me word how the plan answers with them. You may see that I have drawn the Hive with a weighing dial, by which it is fastened to the beam above: I thus intend to mark what the Hive gains or loses every day in the year, and thus shall know, for certain, what sort of weather is best for Bees, and how much weight they gain whilst each sort of tree or shrub is in flower. If many Bee-masters through England would, however rudely, put down upon paper such sort of facts, we should soon know more about Bees than we now do.

The next seven wood-cuts, whose varied beauty you must all feel, may be called the Seven Ages of Comb. No small trouble has been taken, in making these imperfect copies of the wondrous works of the Bees: whilst they build these



beauteous combs without any doubt, and as easily the first day of their lives as in the last. The Bee, as I have before told you, does not live to old age. She never sees two winters, while some combs stand through very many "a summer heat and winter cold," showing their age, as a man does, on the face, and getting fouler every year, more fit to rot and be destroyed, which I trust many a man does not. The seven ages of comb illustrate this great change. *No. 1* is a small cake of

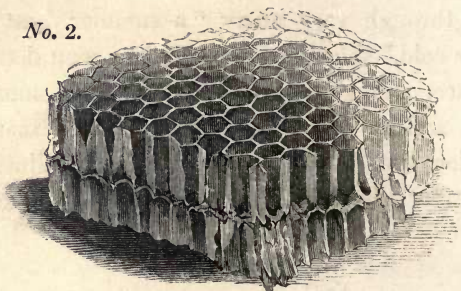
*No. 1.*



wax, pure, colourless, and perfect in shape, as it was first put together by its architect; no grubs have been hatched in it, therefore no maggots have left any foulness there; no Bee has glued any silk cloth, spun by herself when she was an industrious little child, fond of silk-working the walls of her nursery, and left it there as a fixture,

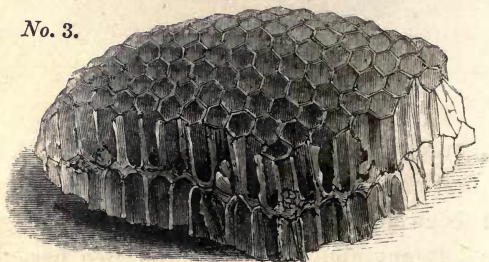
when she came out. She never does any silken work after she is launched into the world. It is the outermost comb of a Hive. Had honey been

*No. 2.*



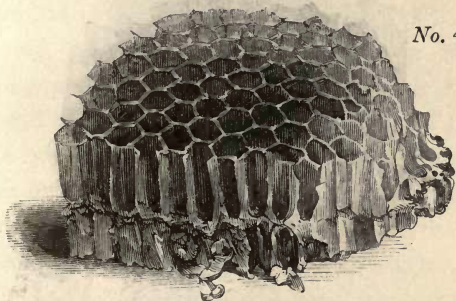
stored in it, it would have remained pure and untainted for many years. In *No. 2* the same comb has been expanded to a larger size, still keeping

*No. 3.*

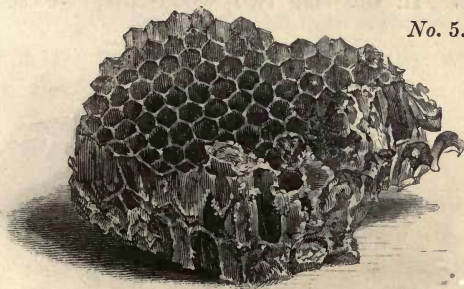


its first shape, still pure, still beautiful—and beautiful, because pure. From *No. 3* one batch of

young Bees has just issued forth; each one has left in his own cell one single fold of silk hangings upon the wall. As time runs on, these Bees,

*No. 4.*

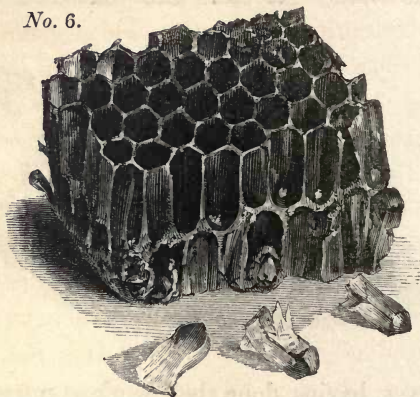
themselves, having done their work as nurses, die. Another generation has taken their place; the silk

*No. 5.*

is doubled, and what is more, the cell is never cleaned out, so it gets "right nasty." (See *No. 4.*) This goes on and on from year to year, (*No. 5.*) till

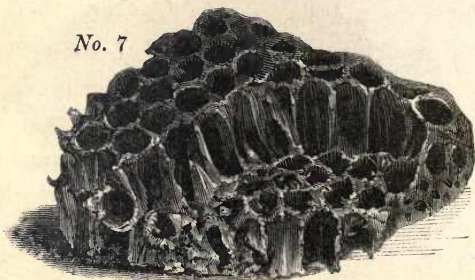
at last the cells become so blocked up by the baby-linen of a numerous family, that they are unable

*No. 6.*



any longer to find room for the young who are to come. In the last two wood-cuts, we see the

*No. 7*



comb in its final state of helpless decrepitude. (*Nos. 6, 7.*) The section across, shows old Bee-bread



stored in the bottom of several cells, and some silk cocoons half pulled out of their places, like a glove half pulled off the hand. There is something very curious about this, which cannot well be marked even in the most perfect wood engraving, and which I will try to describe to you. If you examine a piece of real comb cut cross-ways, you will find distinct layers of Bee-bread packed to the bottom of it; each layer the load of one Bee. There are great odds in the layers of different colours, when several flowers bloom together near the Bees, as for instance, turnips with light yellow pollen, and mignonette with its dark red. All pollen seems to have the same taste, so the Bees do not object to put in the same store-house what comes from different flowers.

If Bees, who are much the best setters of cucumbers, do not happen to take kindly to the frames, the best way is to tempt them by a little honey put on the male and female bloom. When they are once induced to haunt the frames, they set all the fruit, and will hover with impatience round the lights in a morning, till the glasses are opened—*Probatum est*,\* (which means, “it is proved.”)

This observation of that most *painful* observer

\* From that most delightful book, White's *History of Selborne*, p. 487, ed. 1837.

and dear man, Gilbert White, is a full confirmation of what I have said above on the use of Bees in setting fruits. Indeed, when Bees are not about, gardeners are in the habit of setting melons and cucumbers by hand.

I shall say no more on this subject at present; my second Letter you will see is much longer than the first. I suppose even Bees, or at least all who write about Bees, will have much more to say to their friends, since the penny post came in. My two letters, though both about Bees, are different, as you will see from the way in which they severally speak about them. My first told you how to keep Bees, my second how to watch them; just as in old cookery books the receipt for dressing a hare runs thus; "First catch your hare, then," &c. I would have you, after the pattern which this receipt gives, first get a stock of Bees, which you may beg, borrow, or buy, not steal; then learn to keep them well; and lastly, use all your eyes in observing them, for it is a poor thing if you keep Bees only to watch them dying.

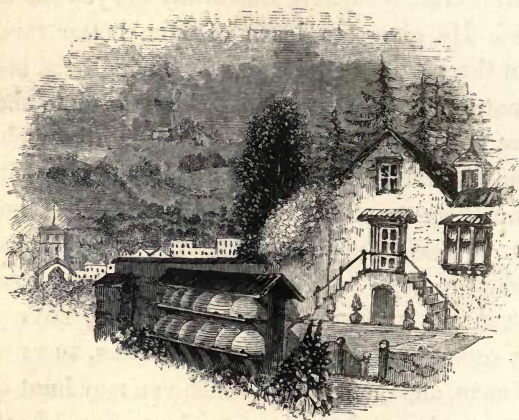
Though I have treated mainly of Bees, yet you will see I have tried to teach many other good lessons; the book of nature has taught me many a good lesson besides, and, I trust, will teach me many more; for the school of nature is one to which both old and young may go without shame;

and, what is better, there is nothing to pay to the schoolmaster, except thanks to Almighty God, who has built this grandest of all national schools, one in which all people of all nations may learn. Christ himself, the Creator of all we see, is the Teacher: and they only will learn aright the lessons which these things teach us about the highest God, who have thankfully obeyed the call which He gives, to learn of Him better things than the art of Bee-keeping. Though the book of nature be all very good, I have tried to show there is a better; but we cannot rightly understand it, unless we have the spirit of the Bible in our hearts. The *good* lessons, which I hope you, as *good* scholars, will learn by this, I have marked in large letters; they are PATIENCE, PERSEVERANCE, INDUSTRY, TEACHABLENESS, LOVE TO THE QUEEN, LOVE FOR THE LITTLE ONES, DUTY TO PARENTS, and many others which you may hunt out for yourselves. I shall now end my second Letter as I did my first:—

“I have now said my say. Much good may it do you, which I am sure it will, if you give it a fair trial. READ IT OFTEN; KEEP IT SAFE; LEND IT TO YOUR NEIGHBOURS WHO DO NOT KEEP BEES; TALK IT OVER WITH THOSE WHO DO; LEARN FROM THE BEE TO WORK HARD AND WASTE NOTHING. REMEMBER, NOTHING WORTH DOING CAN BE DONE

WITHOUT A LITTLE TROUBLE ; AND, ABOVE ALL,  
HELP EACH OTHER ALL YOU CAN."

*So, good bye to you once more.*



**GOD SAVE THE QUEEN.**



# APPENDIX.

PART II.





## APPENDIX.

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### PART II.

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### HÜBER'S PREFACE.

IN publishing my observations on Bees, I shall not pretend to have made them with mine own eyes. I became blind in my early youth, by a train of unfortunate accidents ; but I loved the sciences, and when I lost the organ of sight, I lost not my taste for them. I caused the best works on Physics and Natural History to be read to me. I had for reader a servant (Francis Burnens, born in the Pays-de-Vaud,) who took extraordinary interest in all that he read to me. I soon judged, by his observations on what he read, and by the conclusions which he drew from them, that he understood them as well as I, and that he

was born with the talents of an observer. This is not the first instance of a man, who, without education, without fortune, and in circumstances the most unfavourable, has been called by nature to become a naturalist. I resolved to cultivate his talents, and to make use of them some day for the observations which I was then planning; and with this view, I made him, in the first place, repeat some very simple experiments in Physics. He went through them with ability and intelligence, and afterwards passed on to more difficult combinations. I did not, at that time, possess many instruments; but he knew how to make good ones, and how to apply them to new uses; and, when it was needful, he himself made the machines of which we were in want. The taste he had for these soon became a downright passion, and I no longer hesitated to place my entire confidence in him, being perfectly sure of seeing well, when I saw with his eyes.

The course of my reading led me to the beautiful observations of M. de Reaumur on Bees, and I found such an excellent system of experiments in that work, observations made with so much art, and such wise reasoning, that I resolved to study very particularly that celebrated author, so as to form my reader and myself in his school, and so fit us for the difficult art of observing nature. We began to mark the Bees in glass Hives; we repeated all the experiments of M. de Reaumur, and we obtained exactly the same results when we employed the same means. This agreement between his observations and our own, gave me great pleasure, for it proved to me that I could entirely rely on the eyes of my scholar.

Emboldened by this first trial, we attempted to make entirely new experiments on our Bees; we invented Hives of different constructions, never before thought of, and which presented great advantages; and we had the happiness to discover remarkable facts, which had escaped the Swammerdams, the Reaumurs, and the Bonnets. These



facts I now publish : every one of them we have seen over and over again, during the period of eight years, which we have employed in making our researches on Bees.

It is impossible to form a just idea of the patience and skill with which Burnens has carried out the experiments which I am about to describe : he has often watched some of the working Bees of our Hives, which we had reason to think fertile, for the space of twenty-four hours, without distraction, and without taking rest or food, in order to surprise them at the moment when they laid their eggs. At other times, when it was important to examine all the Bees of a Hive, he did not use the bath, which is so simple and so easy, for he had observed that the water disfigures the Bees up to a certain point, and did not permit us to distinguish those slight differences of structure which we were desirous of ascertaining ; but he took all the Bees, one by one, between his fingers, and examined them with attention, without fearing their anger. He had acquired, it is true, such dexterity, that he generally escaped being stung ; but he was not always equally lucky, and, at the very time that he was stung, he carried on his observation with the most perfect tranquillity. I frequently reproached myself for putting his courage and his patience to such a trial ; but he interested himself quite as much as I did in the success of our experiments, and he counted fatigue and pain as nothing in comparison with the great desire he felt to know the results. If, then, there be any merit in our discoveries, I must share the honour with him ; and I have great satisfaction in rendering him this act of public justice.

Such is the faithful account of the circumstances in which I have found myself placed. I do not conceal from myself that I have much to do, in order to gain the confidence of naturalists ; but to be more sure of obtaining it, I shall permit myself to give way to self-love. I have successively communicated to M. C. Bonnet my principal observations

on Bees; he has found them good, has exhorted me to publish them, and it is with his permission that I now cause them to appear under his auspices. This testimonial of his approbation honours me so much, that I have not been able to refuse myself the pleasure of communicating it to my readers.

I ask not to be believed solely on my own word: I shall relate our experiments and the precautions we have taken. I shall detail so exactly the means we have used, that all observers may be able to repeat our experiments; and if they obtain the same results, of which I have no doubt, I shall have this consolation, that the loss of sight will not have made me altogether useless to the progress of Natural History.—*Nouvelles Observations sur les Abeilles, par François Hüber. Seconde Edition, revue, corrigée et considérablement augmentée. A Paris et à Genève, 1814.*

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## EXTRACTS FROM MY OWN NOTE-BOOK.

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“Nunc age, naturas apibus, quas Jupiter ipse  
Addidit, expediam.”—VIRGIL. *Georg.* iv. 149.

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I have always loved Bees; one of my earliest recollections consists in the vision of a swarm being brought home for me in the tax-cart belonging to one Mr. Noble, a carpenter. They stayed with us only one year, for, in the autumn, they were “murdered for their pains.” Soon after I tried the storifying system, for at least four years. Some beautiful boxes of honey were obtained from the stocks, but the many disadvantages of the system soon forced themselves even on my notice, inexperienced as I was, and

straw Hives, with glasses on the top, were gradually substituted for my boxes. But as I was ignorant of ventilation, the proper method of feeding, and the advantage of good winter quarters, what could be expected but failure? My stock once reached the number of six Hives. But on my return from Eton in Easter (I think, 1829-30), I found all but one dead. The winter, as far as I recollect, had been very warm, and if the preceding year was a bad one for Bees, the result is easily accounted for. I remember my grief at taking up the Hives one after another, and seeing the Bees all dead between the combs, which were quite empty. Had these been fed, as were my Bees in 1836, I doubt not but all would have been saved. The stock which was left, swarmed in the following summer. The swarm was put into the storifying boxes, and placed away from the parent stock, in a situation nearer the forest. The news of the "three glorious days" had just been received in England, when a remarkable instance of the rapid diffusion of the revolutionary mania, and its eager reception by all *classes*, fell under my observation. I was sitting quietly in my room, about four o'clock in the even of a fine August day, when my sister came puffing into the room, and exclaiming, "Oh! Willy, make haste, and come into the garden; the Bees are swarming!" "Nonsense," I said, "they cannot be swarming: it is August, and four o'clock in the even." Nevertheless, I was bound, as a loving brother, to see what grounds my wise sister had for her assertion. I got up, went to the window, and although I was at least four hundred yards from my Bees, the air seemed full of them. I rushed out to the garden; the first sight of my Hive made me think my sister was right. On looking more narrowly I perceived that the Bees were hurrying in, instead of swarming out; and on peeping about, I saw, lying on the ground, the—

"Defuncta corpora vitâ  
Magnanimum heroum."

Each old veteran, where he fought, there he fell. They all had died fighting, as the play-book says, "*pro hares et foxes.*" The stock, though heavy, was not strong in Bees. My plan was soon laid. I determined to pay off these most unruly plebeians, who had dared to fall upon my poor Bees with such murderous effect. I soon fetched some sulphur squibs, which the gardener used for taking wasps' nests. These I lit, put in at the mouth of the Hive, and stopped it up. When the squib burned out, I turned the Hive up, and the number of Bees which I had slaughtered was quite extraordinary. The attack on my Hive was evidently not the unpremeditated work of a single stock, but of a joint league. (What a glorious opportunity this would have been for capturing the robbers, and adding them to my own stocks, had I then been acquainted with the narcotic and fumigating apparatus!!\*) I carried the Hive away to the house as fast as I could, to save the honey, surrounded by Bees, who were so intent on plunder, that they did not attempt to sting me, and dashed into the burning squib which I waved round my head.

My thoughts then turned to my other stock, which was about a quarter of a mile off. I ran to it as fast as I could; hardly had I arrived there, when an advanced body of the robber regiment followed me; they soon thickened. I tried every means I could think of to disperse them, but in vain. I threw dust into the air, among the thickest; and read them the passage in Virgil, which makes the throwing of dust in the air equivalent to the Bees' Riot Act:—

"*Mi motus animorum, atque hæc certamina tanta  
Pulveris exigui jactu compressa quiescent.*"

VIRGIL. *Georg.* iv.

I should have lost this Hive also had not a sudden thought struck me, which I adopted. It being so late in the even,

\* *Query*:—Should I have been justified in so doing, or could the Queens of the invading stocks have taken out a writ of *Habeas Corpus* against me? A knotty question this for the lawyers, to whom I leave it.



I concluded that most of my Bees had come home. I therefore shut up the entrance, and let the robbers knock until they were tired! I made a gimblet-hole in the top, to give them air, and next morning, when I let them out, all was quiet.

1835—Was, I should think, a good honey year. I only had two stocks. They did not swarm at all; but filled some glasses very well.

1836.—In the spring of this year Mr. Nutt's book fell in my way. It was too late to stock one of his Hives that year; but I resolved to get my apiary into good order to start fair the next year. The spring was very backward; neither of my Hives swarmed either in May or June. They bred very fast; but hung out, and covered the whole front of the straw Hive. As long as this retreat was open to them, I was sure they would not swarm. By the plentiful application of wetted nettles, we forced them all into the Hive on the even of the 30th of June. On the 31st of June I got up at four o'clock in the morning, and turned a small plaster of Paris arch, uniting the Hive to the front of the Bee-house. On the 31st they hung out in a most tremendous *πώγων*, or beard, extending two feet laterally. They were so quiet that I took the end of the cluster in my hand. On the 1st of July they swarmed; the whole family was out to see them. It was a piping hot day, and they filled, I may almost say darkened, the air. They settled, however, on a most inconvenient place—the stem of an espalier pear tree, and did not hang in a bunch, but clustered all round the tree, extending from its top, about four feet nine inches from the ground, nearly to the bottom of the stem. A council of war was held on the occasion. It seemed impossible to sweep them into the Hive. The danger of missing the Queen was so great, that a second flight, and probably the loss of the swarm, seemed inevitable, if we attempted the usual method. A gentle method was therefore determined

on; a well-dressed Hive was held over the crown of the swarm, touching the stem of the tree; some few Bees went up into it; we gradually lowered the Hive, keeping it close to the stem. It took us about half an hour to work half down the tree. So many Bees had, by this time, gone in,



that I thought it would be well to put the bottom board half under the Hive. To our great joy the Bees then rapidly left the tree, and formed a cluster, partly supported by the Bees who had entered the Hive, and partly by the bottom board. They were then placed on a large garden pot, and left to themselves. In the even they had all gone in, and a splendid swarm it was. Virgil seems to have experienced difficulties of this sort; or rather, the old writers *de re rusticâ*, from whom he borrowed his matter. His lines on swarming are worth quoting :—

“Palmaque vestibulum, aut ingens oleaster inumbret;  
At, cum prima nobi ducent examina reges  
Vere suo, ludetque fabis emissa jumentus;  
Vicina inbitet decedere ripa calori,  
Obviaque hospitibus teneat frondentibus arbor.”

VIRGIL. *Georg.* iv. 20.

This swarm weakened the parent stock so much that it left off working in a large glass which was on the top. I had an idea that *no Drones* at all accompanied the swarm. The majority certainly stay in the old stock, as I killed 250, I think, in five minutes, the day after the swarm rose, at the entrance of the Hive ; but I believe I saw one or two Drones who accompanied the swarm. This point, however, requires further examination. It would be agreeable to theory ; for if the old Queen goes away with the swarm, she is already impregnated, and consequently the Drones of the next year, which are the first to be hatched of any brood, will be produced soon enough for the young Queens. But if Hüber's theory of the impregnation of the Queen be true, there is no need that *every* Hive should be furnished with Drones, unless they have some other office to perform. I do not believe they feed the brood ; but they certainly may increase the temperature of the Hive to a great amount. This swarm weighed twenty pounds in a little more than a month after it swarmed, thanks to the lime trees.

This year I had four other swarms, and one strong cast—strong in Bees, but only weighing three pounds. I transferred them home safely on the top of the carriage, a distance of two miles ; some of them were in a very foul state. I smoked them with the fungus, cleaned the rim of the straw Hives, cut out all the combs which seemed infested with the moth, and set them all on new bottom boards. I united the cast to a healthy swarm of the same year, which only weighed nine pounds ; I then fed them with sugar and sweetwort, unfortunately, as will be seen hereafter ; they seemed to prefer this to sugar and beer. I fed them by raising the Hives on a feeding-box, into which I put a tin pan, with coarse muslin stretched over the liquor. The union Hive took up three pounds and a half in one night, and when I had done feeding them, weighed many pounds above twenty. Everything seemed

to promise for a fair start on the following spring ; but—

“ O fallacem hominum spem ! ”

I removed them to a shed which had a northern aspect, and, I thought, was tolerably dry ; but I omitted to raise the boards from behind, that the damp might run out. I also confined them with a piece of perforated tin, as Nutt advises, which I am convinced is a bad plan. The winter 1837-38 was very warm, muggy, and damp. A dysentery got among my Bees, and when they came down to the entrance many perished by being squeezed against the damp entrance by those who pressed on from behind. It was mainly owing to their being confined. Had they been on their summer stands, though they would have diminished more in weight, I am convinced so many would not have died. The stench in many of them was terrible. They tried to alleviate it by fanning with their wings ; I assisted them by sponging out the entrances, and as far as I could reach along the bottom, by means of a sponge tied to a piece of stick. *I ought to have given them fresh bottom boards*, but I did not think of it.

The spring of 1837—

“ Came so slowly up our way,”

such a succession of easterly winds occurred in March, April, and May, that they could not get out to recruit themselves. Had the spring been favourable, many might have recovered ; but, to make a sad tale short, only two stocks got through, and many of their combs were in a very bad state. I turned them up, and cut out several covered with a powder of a greyish green. The stock whose loss I regretted most was that of the union Hive, as it prevented my proving for myself the truth of De Gelieu's statement (though I have myself no doubt of its correctness) ; as it was, the union swarm, though much the strongest in Bees, did not diminish more in the autumn months than those



who had only their own population. The cause of their death was a mistake which I made, misled by Nutt, in feeding them with wort and sugar, instead of ale and sugar, though they took the former much more readily up than the latter;—it fermented in the Hive.

To return to the summer of 1836:—In my rooms at Christ Church, I had two stocks of Bees, which worked through a sort of cuniculus in the window sill into the open air; one was in a leaf Hive, the other in an observatory Hive (or, rather, in an octagon box, with three glass windows in the back, as they never worked up into the observatory leaves). [N.B. Bees should be put directly into the observatory Hive, without any apartment below, or else all the Bees will never be in sight at the same time.] Still, as it was, I saw many things new to me. *Very few Bees worked out the first day.*—Vide p. 251, *Theory of Wax*.

Saw the Queen, May 30th and 31st: ovipositor very much distended.

*June 2.*—About one hundred Bees killed, probably by eating putty, with which I stopped the cuniculus leading into the Hive. *Mem.* Never to use putty again.

*June 3.*—Saw one Drone; which floors my theory that no Drones go off with the new swarms.

*June 5.*—Saw a Bee with two scales of wax protruding between the second and third, and third and fourth scales of the abdomen, on the left side. The Bee remained remarkably quiet, with his belly toward the glass, holding on to the glass with his anterior legs, and at intervals shaking his body and rubbing it with his hind legs, as if to help the wax forward. He disappeared in the crowd of Bees, after about half an hour, before the wax scales had fallen, yet they had become quite imbricated. I often observed Bees hanging in the clusters shake themselves violently.

Early in June I opened my Hüber's Hive, and took out a comb; eggs were laid in the cells, and much pollen stored in them. I took some out of one with the point of a

needle, and subjected it to a microscope. I also took some off the legs of a Bee who was flying in. Both had precisely the same appearance, which shows that Bee-bread is the farina of flowers simply pressed into the cells, without any admixture, any digestive, or chemical process. H. Woolcombe told me that it was the pollen of some composite cruciform flower.



#### SUBJECTS OF INVESTIGATION.

(?) Bees pierce the corollas of flowers which are so shaped that, in their natural state, they are unable to reach the nectary.

“ I can only observe, that I have repeatedly stood a considerable time, and called others to witness the fact, in my own garden, more especially when the Humble Bee has been actively employed in piercing the bases of the common honeysuckle (*Lonicera capresol*), and although the *Lonicera sempervirens* grows along with them, its blossom generally remained untouched.”—*Bp. Brown. April 5th. 1833. Loudon's Mag. vol. vi. 469.*

(?) This account only mentions the Humble Bee; does it equally hold of the common Bee?

Vol. v. p. 753.—Columbine and heart's-ease are said to have been similarly treated.

Vol. v. p. 74.—*Aquilegia vulgaris*.

Vol. iv. p. 479.—*Antirrhinum majus*, and *Jasminum officinale*.

I have seen the conical hood (*galia*) of *Aconitum lycoc*, and the species nearest to it, perforated and under perforation by Bees: *Aconitum apellus* also.—Vol. iv. p. 479. *Loudon*.

June, 1837, I saw the Bees working at the bean blossom; the ants were sharing the honey with them through the holes which were pierced at the bottom of the upper side of the corolla; there were generally two holes, and they became black by age. I at first thought the work was the ants, and the profit the Bees; at last I saw one which came to a fresh flower, pierce it with the horny case of his proboscis, and then suck away.



#### WEIGHT OF BEES, THEIR BURDENS, &c.

Some very interesting experiments might be tried, I think, on the weight of Bees, their external loads, and the weight of honey which they can carry in their honey bags.

On the 23d of August, 1841, I took a glass full of honey, and, instead of turning the glass up, and letting the Bees depart at their leisure, I smoked them by inserting a bit of fungus, about the size of a small marble, under the glass. When in a state of intoxication I weighed them in a pair of accurate medicine scales, and found—

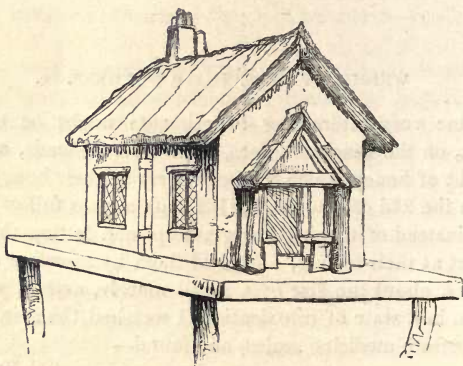
	dwt.	gr.
100 Bees, taken at random, weighed .....	3	11 = 191.
10 Bees of the largest size, having probably their honey bags nearly full, as one which was accidentally killed was so .....		22
10 small Bees, with the abdomen contracted .....		17

giving an average weight of about  $19\frac{1}{2}$  grains for ten Bees, which will correspond very nearly with the gross weight of the hundred, or nearly 2 grains as the weight of each Bee.

Supposing each Bee had some honey in his bag, the average quantity contained by each would be half a grain.

I purpose trying the quantity of honey which a Bee can carry when fully gorged, in the following manner:—In the morning, when the Bees are going out to work, to catch two parcels of ten each. One parcel I shall stupify immediately, and then weigh; the other parcel I shall put into a box with some honey, and when they are gorged—for even in confinement I do not think a Bee will ever be “*off his feed*,” then stupify and weigh them. The difference will give the weight of honey which a Bee’s honey bag can contain.

The weight of pollen which a Bee can carry is also very great.



COTTAGE HIVE.





## PROPOSALS FOR FORMING A SOCIETY, TO BE CALLED "THE OXFORD APIARIAN SOCIETY."

THE object of this Society to be twofold.

I.—To promote an improved and more extensive system of Bee management among the cottagers, by the diffusion of information on the subject; the loan, not the gift, of Hives, their cost to be repaid from the produce; and the annual distribution of prizes, of which due notice will be given in the Oxford Papers, with conditions to be observed by the competitors.

II.—To promote a more extensive and scientific knowledge concerning the natural history and cultivation of Bees among the higher classes.

To further this latter object, a small plot of ground to be rented within a very short walking distance of Oxford, and Hives of all sorts to be established there. The ground to be open to the members of the Society, and visitors admitted by tickets from subscribers, on payment of one shilling. Cottagers to be admitted by tickets, gratis.

The subscriptions to be 1*l.* 1*s.* for the first year; for sub-

sequent years 10s. 6d., to be devoted to lending new Hives, distributing prizes, and establishing an experimental garden or gardens, and other purposes connected with the objects of the Society.

Donations thankfully received from casual visitors towards the support of the Bee-garden. Subscriptions to be received by Mr. Kirtland, at the Museum, and at the Bank of Messrs. Parsons and Co.

*Oxford, Feb. 28, 1833.*

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#### RULES OF THE OXFORD APIARIAN SOCIETY,

Agreed on at a General Meeting, held at the Ashmolean Museum, by permission of the Curator, on Tuesday, May 15, 1838, P. B. Duncan, Esq. in the chair:—

I.—That the Society be called the “Oxford Apiarian Society.”

II.—That each member pay 1*l.* 1*s.* the first year, and 10*s.* 6*d.* on subsequent years. Subscriptions, after the present, to be payable at the beginning of the year. Ladies to pay half the above sums. Donations thankfully received to aid in forming a permanent fund to promote the loan of Hives.

III.—That the affairs of the Society be under the management of a president and committee, who shall make their report at an annual meeting in June.

IV.—That Mr. Duncan, of New College, be president of the Society.

V.—That Mr. Hill, of Christ Church; Mr. Bigge, of Merton College; Mr. Cotton, of Christ Church; Mr. Acland, of Christ Church; Mr. Hobhouse, of Balliol College; and Mr. Hawkins, of Jesus College, be members of the committee, with power to add to their numbers.

VI.—That Mr. Cotton, of Christ Church, be secretary of the Society.

VII.—That Mr. Kirtland be honorary secretary.

VIII.—That Messrs. Parsons and Co. be treasurers to the Society, and pay the drafts of the committee on demand.

IX.—That the object of the Society be to promote an improved and more extensive system of Bee management, especially among cottagers, and to collect and arrange information on the subject :—

1. By keeping a garden for the verification of the most important experiments, the institution of new ones, and by recording observations. All experiments to be under the direction of the committee.
2. By providing Hives and models for sale.
3. By advancing Hives and Bees to deserving cottagers; the Hives to be paid for the following year by instalments, or by the produce, as may be agreed on. The Hives, if not approved, to be returned.
4. By giving prizes for specimens of Bee produce, the conditions to be observed by competitors to be declared by the committee.

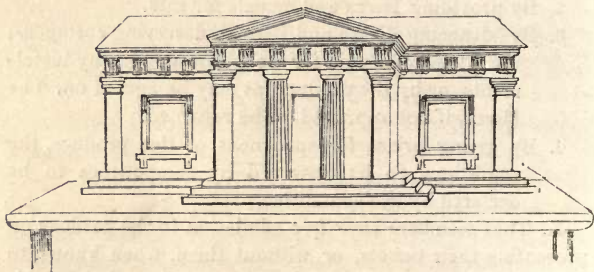
X. That members have free admission to the gardens on presenting their tickets, or without them, when known to the superintendent. Non-subscribers to be admitted by tickets, signed by subscribers, on payment of sixpence at the garden. That family tickets do admit any number (*bonâ fide* relations), on the payment of one shilling. That cottagers be admitted on presenting a *free* ticket, signed by a member. Applications for tickets to be addressed to the secretary. That no money be received at the garden except the payment for admission. That all visitors inscribe their names in a book kept for that purpose, and deposit their tickets with the superintendent when they first enter the garden.

XI.—Subscribers to have the privilege of recommending

cottagers for the loan of Hives, and the option of purchasing honey at a reduced price. They may also be supplied with swarms of Bees, by application to the secretary.

XII. That a book be kept at the garden, in which visitors are requested to write their names, and offer any remarks or suggestions on the management of the garden. That some of the best works on Bees be procured for the use of members.

N.B.—All communications, the result of experiment, &c., will be thankfully received, and questions answered, if addressed, post paid, to the secretary, who will also receive the names of the neighbouring gentry and others desirous to become subscribers.



TEMPLE HIVE.

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NOTES FROM SOCIETY'S SCRAP BOOK.

*Bean piercing.*—Barnett and E. O. saw the Bees **PIERCING** the beans in the bean-field, at the end of May, 1838.

*Bees drinking.*—It is very curious that not a single Bee has been seen drinking, since the showers in the beginning of June, 1838. At the end of May, and before the beans came out



into flower, they were seen by dozens at a time in the water-trough.

*Imperfect embryos thrown out.*—June 7. An imperfect Queen was found by Barnett thrown out from No. 22. All the soft and watery matter had been sucked out; as I believe is the usual habit of the Bees, when they throw out imperfect pupæ. The specimen will be put among others which will soon be in the room.

W. C. COTTON.

*Queens trumpeting.*—June 14. A young queen was heard crying in the swarm, No. 22. It had swarmed.

May 31.—Barnett expected it to cast; but if it has additional room, I think we shall prevent it.

*Queens—when cast out of Hives.*—June 21. No less than four Queens were picked up, being cast out of the Hives. One alive; three dead.

*Drones killed in Hives not intending to swarm.*—June 26. A very weak swarm (16), which we have with difficulty preserved up to this time, was seen killing its drones.

June 21.—(Swarmed June 1) killing drones.

*Wasp's nest in a Hive.*—1839, May 10. A wasp's nest found fixed to the top of the empty Bagster's Hive. Queen wasp killed. Soon after another wasp began to build in the same spot.

*Weight of a Swarm. How to calculate it.*—A swarm, on Saturday, June 9, weighed four pounds. It has been calculated, (see Wildman,) that 4480 Bees go to a pound. Ergo,

4480

4

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17,920 Bees in the swarm.

The wooden box was weighed before and after, which gives the clear weight of the swarm.

W. C. COTTON.

*Prevention of Swarming.*—1839, June 19. Mr. Nutt is certainly right in ascribing swarming to want of coolness, and want of room. Yet, in some instances, this is difficult to be

discerned, owing to the impossibility of knowing *all* that the Bees are doing inside their Hives. *E.g.* The Bees had made a considerable quantity of comb in a straw Side-Hive; but after staying there some time, they swarmed and left the new combs empty. This seemed quite unaccountable at first; but, some time after, Barnett gave what was undoubtedly the true reason, viz. that the Bees which took to the Side-Hive were the first swarm; but when the cast was hatched, the two Hives became too crowded for all. Consequently, the Queen with the Bees in the old Hive swarmed, and were naturally followed by those in the Side-Hive. Had an additional Hive, or even a cap, been added to the Hive, this would probably have been prevented. This proves that in some cases it may be necessary to open a second Side-Hive, before the first is nearly full; and, therefore, unless a large bell-glass or straw cap be used, when there is only one side box or Hive, a strong stock will always be liable to swarm, even though the Bees may have taken to the Side-Hive.

H. W. LLOYD.

*Bottom boards.*—Bottom boards on Cotton's plan are liable to several objections. In the first place, such thick wood is too expensive for cottagers. This is proved at once by the utter impossibility of getting them to try it. In the next, they do not answer well. The zinc, with which the passage of communication is covered, soon warps, and lets in the light as well as the air, and rain. It also bends down and makes the passage smaller than at first intended. Again, half of the passage is cut in one board, and half in the other. Each half slopes down to the rim of the board, so that, when both the boards are pushed close together, the centre is the lowest or deepest part of the passage, and the Bees, in passing, must go first down and then up hill, as it were, from one Hive to the other. The Bees are apt to drag their rubbish and dead men to wherever they see any light, consequently this passage is sometimes blocked up by them at once, before they have taken to the Side-Hive at all. These objections are entirely obviated by Mr. Taylor's doubling-board, and by the communication-

bridge. The latter is so simple that any cottager may make it for himself.

H. W. LLOYD.

*Passage of communication in collateral boxes.*—Any one who has seen Mr. Nutt's as well as Mr. Cotton's boxes, will have observed, that, in the former, the passages from the middle to the side-boxes are far more numerous than in the latter. In this respect, Mr. Nutt has decidedly the advantage over Mr. Cotton; but then his way of cutting off the communication between them, when the honey is to be taken, is inconvenient.

N. B. The great thing seems to be to have the passage to reach as far along the very top of the box as possible.

*Nadir Hives.*—*June 22.* Art is ever most successful when it acts most in accordance with nature. In Bee-keeping, this has been shown by nothing more than the greater success which has attended our experiments with Nadir than with Collateral Hives. In two instances, where the former have been tried, the Bees have instantly begun to work; and, in a short time, have made a surprising quantity of comb. In building combs, Bees naturally begin at the top of a Hive, and work downwards. Hence they are more readily induced to enter a Hive placed below their old one, than a side one, up which they have to crawl before they can begin. In the latter, they have to begin quite afresh: in the former, they almost continue their old combs in the upper Hive. An accidental observation led me the more irresistibly to this conclusion. Having occasion to open the feeding-drawer of a centre box, the passage of which into the side-box was open, I discovered the Bees hanging down quite into the drawer, but yet unwilling to enter the side-box.

H. W. LLOYD.

*Objections made to us that our system is not new.*—It has been objected to us that there is nothing new in our system; that all our plans are to be found in some old book or another on Bees, and that some of them have been practised even more than a hundred years ago. True; we acknowledge that the principles upon which we go have all been discovered by

others; but these are known to only a certain number. All that we pretend to, is the endeavour to establish these principles on so sure a footing, by means of experiments, that there may be no excuse in future for the practice of destroying Bees; and, secondly, to show how straw Hives may be made by cottagers for themselves, in which Bees may be prevented swarming, and pure honey obtained with little or no additional expense to that incurred on the old plan.

*Popular objection answered.*—That our system would encourage too great an increase in Bee-population: see “The Cottager’s Bee-book,” by Mr. Smith, of Queenington.

It is objected that if Bees are never destroyed they will go on increasing interminably, and in a short time will overstock the country, so that, after a certain lapse of time, our land will be in the same condition as that described by Herodotus, where no people could live for the quantity of Bees that were in it. The fallacy of this notion will appear by a little reflection. In every stock of Bees there is only one Queen, who lays all the eggs of the stock, and of these only a certain definite number. It is well known that Bees live only one year; so that in the course of two seasons a generation of Bees has passed away and a new one succeeded it. It follows, therefore, that in every stock only a sufficient number of young ones will be brought up to replace those that have died in the common course of nature.

H. W. LLOYD.

*Collateral Straw Hives.*—I do not think that the collateral system in straw Hives can ever answer. It is impossible to cut out any of the rings of straw at the bottom, in order to fit in a wooden passage or communication-board, without spoiling the Hive. The doubling-board certainly seems to answer, but then it is too expensive for cottagers. The Nadir Hive plan must be the one, if any, to supersede the old one of swarming and burning.

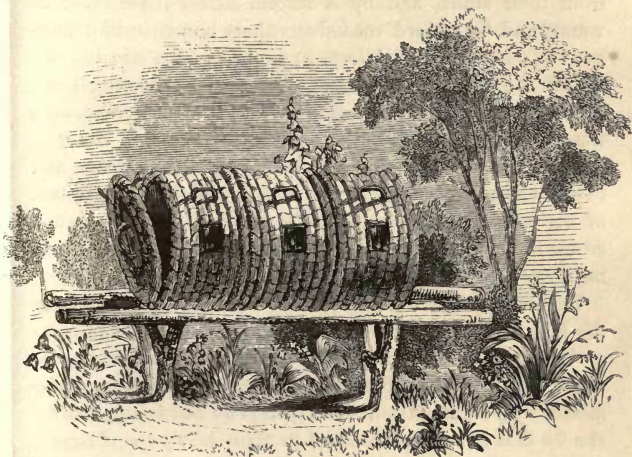
H. W. LLOYD.

*Pasteboard Hives.*—Mr. Drewitt, to whom the paper-mill at the Weirs belongs, offers to make square pasteboard Hives, at sixpence a-piece. I see no reason why they should not answer



as well as boxes, and the sooner they are tried the better. He has a fine stock of Bees in a round one of this kind, with a bell-glass at the top in which they are working.

H. W. LLOYD.



SICILIAN, OR BARREL HIVE.

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## EXTRACTS FROM MY OWN NOTE-BOOK.

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### BEES IN SIBERIA.

ANOTHER advantage which may be received from the most barren and the most northern countries, such as Lithuania and Muscovy, is the keeping of Bees; and although these insects do sufficiently secure to man the fruit of their labours, by that admirable form of government and polity which they observe among themselves: yet are they so

formed by nature to serve him, whenever he shall see fit to employ them, as to be subject to his directions, and to fly obedient to his call in as orderly a manner as sheep obey the voice of their shepherd. As the herdsman, by the winding of his horn, draws forth horses, mules, goats, &c. from their stalls, and by a second signal leads them to water, and by a third reconducts them home, in like manner the master of the Hives, by a blast of his whistle, can call all the Bees of the village after him, conducting them by this signal sometimes into one field of flowers, sometimes into another, thus taking them by turns, in order to give the flowers time to recruit their stock of sweets, and thereby afford the Bees a fresh repast. With another blast of his whistle he leads them back to their Hives, when either impending rains or the approach of night gives warning to sound a retreat.

This was a very common, as well as ancient, practice in the East, and to this the prophet Isaiah alludes when comparing the enemies which God brings upon any nation to afflict it, to a swarm of Bees which a shepherd calls or dismisses by a signal given. He says, "The Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt, and for the Bee that is in the land of Assyria."\* This custom did still subsist in Asia in the fourth and fifth centuries, and St. Cyril speaks of it as a thing very common in his time, and which he had very often seen.

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#### BEES IN SURINAM.

On the 16th I was visited by a neighbouring gentleman, whom I conducted up my ladder; but he had no sooner entered my aerial dwelling than he leaped down from the top to the ground, roaring like a madman with agony and

\* Isa. vii. 18.

pain, after which he instantly plunged his head into the river; but, looking up, I soon discovered the cause of his distress to be an immense nest of wild Bees, or *Wassee Wassee*, in the thatch, directly above my head, as I stood within my door, when I immediately took to my heels as he had done, and ordered them to be destroyed by my slaves without delay. A tar mop was now brought, and the devastation just going to commence, when an old negro stepped up, and offered to receive any punishment I should decree, if even one of these Bees should sting me in person. "Massa," said he, "they would have stung you long ere now had you been a stranger to them; but they, being your tenants, that is, gradually allowed to build upon your premises, they assuredly know both you and yours, and will never hurt either you or them." I instantly assented to the proposition, and, tying the old man to a tree, ordered my boy Quaco to ascend the ladder quite naked, which he did, and was not stung. I then ventured to follow; and declare, upon my honour, that even after shaking the nest, which made the inhabitants buzz about my ears, not a single one attempted to sting me. I next released the old negro, and rewarded him with a gallon of rum and four shillings for the discovery. This swarm of Bees I since kept unhurt, as my body guard, and they have made many overseers take a desperate leap for my amusement, as I generally sent them up my ladder on some frivolous message, when I wished to punish them for injustice and cruelty, which was not seldom.

"Inter apes heu! inter et aves concordia."—ANON.

The above negro assured me that on his master's estate was a tree, in which had been lodged, ever since he could remember, a society of birds and another of Bees, who lived in the greatest harmony together; but should any strange birds come to disturb or feed on the Bees, they were instantly repulsed by their feathered allies; and if strange

Bees dared to venture near the birds' nests, the native swarm attacked the invaders, and stung them to death;—that his master and family had so much respect for the above association, that the tree was considered as sacred, and was not to be touched by an axe until it should yield to all-destroying time.—(The above stories are extracted from *Capt. Stedman's Surinam*, vol. ii. p. 236.)



“The Bee is but small among the fowles, yet doth her fruit passe in sweetnesse.”

ECCLESIASTICUS, xi. 3; Bible, ed. 1603.

These Heaven-instructed mathematicians, before any geometer could calculate under what form a cell would occupy the least space without diminishing its capacity, and before any chemist existed to discover how wax might be elaborated from vegetable sweets, instructed by the Fountain of Wisdom, had built their hexagonal cells of that pure material, had closed them at the bottom with three rhomboidal pieces, and were enabled without study so to construct the opposite story of combs, that each of these rhomboids should form one of those of the opposed cells, thus giving strength to the structure that in no other place could have been given. Wise in their government, diligent and active in their employments, devoted to their young and to their Queen, they read a lecture to mankind that exemplifies their Oriental name רְבוּיָהּ, she that speaketh. Whoever examines their external structure, will find every part adapted to their various employments.—*Kirby*, vol. ii. p. 328.



The great instrument by which the Bees, in their perfect state, collect their food, is their tongue. This they have the power of inflating, and can wipe with it both convex and concave surfaces; and with it they, as it were, *lick*, but not *suck*, the honey from the blossoms, for Reaumur has proved this organ acts as a tongue, and not as a pump.—*Id.* vol. ii. p. 329.



#### BEE-CUCKOO AND HONEY-RATEL.

There is a genus belonging to the order Climbers, found in the southern parts of Africa, the species of which are called Bee-Cuckoos (*Indicator major*), and are remarkable for indicating both to the Honey-Ratel (*Viverra mellivora*) and the Hottentots the subterraneous nests of certain Bees, which they do by a particular cry

morning and evening, and by a gradual and slow flight towards the quarter where the swarm of Bees have taken up their abode. The beast and the man both attend to the notice, and dig out the nest; and to the share of the bird generally falls, not the part stored with the honey, but that in which the grubs are contained: so that the bird, though it invites others to partake with it, has its own subsistence, which it could not otherwise readily come at, principally in view. Both this animal and its companion, the Ratel, are fitted by Providence for their function, and protected from the danger to which they are exposed from the stings of the irritated Bees, by a very hard skin. The Bees, however, sometimes revenge themselves on the treacherous bird by attacking it about the head and eyes, and so destroying it. It is singular, and affords a singular proof of design, that two animals which are so necessary to each other, the one to indicate and the other to excavate their common prey, should each be defended by the same kind of armour, and each seek a different portion of the spoil, suited to its habits.—*Kirby*, vol. ii. p. 464.



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#### BEES IN SOUTH AMERICA.

From the Plaza we went to a house where a Bee-hive of the country was opened in our presence. The Bees, the honey-comb, and the Hive, differ essentially from those of Europe. The Hive is generally made out of a log of wood from two to three feet long, and eight or ten inches in diameter, hollowed out and closed at the ends by circular

doors cemented closely to the wood, but capable of being removed at pleasure. Some persons use cylindrical Hives, made of earthenware, instead of the clumsy apparatus of wood; these are relieved by raised figures and circular rings, so as to form rather handsome ornaments in the verandah of a house, where they are suspended by cords from the roof, in the same manner that the wooden ones in the villages are hung to the eaves of the cottages. On one side of the Hive, half way between the ends, there is a small hole made, just large enough for a loaded Bee to enter, and shaded by a projection, to prevent the rain from trickling in. In this hole, generally representing the mouth of a man, or some monster, the head of which is moulded in the clay of the Hive, a Bee is constantly stationed, whose office is no sinecure, for the hole is so small that he has to draw back every time a Bee wishes to enter or leave the Hive. A gentleman told me that the experiment had been made of marking the sentinel, when it was observed that the same Bee continued at its post all day.

When it is ascertained by the weight that the Hive is full, the end pieces are removed, and the honey withdrawn. The Hive we saw opened was only partly filled, which enabled us to see the economy of the interior to more advantage. The honey is not contained in the elegant hexagonal cells of our Hives; but in wax bags not quite so large as an egg. These bags or bladders are hung round the sides of the Hive, and appear about half full, the quantity being probably just as great as the strength of the wax will bear without tearing; those nearer the bottom, being better supported, are more filled than the upper ones. In the centre, or lower part of the Hive, we observed an irregular-shaped mass of comb, furnished with cells like those of our Bees, all containing young ones in such an advanced state, that when we broke the comb and let them out, they flew merrily away. During this examination of the Hive, the comb and the honey were taken out, and the Bees dis-

turbed in every way ; but they never stung us, though our faces and hands were covered with them. It is said, however, that there is a Bee in this country which does sting ; but the kind we saw seemed to have neither the inclination nor the power, for they certainly did not hurt us, and our friends said, they were *muy manso*, very tame, and never stung any one. The honey gave out a rich aromatic perfume, and tasted differently from ours, but possessed an agreeable flavour.—*Basil Hall's South America*, chap. 46.

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July 7, 1782.—Bees have thriven well this summer, being assisted by the honey dews which have abounded this year ; some of the standard honeysuckles which a month ago were so sweet and lovely, being covered with aphides and viscous honey dews. These latter are probably occasioned by the effluvia of flowers being drawn up by a brisk evaporation in hot days, and then in the night falling down with the dews !!!—*White of Selbourne, from Jesse's Gleanings*, 2d Series, p. 172.



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SIR THOMAS BROWNE ON THE BEE'S VOICE.

That Flies, Bees, &c. doe make that noise or humming sound by their mouth, or, as many believe, with their wings only, would be more warily asserted, if we consulted the determination of Aristotle, who, as in sundry other places, so more expressly in his book of Respiration, affirmeth this sound to be made by the allision of an inward



spirit upon a pellicle or little membrane about the precinct or pectoral division of their body. If we also consider that a Bee or Flie, so it be able to move the body, will buz, though its head be off; that it will doe the like if deprived of wings, reserving the head, whereby the body may be better moved. And that some, also, which are big and lively, will hum without either head or wings. Nor is it only the beating upon this little membrane by the inward and con-naturall spirit, as Aristotle determines, or the outward air, as Scaliger conceiveth, which affordeth this humming noise, but most of the other parts may also concurre hereto, as will be manifest if, while they humme, we lay our finger on the back or other parts, for thereupon will be felt a serrous or jarring motion, like that which happeneth while we blow on the teeth of a comb through paper; and so if the head or other parts of the trunk be touched with oile, the sound will be much impaired, if not destroyed. For those being also dry and membranous parts, by attrition of the spirit doe help to advance the noise; and therefore, also, the sound is strongest in dry weather, and very weak in rainy season, and toward winter; for then the air is moist, and the inward spirit growing weak, makes a languid and dumb allision upon the parts.—*Vulgar Errors*, book iii. ch. 26, 10.

The humming of insects seems still involved in mystery, nor do I clearly see what experiments can be made to clear it up.





*From a Zoological Dictionary, called Hayat Alhaywan, or Life of Animals, by Kemal-al-din Muhammad Aldamiri : he died in the year of the Hijrah, 808. A.D. 1405.*

### THE BEE.

“THIS is the honey-fly. I have already said, in what goes before in the chapter on Flies, that the prophet, on whom may God’s benediction and peace rest, has declared, that all flies go to hell fire except the Bee. The dignity of the Bee is sufficiently established by the saying of the Most High God ;—‘The Lord spake by inspiration unto the Bee, saying, Provide thee houses in the mountains, and in the trees, and of those materials wherewith men build Hives for thee ; then eat of every kind of fruit, and walk in the beaten paths of thy Lord,’ (Coran : chapter, The Bee : see Sale’s Coran, 4to. Edit. p. 219.) It is said, in a work entitled ‘The Wonders of the Creation,’ that the Bee is an intel-

ligent animal, possessed of much cunning and courage, that it foresees consequences, is acquainted with the seasons of the year, with the rainy period and the time for the meadows, is very obedient and submissive to its governor and leader, and is an admirable artisan. Aristotle says, that Bees are of nine kinds, six of which visit each other. Its food is of the superabundance of sweet and moist matter with which the flowers and leaves are sprinkled; this it gathers and stores up, and this is the honey. It gathers also with this other moist matter, from which it makes the cells for the honey; and this matter is the wax which it gathers with its trunk, and places it upon its thighs, and shifts it from its thighs to its loins. So much says he. The Coran also shows that it feeds upon flowers, then turns this food in its stomach into honey, and then discharges the honey from its mouth and gathers it into its cells. The difference of the colour of the honey depends upon the difference of the Bees, and also of what they feed upon; its taste also differs according to the place where the Bee feeds. In providing for its means of living, when it finds a clean place, it constructs in it, its comb of wax first of all; then it constructs the cells which the kings are to inhabit; then the cells of the males, which do not labour at all, and are less in size than the females; they generally continue within the Hive, but if they fly, they go out altogether into the air, and then return to the Hive. The Bee makes the wax first, and then deposits in it the eggs, for this is the same to the Bee as a nest to a bird; and when it has deposited the eggs it sits upon them, and cherishes them in the same manner as a bird. The eggs then become white maggots; afterwards the maggot rises and eats, then afterwards it flies.

“It is the practice of the Bee when it sees any thing corrupt in the king, either to depose him, or to kill him; and generally he is killed outside of the Hive. The king never goes out except with all the Bees; if then he be too weak to fly they carry him. One of the peculiarities of the king is that

he has no sting to sting with. The Bees assemble together and divide the work; some make the wax, and some the honey; others bring water, and others again build their cells. Their cells are some of the most wonderful things in the world, for they are built in hexagonal form, as though they had been constructed by a geometrical rule. They are formed in hexagons, without any difference of sides; and when they are joined together they form one piece; for of all the figures, from the triangle to the decagon, the hexagon is the only one of which the sides will join one to another and form one piece. All this is done without any rule or instrument; and this is the sign of the art of a clever and skilful creature; or, indeed, it is rather a sign of inspiration, as has been said by the Most High God (here he quotes again the passage of the Coran above cited). Stop, then, and consider, and admire the perfect obedience of the Bees, and the beauty of their compliance with the commands of their Lord. How they build their houses in these three,—in the mountains, and in the trees, and in the materials wherewith men build Hives for them; for the Bees never build their houses at all in any other than these three; and consider, moreover, how their houses are generally in the mountains, which are the first mentioned in the verse of the Coran; then in the trees, which are the next mentioned; and, last of all, they make their houses in the materials wherewith men build Hives for them less frequently than in any other. Look, then, how they yield the beauty of obedience even to the taking their houses before they eat; for they take them first, and when they have established their houses they go out and eat of the fruits, and then come back to their houses; for their Lord, to whose name be praise, ordered them to take their houses first, and then to eat afterwards.”

Here follows an extract from Zamakhshari,\* very much

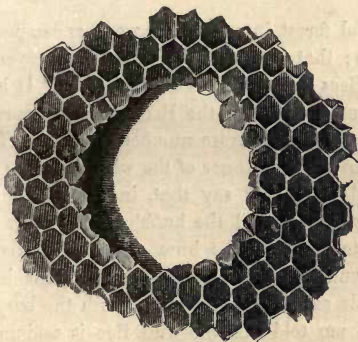
\* The celebrated Mahmoud Zamakhshari, surnamed Jar-allah, or the Neighbour of God, died A.H. 538. A.D. 1143.



like the preceding, from the "Wonders of the Creation," by Kazwini.\*

"It is the nature of Bees to rob one another, and to fight with one another, and to sting whosoever approaches the Hive; it often happens that the sting is fatal. When any one of them dies the living ones throw it out of the Hive. It is the nature of Bees to be very clean; for this cause they throw their dung out of the Hives because it stinks. They labour during the season of spring and autumn; but that which they make in spring is the better. The small Bees are more industrious than the large ones. They drink water when it is sweet and clear, and they go to search it wherever it may be. They never eat more than just enough to satisfy them; and when the honey in the Hive becomes scarce they sprinkle it with water, out of fear lest it should fail; for when it does fail they destroy the cells of the kings, and the cells of the males, and often kill all that they find there."

\* Zakariyya Kazwini, who has been denominated the Pliny of the East, died A.H. 682.





## A BEE HUNT.

THE beautiful forest in which we were encamped abounded in Bee trees; that is to say, trees in the decayed trunks of which wild Bees had established their Hives. It is surprising in what countless swarms the Bees have overspread the far West within but a moderate number of years. The Indians consider them the harbinger of the white man, as the buffalo is of the red man; and say that, in proportion as the Bee advances the Indian and the buffalo retire. We are always accustomed to associate the hum of the Bee-Hive with the farm-house and the flower-garden, and to consider those industrious little animals as connected with the busy haunts of men; and I am told that the wild Bee is seldom to be met with at any great distance from the frontier. They have been

the heralds of civilization, steadfastly preceding it as it advanced from the Atlantic borders; and some of the ancient settlers of the West pretend to give the very year when the honey Bee first crossed the Mississippi. The Indians with surprise found the mouldering trees of their forests suddenly teeming with ambrosial sweets; and nothing, I am told, can exceed the greedy relish with which they banquet for the first time upon this unbought luxury of the wilderness.

At present the honey Bee swarms in myriads in the noble groves and forests that skirt and intersect the prairies, and extend along the alluvial bottoms of the rivers. It seems to me as if these beautiful regions answer literally to the description of the land of promise, "a land flowing with milk and honey;" for the rich pasturage of the prairies is calculated to sustain herds of cattle as countless as the sands upon the sea-shore, while the flowers with which they are enamelled render them a very paradise for the nectar-seeking Bee.

We had not been long in the camp when a party set out in quest of a Bee-tree; and, being curious to witness the sport, I gladly accepted an invitation to accompany them. The party was headed by a veteran Bee-hunter, a tall lank fellow, in homespun garb, that hung loosely about his limbs, and a straw hat shaped not unlike a Bee-Hive; a comrade, equally uncouth in garb, and without a hat, straddled along at his heels, with a long rifle on his shoulder. To these succeeded half a dozen others, some with axes and some with rifles; for no one stirs far from the camp without fire-arms, so as to be ready either for wild deer or wild Indian.

After proceeding some distance we came to an open glade on the skirts of the forest. Here our leader halted, and then advanced quietly to a low bush, on the top of which I perceived a piece of honey-comb. This I found was the bait or lure for the wild Bees. Several were humming about it, and diving into its cells. When they had laden themselves with honey they would rise up in the air, and dart off in one straight line, almost with the velocity of a bullet. The hunters

watched attentively the course they took, and then set off in the same direction, stumbling along over twisted roots and fallen trees, with their eyes turned up to the sky. In this way they traced the honey-laden Bees to their Hive, in the hollow trunk of a blasted oak, where, after buzzing about for a moment, they entered a hole about sixty feet from the ground.

Two of the Bee-hunters now plied their axes vigorously at the foot of the tree to level it with the ground. The mere spectators and amateurs, in the mean time, drew off to a cautious distance to be out of the way of the falling of the tree, and the vengeance of its inmates. The jarring blows of the axe seemed to have no effect in alarming or agitating this most industrious community. They continued to ply at their usual occupations, some arriving full freighted into port, others sallying forth on new expeditions, like so many merchantmen in a money-making metropolis, little suspicious of impending bankruptcy and downfall. Even a loud crack, which announced the disrapture of the trunk, failed to divert their attention from the intense pursuit of gain: at length down came the tree with a tremendous crash, bursting open from end to end, and displaying all the hoarded treasures of the commonwealth.

One of the hunters immediately ran up with a whisp of lighted hay as a defence against the Bees. The latter, however, made no attack and sought no revenge: they seemed stupified by the catastrophe, and unsuspicious of its cause, and remained crawling and buzzing about the ruins, without offering us any molestation. Every one of the party now fell to, with spoon and hunting knife, to scoop out the flakes of honey comb with which the hollow trunk was stored. Some of them were of old date, and a deep brown colour; others were beautifully white, and the honey in their cells was almost limpid. Such of the combs as were entire were placed in camp kettles to be conveyed to the encampment; those which had been shivered in the fall were devoured upon



the spot. Every stark Bee-hunter was to be seen with a rich morsel in his hand, dripping about his fingers, and disappearing as rapidly as a cream tart before the holyday appetite of a school boy.

Nor was it the Bee-hunters alone that profited by the downfall of this industrious community. As if the Bees would carry through the similitude of their habits with those of laborious and gainful man, I beheld numbers from rival Hives, arriving on eager wings, to enrich themselves with the ruins of their neighbours. These busied themselves as eagerly and cheerily as so many wreckers on an Indiaman that has been driven on shore,—plunging into the cells of the broken honeycombs, banqueting greedily on the spoil, and then winging their way full freighted to their homes. As to the poor proprietors of the ruin, they seemed to have no heart to do any thing, not even to taste the nectar that flowed around them, but crawled backwards and forwards, in vacant desolation, as I have seen a poor fellow, with his hands in his breeches pocket, whistling vacantly and despondingly about the ruins of his house that had been burnt.

It is difficult to describe the bewilderment and confusion of the Bees of the bankrupt Hive who had been absent at the time of the catastrophe, and who arrived, from time to time, with full cargoes from abroad. At first they wheeled about the air, in the place where the fallen tree had once reared its head, astonished at finding all a vacuum. At length, as if comprehending their disaster, they settled down, in clusters, on a dry branch of a neighbouring tree, from whence they seemed to contemplate the prostrate ruin, and to buzz forth doleful lamentations over the downfall of their republic. It was a scene on which the "melancholy Jacques" might have moralised by the hour.

We now abandoned the place, leaving much honey in the hollow of the tree. "It will be all cleared off by varmint," said one of the rangers.

"What vermin?" asked I.

“Oh, bears, and skunks, and racoons, and 'possums. The bears is the knowingest varmint for finding out a Bee tree in the world. They'll gnaw for days together at the trunk, till they make a hole big enough to get in their paws, and then they'll haul out honey, Bees and all.”

*Washington Irving, Tour on the Prairies, ch. ix.*

## AN EXPERIMENT OF THE GENERATION OF BEES,

Practised by that great Husbandman of Cornwell, Old Mr. Carew of Anthony.\*

TAKE a calf, or rather a sturk (or steer) of a year old, about the latter end of Aprill, bury it eight or ten dayes, till it begin to putrifie and corrupt; then take it forth of the earth, and opening it, lay it under some hedge, or wall, where it may be most subject to the sun, by the heat whereof it will (a great part of it) turn into maggots, which (without any other care) will live upon the remainder of the corruption. After a while, when they begin to have wings, the whole putrified carcassee would be carried to a place prepared, where the Hives stand ready, to which, being perfumed with honey and sweet hearbs, the maggots (after they have received their wings) will resort. The gentleman in Cornwell, that practised this experiment, used hogsheads, or bigger wine casks, instead of Hives, and the practise of the Bee being to spend the first part of the summer in filling the upper part of the cask, and so still to work downwards: the gentlemans usuall custome was (through a door in the upper part of the cask) to take out what honey he wanted, without any disturbance to the Bees, whose work and abode then was in the lower part of the cask.

*Dr. Arnold Boate's Observations upon the Experiment of the Generation of Bees.*

I DID ever think that the generation of Bees out of the carcass of a dead calf, given us by divers of the ancients, but

\* See Preface, p. lii.

most amply and elegantly by Virgil in the fourth book of his Georgicks, had been a fiction, but am glad to find the contrary by your letter, which confirmed the same out of modern and English experience. And I would as little have thought, that Bees would have wrought in such vast Hives as hogsheads, whereas some of the ancients give us a caveat, even of the ordinary Hives, not to make them too large—*ne Apes anima despondeante ex desperatione implendi*,—least Bees should be discouraged out of a despair to fill them.—*Hartlib's Reformed Commonwealth of Bees.*



“ONE FACT HAS NOT, TO MY KNOWLEDGE, BEEN MENTIONED. THE FLOWERS OF THE PLANTS ABOUND WITH HONEY, WHICH THE NATIVES FREQUENTLY SUCK. THUS, SHOULD BEES BE INTRODUCED INTO NEW ZEALAND, AND I SEE NO REASON WHY THEY SHOULD NOT, THEY WILL FIND ABUNDANCE OF FOOD IN THE FLOWER OF THE PHORMIUM TENAX, AS WELL AS IN OTHERS. I MENTION THIS, IN CASE ANY ONE SHOULD BE DISPOSED TO TAKE BEES AS AN EXPERIMENT.”—*Honourable Henry William Petre on the Settlements of the New Zealand Company*, p. 69.

It seems to me that this is a lucky guess, which would entitle the clever writer of the book from which it is taken, to a pro-

phetic mantle, at least as stately as that of old Merlin. And how do I know that it will turn out as true as, or rather more true, than any of the far-famed Welshman's prophecies? Just for this good reason—because I myself intend to have a good try at bringing it to pass. I hope many a busy Bee will

“ Gather honey all the day  
From every opening flower ”

of *Phormium tenax* in New Zealand. There is enough and to spare, for Bees as well as men; so these new flower-suckers will not, if they get safe to New Zealand, which I trust they will, deprive one single man, who has the best right to all that is good in his native land, of the *sweet* occupation of sucking the *Phormium tenax*, or any other of the unnumbered and unnamed flowers. The Bees will do more effectually for them with their small proboscis what the natives now do for themselves with their large mouths. I hope a Bee will never be killed in New Zealand, for I shall start the native Bee keeper on the no killing way, and when they have learned to be kind to them, they will learn to be more kind one to another.

“ To Bee or not to Bee—that is the question ”—as Hamlet would have said, if he had been sensible enough to calm his wounded spirit by *taking* to Bee-keeping, instead of *taking* the poisoned foil. A Bee's sting is as sharp as any unbuttoned foil; but, as I said in my first Letter, the pain of a sting is a mere nothing, and the swelling goes off in a day. Bee keeping is a good thing to calm a sorrowful heart, so I think I can solve this question better than he did. In a former article of this Work, *you* have seen my notions—no dreamy ones, I believe,—of the way in which Bees may be put to sleep in winter. How those who are thus treated come out ready for harder work in the spring, than their fellows of other Hives, who have not enjoyed this state of hybernation—this state of what we may call true collegiate repose:—I call it collegiate repose, because they are all *collected* together at the *head* of the *Hives*. You have also seen, that the most intense

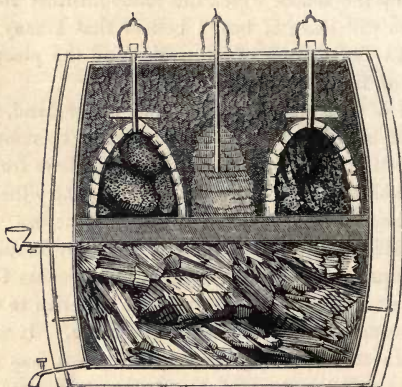


degree of cold, if it be not accompanied with moisture, is highly conducive to the health of Bees in winter. Such was Mr. Murphy's winter—such is every winter in Siberia. Now, more useful things are found out, by combining the knowledge of others than by presumptuously keeping ourselves perpetually on the stretch to start something new of our own. The world would never get on in this way if all men were so proud-spirited as this. As a disciple in the school of others, and above all, in the school which the schoolmistress Bee keeps for all who will learn of her, I believe that I may be able to confer on the natives of New Zealand the pleasure and the profits of Bees of their own.

The Bee of England, like the man of England, if he be but good of his kind, is, I think, surpassed by none in the world. I will not get Bees from India—nor Bees from South America—nor Bees from New Holland, but carry them direct from England, sixteen thousand miles over the sea. How is this to be done?—By putting them to sleep, by keeping them at a low temperature, by burying them, and keeping them dry. Ice has, I know, been carried from North America to Calcutta, in which passage it had to cross the line twice. It was taken for the purpose of packing fresh salmon:—it was not considered as a valuable part of the cargo; and yet, when it arrived at port, it sold for much more than the salmon which it preserved. Fresh salmon is not a necessary in India: ice is nearly so. The waste was, I believe, not great, and what melted was pumped out of the ship from time to time, together with the common leakage. The only care that was taken of this extraordinary cargo, was to keep the hatches closed and battened down, that the change of temperature might not affect the contents of the hold. The success of this scheme was entirely owing to the property of ice, in virtue of which, it conducts heat so slowly.

Now here is a diagram, showing, more clearly than I can do in words, the mode in which I intend to carry Bees to New Zealand; that is, to the furthest point of the globe. At all

events, I will try: I will take care that my Bees shall send word to their relations in England how they fare. They will have put a girdle round the world, though not in the space of a minute, as the faithful Ariel did—Bees surely are aërial creatures, though not of super-Bee power. I shall be fully satisfied if they arrive safely at New Zealand in five months, or even a little more.



The diagram is a vertical section of an old hogshead, which I have had fresh coopered, and the joints properly fitted. It is lined throughout with a coating of thick felt, which is, I believe, one of the best non-conducting things. The bottom has a pipe and tap to carry off the leakage, and is filled with broken crocks, that the drainage may be most perfect.—N. B. always fill your garden-pots with such crocks as these.—Plants, Bees, and Men all like to have their feet kept dry.—Man is often an ungrateful animal—but ingratitude is not the fault of Plants or Bees. The Plants will repay a gardener for his care by their healthy state:—the Bees, I trust, will

repay me by voyaging safe to New Zealand—Man alone gives a grumble or hard look to the kind doctor who tells him to keep his feet dry, and his head cool, if he wishes to be well; I wish he would take a lesson from the Bees or the plants. They both teach the same, as do all the sinless works of God.

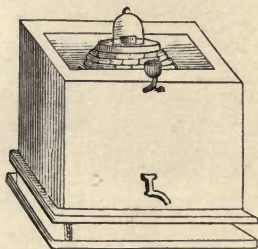
Now then to return to my Bees from this little side-path, in which, I trust, you have not been wearied;—if you have, let the prospect of some New Zealand honey revive you. As the ice melts away—as melt it will—though I trust two-thirds of it will safely cross the Line, I shall draw it off through the tap, and by measuring the waste every day, know how much I have left. When old Neptune comes on board to inquire the nature of our cargo,—of a surety the old marine *Ditty*, as I have heard him called, will, with his spouse, Mrs. Amphytrite, be strangely surprised to hear that we have a hundred thousand passengers on board—which is about the crew which will be shipped in ten Hives. Such a crew he never, I am sure, dreamt of before—and I should not wonder to see him fly across the sea in his watery car, when he hears that each and all of them are armed with a poisonous dart, far more piercing than his own trident. Now, without some care we should have a pretty mess of half-melted ice—Virgil would have called it *tabes*, if he had thought of carrying Bees to the undiscovered parts of the earth, where he says the sun is hotter than a fiery furnace—we should have had a pretty mess of this “*tabes*,” together with dead Bees and spoilt honey, if the Hives had been permitted to rest on the ice, and sink down with it as it melted. I have thought of this: and the same diagram represents a wooden frame, which is fixed firmly across the inside of the hogshead, about an inch above the ice. The Bees will be moved from their bottom boards on some cold November day, and securely tied, each in a square cloth of dairy canvass. The Hives will then be placed on the top of this frame, and well dried cinders, from which the moisture has been all baked out, will be poured in from above, till the hogshead is quite filled. By these means light and heat

will be both excluded, and the Bees will be put into a deep and long sleep; though I hope not an eternal one. But some one who doubts my success may say, "Your Bees will be stifled; they can get no air, and air is necessary to their life." I do not think so. A friend has written to me about some Bees which were buried last winter, and were not supplied with any air, but that which *was drained*, you may say, into them through the earth; and they, without air, lived passing well, exempt from all those evils to which unburied Bees are heirs to in the winter.\* But in order to give my Bees every chance of a long life and a happy one, as well as of a long voyage;—that I may not have the pain of seeing their carcasses dug out of the cinders on the shores of New Zealand, instead of having the joy of hearing their merry thankful hum as I remove the load which has so long lain heavy on them, when the balmy breezes of New Zealand, loaded with the scent of flowers long unvisited, and of fresh honey long untasted gradually wakes them, softly from their sleep;—that this pleasure rather than that pain may be mine, I have planned, what you will consider, as he of Halicarnassus would have called it, σοφὸν εὑρημα. Each Hive has a pipe leading from the outward air to its T hole;—this will supply fresh air. But you well know, that you cannot put any thing into a full bottle, except you first take something out. So I must remove the foul air before I can put any fresh in. How then is it to be got rid of? Why, by a pipe to be sure, leading also into the outer air, but, as well as the other, guarded by a piece of perforated zinc, that the foul air may pass out without allowing one single Bee to accompany it. This will carry away all dampness, as well as foul air; the Bees' breath may be condensed in an inverted bell glass, as described in p. 85, First Tract. It will then trickle down in the shape of water, just as the Bee-breath did in a long icicle from my Hive in the severe frost of 1838. Thus, I trust, my Bees will arrive safely at New Zealand; and their friends

\* See Winter Quarters, page 86.



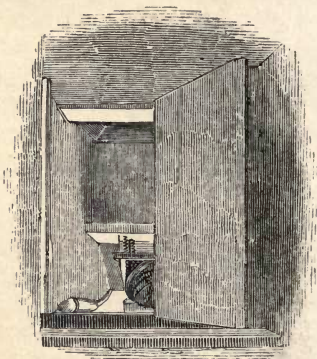
shall hear in a few months of their arrival, or, *absit omen*, of their death by sea-sickness.



In order to give myself every chance of getting some Bees, at least, safe to New Zealand, I am not going to confine myself to the ice method alone, but I shall try to keep one or two stocks cool by means of evaporation. The cut, aided by description, will make it plainer to you than words could do. The Hive is placed on a board resting on springs, that the motion of the ship may not disturb the Bees. Another I have suspended on gimbles, by the aid of which it will always remain quite upright.

A wall of water entirely surrounds the Hive. Fresh water is perpetually running in from the double case in which the Hive is placed, from the ship's cistern. The two cylinders of zinc, in which the Hive is placed, are open at the top, so that the water is exposed to the open air. A piece of rag, which will suck up the water, is laid between the two zinc cylinders. This will conduct the water on to the top of the Hives; evaporation will be always going on, and, as I believe, will keep the Hive so cool that the Bees will remain asleep. A few cinders will be also poured in between the Hive and the cylinder, to keep the Bees quite quiet. A pipe also will be

fitted to the T hole to supply them with air, just as I did to those in the hoghead.



Here is a cut of one of the Hives placed in the bath-room at the stern of the ship. The cylinder is supplied with water from the ship's cistern. I shall also take an Observatory Hive in my cabin; they, of course, will be affected by every change of temperature, so I shall feed them by putting glasses of honey over the holes at the top of the Observatory Hive.

I have given you one prediction touching New Zealand, and the way in which I trust it will be accomplished. Now follows another, which may interest you as much as the other has perchance amused you. Look at page 110, of that most interesting book, "Guesses at Truth." All who have done the good deed of buying "My Bee Book," where much is *guess* work, cannot do better than purchase two volumes of Guesses at Truth, one of which may well stand on each side of mine, to prevent my offspring falling into bad company.

These were the parting words of the Bishop of New Zealand to the inhabitants of Windsor, whom for the last two years he has taught to love him whilst he has filled the lowest office of the Church. By the Providence of God, his daily

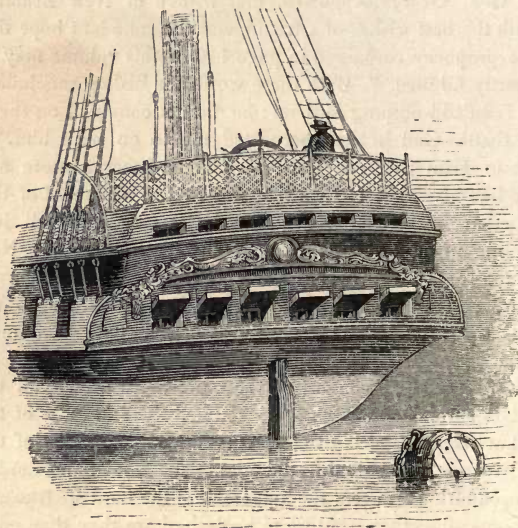
acts were parts of that discipline which has fitted him to mount at one step to the very highest. "But a few words more: I would not appeal to any false excitement; but I hold in my hand a book, which contains a few sentences couched in the form of a prophecy, which bear directly upon my present subject, and with which I will conclude. A friend, whose name I will not mention, one of my dearest friends—whose heart is as my own—and who, whilst he has heard me, has entered into the spirit of every word I have said, and could have carried my ideas out much farther than I have been able to do, sent me this volume with these words written on the title-page: 'To the Right Reverend Father in God, George Augustus, first Bishop of New Zealand, with the best wishes of a friend, and the confident hope that the prophecy contained in page 110 of this volume may be shortly fulfilled.'" With these words the Bishop concluded; and I can add nothing to them: he did not comment on them.

I thank God he has permitted me to go with him. I pray to Him that my spirit may daily become more and more like his—that He will bless us in the fulfilment of this prediction in His own good time. I trust you will join with me in saying, "God speed the Bishop, and the New Zealand Mission!" and pray Him to engrave upon your hearts, and what is more, help you by His grace to act upon these words of the Nineteenth Psalm, that most glorious picture of the wonders of creation—"The law of the Lord is perfect, converting the soul: the testimony of the Lord is sure, making wise the simple. The statutes of the Lord are right, rejoicing the heart: the commandment of the Lord is pure, enlightening the eyes. The fear of the Lord is clean, enduring for ever: the judgments of the Lord are true and righteous altogether. More to be desired are they than gold, yea, than much fine gold: sweeter also than honey and the honey-comb. Moreover by them is Thy servant warned: and in keeping of them there is great reward. Who can understand his errors? cleanse Thou me from secret faults. Keep

back Thy servant also from presumptuous sins ; let them not have dominion over me : then shall I be upright, and I shall be innocent from the great transgression. Let the words of my mouth, and the meditation of my heart, be acceptable in Thy sight, O Lord, my Strength, and my Redeemer."\*

Farewell ! and God bless you, and all my readers, together with me, the unworthy writer, who desires your prayers.

\* Verse 7—14.







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