THE BEE-MASTER's COMPANION, AND ASSISTANT.

Wherein is set forth the propereſt Methods of managing thoſe Inſects, ſo as they may turn out to the beſt Advantage. Shewing an effectual Way to preſerve them from Famine, Cold, Robbers, Mice, or other Enemies: alſo how to make all your Hives equal in Bees, ſo as never to have any weak Hive; with an Account of the Power the working Bees are inveſted with, of raiſing any Egg in the Hive to be a Queen, when the Community ſtands in Need of One.

By JAMES BONNER,
Bee-Maſter, Auchencrow, near Berwick upon Tweed;
Author of Practical Warping made Eaſy.

I am come to bring them into a good land, a land flowing with milk and honey.
He ſpake alſo of beaſts, and of fowls, and of creeping things, and of fiſhes. ANCIENT HISTORY.

B E R W I C K:
Printed by J. Taylor, for the Author; and ſold by him, and Mr. Neſbitt, Bookſeller, Berwick; and Mr. Nealſon, Bookſeller, Haddington.

MDCCLXXXIX.

Bts.

65 / 50

May 9, 1861.

TO

ALEXANDER RENTON,

OF LAMBERTON, Esq;

THIS Treatise is most humbly dedicated as a Testimony of Thanks and Gratitude, for his encouraging the Publication of this Work; and other Favours received from him,

By his

most humble Servant,

JAMES BONNER.

THE

PREFACE.

THE writer of the following pages has been almoſt from his infancy an admirer of bees. When a boy at ſchool learning to read, he uſed to read with delight the promiſes made to the children of *Iſrael* concerning the land of *Canaan;* eſpecially when it was ſaid to be a good land, a land flowing with milk and honey. When appointed by his father to watch his bees in ſwarming time, he eſteemed it a happy employment, and thought he was in a kind of paradiſe when running among the buſhes and ſeeing the bees ſwarm. When very young he purchaſed three hives, and ever ſince has had a pretty large ſtock, and taken particular delight in ſtudying and working about them for near twenty years paſt; in which time he has peruſed all the authors in the *Engliſh* language he could come at, and tried multitudes of experiments upon them.

He is alſo very ſenſible that there are a great many treatiſes on bees already, and that they contain a good many uſeful obſervations and directions; but he is alſo certain that they are defective and even erroneous in many points; and that the culture of bees in this country has never arrived to near that degree of per-

fection they might, in case they were properly understood and reduced into practice. Were we to consider the vast millions of melliferous flowers which perfume the air in the honey season, particularly the white clover, which justly bears the major part in many of our pasture lands; and the mustard of all kinds which is interspersed among our corn fields, together with the vast quantity of flowers in large heather muirs. It may justly be said, how large and good is our pasture, and where are our flocks to feed on them.

Bees are well worth our care and attention, for their honey and wax is beneficial to the health of man. Their wax also is now become the greatest supply of light in polite assemblies, and thereby is become a considerable article in commerce. Bees when properly managed, bring to their owner yearly a considerable profit, and that without either rent or tax, and with little attendance.

The culture of bees, says one, is a branch of rural œconomy, the more valuable as it is within the reach of the poorest cottager; it requires not plowing, manure, cattle, nor rich meadows. The whole that is wanted is an attendance which may be given by the meanest, and that but for a short time, in this respect it is really reaping without sowing.

Certain it is, if bees were properly managed in this country, for every hive we have we might easily have a score. The principle reason hives are so thin and far between in this land, is the want of a proper knowledge of them; particularly Bee-masters in setting aside their stalls, they

they often keep such hives for them that have neither a sufficiency of honey nor bees to preserve them from cold, robbers, and famine till *June*; and if their hives fall a prey to these enemies, as too often they do, they draw a wrong inference, and conclude that bees will not thrive with them, and the owners immediately consider if they have fallen out with some wrinkly browed old woman, or suspect they are not in good blood with witches and fairies, being loth to impute their loss to their want of management; they cannot endure that assertion of *Cardinal Richlieu*, that imprudent and unfortunate are two words representing the same thing: therefore they say, that at best they are but precarious goods, and often never try them more; whereas the alone cause of their ill luck was their own bad management in keeping bad stalls. Again if a hive of bees takes any dis-thriving in winter, spring, or summer, they can do nothing to make her thrive again; but if they will take the directions in this book, they will see in page 22, 23, 85, how easily they may be made to thrive again.

Our seasons being very precarious in this country, thereby many of our swarms in some summers cannot lay up as much provision as will supply them till the return of the next summer; but it seldom happens that a Bee-master cannot select as many good hives out of his own apiary as will supply him for stalls. For example, supposing in one parish there are ten Bee-masters, each of whom keeps three stall hives in *September*, which are thirty stalls in all: the next summer happens to be a remarkable bad

bad one, much cold and rainy weather, ſo that of all the thirty ſtalls there will be few ſwarms; and the whole ten Bee-maſters one with another can only ſet aſide thirty ſtalls again, by which their ſtock will be nothing increaſed. However they probably will have got ſome light hives, which will perhaps recompenſe them for their labour, and by which they will ſtill be no loſers as they paid no rent.

The next ſummer goes on the other happy extreme, and is very warm with ſoft ſhowers now and then, and the thirty ſtalls with their ſwarms in harveſt are perhaps increaſed to about ſeventy, ſixty of which are fit for ſtalls; but taking our ſummers at an average, a good ſtall will ſwarm once, and be good herſelf ſtill; and if you ſmoke one of them for your uſe, ſhe will have 20 lb. of honey, which is no ſmall gain to be got with ſo little trouble and almoſt no expence.

In order to make as much of bees as we can, I would adviſe that in every village there ſhould be at leaſt twenty ſtalls, and in every ſtead ſix, and where there is a large diſtance between villages, ſix hives may be ſet within a quarter of a mile from one another, as directed in page 73.

From all which we may ſee how eaſily our number of bee hives may be increaſed in this country.

It may alſo be obſerved that what honey bees collect from flowers, do not injure them; therefore it may be ſaid to be money made out of nothing.

If the directions given in the following pages are properly taken and practiſed, it is hoped that the

he increaſe of bee hives and honey in this country will be more extenſive than formerly, and that every *Briton* may be ſupplied with the honey collected from the flowers of his own farm or neighbourhood, which will agree better with his conſtitution, than that which requires his caſh to bring from foreign countries, ſome of which is ſcarcely palatable.

The author not having the advantage of a grammatical education, hopes the candid reader will overlook miſtakes of that kind, and any inaccuracies of language.

THE

THE

CONTENTS.

Chap.

ER.

E R R A T A.

Page 51. l. 9. for Drones read Bees.
Page 73. l. 11. after Mr. read *Stephen.*
Ditto l. 27. for twenty read two.
Page 106. in the note, after ſtalls read except the three that were 30 lb. wt.
Page 155. l. 30. for 100 read 1000.

THE

THE BEE-MASTER's COMPANION, AND ASSISTANT.

CHAP. I.

OF THE PLEASURE AND PROFIT THAT ATTEND THE KEEPING OF BEES.

BEES, thoſe emblems of virtue, have been the ſtudy and delight of wiſe men, and have employed the ableſt pens in many nations, and in different ages.

We find, in the ſacred writings, the land of *Canaan* ſpoken of as a good land; and as a proof of its being ſo, it is ſaid, it was a land flowing with milk and honey.

Among the ancients, *Ariſtomachus* contemplated them for the ſpace of fifty-eight years; and *Philiſcus* retired into woods, that he might have more convenient opportunities of obſerving them: *Ariſtotle*, *Virgil*, *Pliny*, and *Xenophon* wrote upon them. Among the moderns, I ſhall juſt only mention *Purchas*, *Rouſden*, *Geddie*, *Butler*, *Warder*, *Bradley*, *Thorly*, *Thomas* and

Daniel Wildman, *Stephen* and *William White*, and *Keys*, all *Englishmen*, and *Robert Maxwell*, a *Scotchman*, all of whom have published treatises on them; the most part of which have appeared within this century: and they have given many directions how to manage Bees, according to the knowledge they had arrived at about them.

But the knowledge of Bees, as well as of other things, arrives by degrees; and may be truly said to be yet but in a state of infancy, as appears by the many erroneous points taught by those who have wrote on that subject: notwithstanding their boasted knowledge and large promises in their title pages, as a Complete Guide for the Management of Bees, &c. they have all been strangely misled in their opinion about the generation of Bees, in asserting that the Queen lays three different kinds of eggs, *viz.* one kind to be a Queen Bee, another to be working Bees, and a third to be Drones; which is a mistake, as shall be made appear in the following sheets.

We shall begin with the pleasure and profit that attend keeping Bees, which are the only motives to excite rational creatures to engage in any business.

What is pleasanter than to see a hive of Bees in spring, when the days begin to lengthen, and frost and snow, like birds of darkness, cannot bear the sun? Then these industrious creatures begin to fly about, and dance and sing, rejoicing at the return of the season: then they reform what is amiss in the hive, and as their family is increasing, they omit no opportunity of gathering in fresh provision for their increasing young. How delightsome to see them hurrying

rying in their yellow loads, in summer! In the honey-season, how diligent to lay up provision for the returning winter! View them in this clover-field, and yonder flowery mead, see how throng they work, and hear how sweet they sing! it is very pleasant to see a swarm of Bees flying in the air, and afterwards forming a young colony on a bush, and increasing their master's stock: and even in harvest and winter, in fine days they make a melodious sound.

Bees, when properly managed, are very profitable, which adds greatly to the pleasure of the poor, as they are rent and tax free. In good years one hive will throw two swarms, in middling years one, and in bad years perhaps some will swarm none at all: but I shall just estimate by moderate years, and allow each hive, one with another, to swarm only once, which value at fifteen shillings, twenty stalls will yield their master fifteen pounds yearly;—no small sum to be got with so much pleasure, and little toil: they will yield that much, although one or two should die in winter. None need think my estimate too high; if their stalls be good, they will have that much one year with another. In summer, 1787, many a one made thirty, and some forty shillings of one single stall; and last year I sold a hive to a neighbour of mine in *March*, and I saw him have five hives out of her in *August*, and he has kept four of them for stalls.

CHAP. II.

SHEWING WHO MAY KEEP BEES, AND THE PRINCIPAL FLOWERS BEES FEED ON.

READER, whoever you are, if by the above chapter you are now inclined to become a Bee-maſter, you will perhaps want to be informed if ſuch as you can have an opportunity to keep Bees, and have paſture for them. I anſwer, if you have any property of your own, or can make intereſt with any friend or acquaintance, to ſet a hive in; and can only ſpare fifteen ſhillings or ſo, to purchaſe a hive at firſt, all is anſwered; for by the laws of this land, all paſture, however good, is common to every man's Bees: and *Mortimer* obſerves, "That there is no fruit nor flower, no wood "nor foreſt, no hill nor dale, no fruitful nor "unfruitful ſoil, but what affords them matter "to work upon *;" and indeed all parts wherever I was, I have ſeen heavy thriving hives of Bees in town and country. It is hoped none will underſtand me in ſuch a light, as if I meant all parts were alike good for Bees to thrive in; very far from it: for although they will do well in all paſtures, and fly far for food, yet they will thrive far better when they are in the midſt of good paſture, and ſet in a good ſtance; which

* Art of Huſbandry, p. 191.

which leads us forward to ſhew what is good paſture for Bees.

Experience has taught us that Bees are very fond of ſallows, gooſeberry-buſhes, whins, kail, or colworts of all kinds, turnips, broom, and plane-tree, all flowering before the middle of *May:* in *June* comes the garden-muſtard, wild-muſtard, runches, and white-clover, all of them excellent for Bees to work on, and alſo laſt till harveſt: in the end of ſummer, and beginning of harveſt, are rag-weed, heath, flax, hemp, and a great many flowers in late meadow-grounds; but the principal of all theſe flowers for honey, are the muſtard, runches, white-clover, and heath; off any of which, if a good hive be near them fourteen fine days, ſhe will fill herſelf full of honey and wax.

There is a great variety of other flowers which bees work on, ſuch as ſnow-drops, hazel, crocuſes, oſiers, primroſes, violets, daiſies, pinks, lilies, poppies, beans, and all kinds of fruit-trees, fitches, elders, aſh, yellow-gowins of all kinds, thiſtles, dock, alders; in ſhort, I know no flower they will refuſe when they cannot do better, but when a choice is denied them, like the poor among mankind, they chearfully feed on a coarſer diet; but give them their own choice, and they will let you know how little they eſteem gaudy trifles, when put in balance with things that are ſolid and good; for they will ſkim over our fineſt gardens and beautifulleſt flowers, (as below their notice) and dart eagerly upon their beloved runches, clover, and heath.

CHAP. III.

OF HONEY DEWS.

WHAT the honey dew is, is disputed among the learned. According to the ancients, it was an efflux of air, a dew which fell upon flowers. The moderns say, it is rather a perspiration of the finest particles of the sap in plants, which evaporating through the pores, afterwards condense upon the flowers *.

I shall give Mr. *Key*'s account of it in his own words, which seems to be pretty fair, and is as follows:

"The honey dew is not a liquid deposited by "the air on the leaves of plants, as is generally "supposed; for then, like other dews or fogs, "it would fall on, and adhere to, all sorts of "plants indiscriminately, whereas, it is found "only on a *few* particular plants; and on them "but partially, for the young leaves afford "none.

"The oak, maple, sycamore, hazel, and "bramble, are, as far as I can find, the only "plants on which it is found. Neither is it dis-"covered, like other dews, early in the morn-"ing; but some hours after the sun has shone "with its greatest splendor, that is about ten "or eleven o'clock; and continues, more or "fewer

* Nature Delineated, p. 190.

" fewer hours, in proportion to that ſplendor. " For cloudy dull days are incompatible with " honey dews. This ſubſtance is as tranſparent " and as ſweet as honey, and is, in fact, perfect " honey, attracted through the pores of the " leaves, by a peculiar [illegible] heat; particularly " when reflected through clouds. Sometimes " it is found on the leaves in the form of little " drops or globules. But at other times, being " more diluted by the greater moiſture of " the atmoſphere, it covers the leaves, as " though they were ſpread with a fine ſyrup.

" The time in which theſe honey dews are ge- " nerally found, is from the beginning of *June* " to the middle of *July*. But it will vary in " proportion as the weather is wet or dry; " which will occaſion them to be either ſooner " or later. The hotteſt and drieſt ſummers, " produce the largeſt and moſt frequent honey " dews. In cold and wet ſeaſons, few or none " of them are to be ſeen. When the year is " backward in its fruit, it betokens that the " honey dews will be late alſo; ſometimes, even " ſo late as the middle of harveſt.

" *Butler* has a remarkable obſervation upon " this ſubject: Honey dews, he ſays, were in the " year 1617 produced two months after the u- " ſual time. There having been a long conti- " nuance of wet weather, no honey dews were " found until the latter end of *Auguſt;* which " proved exceedingly hot. But the quantities " were ſmall and of little ſervice. For the " ſtocks when taken, proved light: and moſt " of the ſtocks and ſwarms that were kept, " died for want, before the end of winter; ex-

" cepting

" cepting only in the heath countries; where " the heath being then in full flower, afforded " the Bees that plenty of honey which could " not be obtained from the honey dews.

" Whenever a honey dew is found, the Bees " are so extremely eager to fetch it, that they " quit all other work, that their returns may be " the quicker and more numerous; and lest a " gloomy change should deprive them of the " precious prize. No harvest swain, dreading " impending storms, can be more anxious, or " expeditious, in hastening the housing of his " crops, than these aerial tribes in this their de- " lightful office; so much so, that thronging in " too great numbers at the door-way, they jostle " and tumble each other down. And smart- " ing woe to those who shall thoughtlessly stand " in their way at this important crisis! Their " joy on these occasions, is expressed in such " incessant and loud notes, as to be heard at a " great distance. By these tokens it may be " known there is a honey dew, without seeing " the trees from which they gather it.

" The Bees of such apiaries as are far distant " from those plants that produce honey dews, " cannot collect near the quantity that those " can that are near. Gardens in particular, " seldom furnish plants of this sort.

" A very surprising source of honey was ob- " served by the Abbé *Boffier* in *France*. This " he tells us, the Bees collected from the excre- " ment of a small insect called a *Puceron*, vul- " garly a louse, infesting the bark of some par- " ticular trees; such as holm-oak and the lime. " In the middle of summer they furnish the

" most

" moſt of this excrementitious ſweet: in the " autumn (though that is the time the Bees " have moſt need of it) but little, and of infe- " rior quality to honey gathered from flowers.

" As I was ignorant whether any thing of " this kind had ever been noticed in *England*, " and as there are both oak and lime trees on " my premiſſes, I have from year to year, very " attentively obſerved them; but could never " perceive any ſuch appearances as deſcribed " by the Abbé; I muſt therefore leave this " matter to be aſcertained by ſome one who " ſhall be more ſucceſsfully inquiſitive."

I have ſeen Bees carry honey dew from plane-tree, though very rare. An acquaintance of mine informed me, that he has ſeen Bees on oak-trees, working very faſt, and ants at the ſame time creeping all over the tree, and eating the honey dew as faſt as the Bees; which agrees nearly with the Abbé *Boſſier*'s account of it in *France* *. Some writers believe, that when the liquor which the Bees collect, has been for ſome time in their ſtomachs, it comes from thence changed into true honey; the liquor having been there properly digeſted, and rendered thicker than when it entered. Others are of opinion, that the Bee makes no alteration in the honey, but collects this delicious ſyrup juſt as nature produces it, and firſt fills her bag, and then diſcharges it into the magazine: which laſt is the truth, as I know for fact, by my own experiment; for I have often taken a Bee from the flower ſhe was gathering on, and pulled her aſunder,

* Wildman's account of Bees, p. 80, &c.

aſunder, to ſatisfy myſelf on that point, (although with the greateſt reluctance) and found the fineſt blab of honey in her bladder, as large as a pea, exactly the taſte of the fineſt honey, and alſo the colour of the honey which that flower produced. I have catched them on runches and clover, and the honey in their bellies was white honey; thoſe I catched on heath, their honey was high-coloured, exactly the taſte and colour of heather-honey; beſides it is no time in their bellies, for as ſoon as they are loaded, they hurry home, and pour it into their cells.

One thing obſervable is, that whatever flower a Bee lights on firſt, ſhe always continues to work upon the ſame kind of flowers, till ſhe is loaded, although ſhe ſhould be obliged to fly over better kinds of flowers, and even to ſome diſtance: but as there is no general rule without exception, if they cannot do better, they will make up their load of ſome other flower.

CHAP. IV.

THE KNOWLEDGE OF BEES, NECESSARY TO A PROPER MANAGEMENT OF THEM.

IT is neceſſary that every one who commences Bee-maſter, ſhould have ſome degree of knowledge about them; owing to the want of which many one loſe their Bees entirely; and then they will tell us, it is not every one Bees will

will thrive with; which in ſome ſenſe is true, for they will not thrive with thoſe that underſtand them not, neither will take a moderate care about them; no more than good corn can be expected to grow, if the farmer knows not how to labour his ground, and minds not whether his ſeed be good or bad.

I ſaid, ſome degree of knowledge about them, for it cannot be expected that every one who may have Bees, can underſtand them perfectly; as none ever will, unleſs by good information, great ſtudy, and long experience. And I have often thought that the only method to learn to manage Bees, is juſt the ſame way we take to learn any other thing eaſieſt, and that is by ſeeing it done, for example is eaſier than precept; but as yet that is not the way of learning the management of them in this land; perhaps it may be ſo in times to come, if ever Bees be improved in ſuch a manner as they might and ought to be.

Therefore I ſhall mention ſome of their nature and properties, and point out their diſeaſes and enemies, and ſhew how to guard againſt what is prejudicial to them, and inſtruct to manage them ſo as to turn out to good account; giving directions how to order them in a plain, ſafe, and eaſy manner, which may be practiſed by new beginners, and thoſe who may not be fit to venture on higher projects.

I ſhall alſo give directions to thoſe who are arrived at ſome perfection in the managing of them, and ſhew them various methods, which are highly profitable when performed in a right manner; only I give this caution by way of

preliminary,

preliminary, that people must beware of being too rash in trying schemes about them, till they understand, and can handle them middling well, lest they make the cure worse than the disease, and find to their smart that every one is not fit to be a Bee-master; for I speak it by experience, that although I spared no expence to get myself properly informed about them, yet I hurt many of my hives in my first attempts in trying experiments; but now I have arrived at that degree of managing them, that I have now no bad hives at all; for whenever they take any dis-thriving whatever, I immediately put them to rights, and make them thrive again: the way I do will be taught in its proper place.

CHAP. V.

GENERAL OBSERVATIONS ON THE NATURE AND PROPERTIES OF BEES.

WE shall go forward to take a view of their nature and properties in general: Almost every one knows that there are three different kinds of Bees in every hive, *viz.* the Queen Bee, commonly so called, the working Bee, and the Drone. Certain it is that Bees were created at first along with other creatures, and that from them all the Bees that ever existed have sprung, (whatever whimsical frolic might enter into *Virgil*'s head to the contrary, who alledges, by certain methods used, they will spring from the corruption of other creatures.)

Bees

Bees are of a hot nature, and heat is the very life of them; when they are in the hive, in company, or flying about, they are quick and agile, and fit for buſineſs; but in a cold day, when a Bee is ſeparated from its fellows, it ſoon chills and turns motionleſs, and if not recovered with heat in a day or two, real death enſues. Every hive of Bees is a diſtinct commonwealth, that lives in the ſtricteſt friendſhip, and perfect peace and harmony among themſelves; for they work for all, they watch for all, and fight for all.

They are not ſelfiſh in their aims, but ſtudy the public good. Indeed ſometimes there will be ſome commotions in a hive of Bees among themſelves, when there are two contending princeſſes for the crown, but this is a rare caſe; but though they are peaceable among themſelves, they are profeſſed enemies to all other Bees, and alſo to every other creature.

They are a warlike, heroic, and valiant people: whoever they are that dare preſume to come too near their caſtle, to interrupt their buſineſs, or diſturb their peace; though an *Alexander*, a *Cæſar*, lion, or bear, all one to them, they will point their poiſonous ſpears, and ſound an alarm for war, and attack them in a moment; will neither take nor give quarter, but conquer or die; and ſuppoſe they be knocked down, they no ſooner recover, than they are at blows again: one can ſcarcely forbear laughing to ſee how thoſe little malicious imps, little bigger than a ſnuff, can have the audacity to attack our noble ſpirits, and daring ſons of *Mars*, and give them battle, and make them run ſcreaming

off, tearing their hair, and rubbing their eyes, crying for help in such a panic, as they never dare affront them more.

They are very cleanly, and love to have every thing neat about them, abhorring all filth and impurity; when the cold permits them to quit their warm parlours and dining-rooms, then they set about reforming every thing that is amiss, they mend their waxen partitions, bury their dead, scour and sweep their streets and floors, plaister their walls in the inside, stop up every crevice to prevent the access of cold or vermin, set centinels at their gates, empty themselves in flight. They also live upon the finest food, the purest nectar, as they extract it from the flowers, hating adulteration or mixture, satisfied with the produce of their own industry. "In painful profitable labours, sure no creature "can be more constant and indefatigable, and "no less chearful are they herein, than con- "stant; they have a natural inclination hereto, "and nothing is more odious to them, than "sloth and idleness: labour is their very na- "ture and greatest pleasure; an hungry or a "thirsty man doth not eat or drink with great- "er delight, than these admirable amiable crea- "tures follow their appointed works and em- "ployments: this is their beloved province, "and now they appear to be in their proper e- "lement. With the greatest satisfaction and "admiration, have I frequently beheld them "most faithfully, and as chearfully, discharging "their several offices, without losing the least "opportunity: restraint at such a season would "make them impatient, and confinement would

"be

" be an intolerable punishment. It is to these " their united, most earnest, and constant la- " bours, their prosperity and riches are princi- " pally owing; *the diligent hand maketh rich* *.

They omit no opportunity of doing good; they in the day time work by the light and heat of the sun, for when the sun opens the flowers, and exhales the sweets, then they are keen and eager on work, and hurry in and out of their hives, and deposit their honey in the first empty cell they come at, and to the fields again, and improve their time and opportunity: (they are not like those inverters of nature, who pretend to have full as much wit, who lie in bed when the great candle of nature is shining around them, and rise precisely when it is half burnt; and after it is done, set up their own twinklers, to the injury of their eyes and health) but when night, or a cloudy, or rainy day comes, then they transport the honey they (in their hurry) threw in the warehouses or kitchen, into the most inaccessible principal rooms, and barrel and seal it up secure, where it will keep safe for their use a long time; and in the night they build combs, and gnaw all projecting straws from the inside of their hive, filling the magazines with honey, or sealing the cells and young up, killing the Drones, &c.

A Bee-hive is a commonwealth, of which every individual is a senator, a soldier, and a mechanic. She is governed by laws which every one approves of, and yields chearful obedience to; no

 parliamen-

* The History of Bees, p. 23.

parliamentary diſcords among them, no inteſtine wars, no arbitrary demands, no extorted obedience. She is a nation that holds no correſpondence, nor carries on any traffic, with any other. Every individual in the hive ſtudies the common good; they know not what it is to have poor among them, for they keep a common table, well furniſhed with wholeſome food, the fruit of their own induſtry, to which all have alike free acceſs, when need requires. They are temperate in diet, no gormandizers or drunkards among them (the Drones excepted); decent in apparel, wearing always home-ſpun gowns, and thoſe always neat and clean. Every one of them is in the top of the faſhion, both as to colour of apparel, and mode: they are not like the gaudy butterflies; neither do they employ dyeſters to colour their clothes; perhaps they think that a diverſity of colours would make them unfaſhionable, and at the ſame time make their clothes neither wear longer, nor ſhelter them better. The more rich they are, the keener they are on riches; and the more numerous, the keener on increaſing their numbers. But in caſe their hives turn ſo full of Bees and honey, that they cannot get more room to ſtow honey in, then rather than be idle, they will rear up a young Queen, and ſend off a colony with her, and ſo conſtitute another hive; but after this, the mother-hive and her daughters will be as bitter enemies to each other, as if they had never ſeen other. They will receive none to their dominions to join with them, unleſs they come in an humble ſupplicating manner, proclaiming a truce of peace, as they ſurround

round and enter their gates; and alſo come without a Queen: ſometimes they will receive them then as fellow-labourers and brethren, and ever after love and cheriſh each other. They are true to their word, for if once they paſs it as friends, they never break it again.

Bees have a quick and an extenſive ſmell; by it they will find out any honey, if within their reach, or flowers, though at a great diſtance. Some have thought it is by their ſmell they light on a flower, and know a ſtranger Bee. Others have ſaid that bad ſmells are very diſagreeable to them, and that they ſhould not be placed near them, elſe they will not thrive. I never ſaw much evil done by bad ſmells, unleſs in their hives; they will work among ſtinking gutters, and places where urine is ſhed, and uſe pitch and tar. If one be ſtung by a Bee, the reſt immediately ſmell the poiſon, and come enraged, and fly and purſue the wounded, and give him ſome more of the ſame, if his feet be not ſwift enough to carry him off from their territories.

They are very quick of hearing, for you can ſcarcely give their hive the ſmalleſt touch, but they will ſound again all over their hive. And when a Bee, having loſt its way home, with ſome difficulty has gained its door again, it will make a humming noiſe for joy; and if any other be ſeeking the way about the entry, its humming will call it home. Of all their ſenſes their ſight ſeemeth the weakeſt, ſays *Butler*, and weaker when they come home loaded, than when they are empty; and when loaded, their ſight is weaker when on foot, than when flying.

If when they come home loaded, they alight beside the door, they will go up and down seeking for it, as if they were in the dark; and unless they hit upon it by chance, they must fly again before they can find it. As many as fall beside the stool when it waxeth dark, ten to one they lie abroad all night: on this account it is that before they fly abroad, they take such pains at the door, in rubbing and wiping their glazen eyes, that they may the better discern their way forth and back again.

Bees are not all alike as to their nature; some are of a gentle and mild disposition, so as any thing may be done with them. I once took off six swarms of six different hives in one forenoon, and did not receive above two stings in all. *Columella* informs us, that the ancients distinguished several kinds of them: he joins in opinion with *Virgil*, who approves of those which are small, oblong, smooth, bright, and shining, of a gentle and mild disposition; "for," continues he, "by how much the larger and rounder the Bee is, by so much the worse it is;" but if it be fierce and cruel, it is the worst of all. The angry disposition of Bees of a better character is easily softened by the frequent intercourse of those who take care of them, for they grow more tame when they are often handled.

The time of the day, and state of the atmosphere, has a great influence on the temper of the Bees. The same Bees will be angry and hostile in the morning before they work any, and pacific in the height of the day, and angry at night again. Bees which are of the mildest

kind

kind (for there is a great difference) are commonly the beſt, and ſhould be always choſen, if a choice can be obtained. They are eaſily known, for by turning up a hive, if they are of the mild kind, there will few or none of them come running down to the under edges of the combs, but give a little buz with their wings, and never mind you much; as they mean no hurt, they dread none. But thoſe of the angry kind, as ſoon as you turn up the hive, will come running to the extremity of the combs, and fly fiercely about your face and head, and vent their ſpite at you.

The ſtate of the hive alſo ſours or ſweetens their tempers: the fewer Bees in a hive, the fiercer they are; and thoſe that want a Queen are very cſurliſh. The more Bees in a hive, if they have proper room to work, the better; and 16000 Bees in one hive, will gather far more honey, than if they were divided into two different hives, with 8000 in each; for as the proverb is, many hands make light work.

The fewer hives of Bees in one place, they will thrive the better; not ſo much becauſe they will get more food, but becauſe there will be fewer robbing Bees to diſturb them. However a good hive of Bees ſcarcely ſuffers any by robbers.

If a hive of Bees in ſpring be well ſtored with honey, and but very few Bees, and robbers attack her, and ſhe be prefer[illegible] removed, a mile or ſo, from any other Bees, ſhe will ſoon recover and thrive well; whereas if ſhe ſtand among other [illegible], they will ſoon kill all her Bees, and take off her hone[illegible]

Feeding

Feeding Bees is madneſs, and ſhould never be done, in harveſt or winter: to ſet aſide weak hives in harveſt, is next to throwing money away; with this difference, that throwing money away, is only attended with the loſs of it, whereas weak hives are loſt in winter or ſpring, after a deal of trouble and care about them.

Weak hives die of cold, famine, and by robbers; and if one of a dozen come through with great care and trouble, they ſeldom turn out to any account next year.

Good ſtalls ſet aſide in *September*, bid fair for a great deal of profit and pleaſure next year, and little toil; but in ſwarming time, fine warm weather is beſt for Bees, with ſoft ſhowers now and then: when there is a good crop of corn, it generally is a good year for Bees.

Bees will fly a mile or two for food, and ſometimes farther; for I have ſeen Bees working on clover, and heath, and runches many times, and not a Bee-hive within four miles of them; but the nearer the better, for ſet a ſtrong hive in the midſt of a white-clover field, ſhe will fill herſelf full in a few days, if the weather is good.

Early places is beſt for Bees, for they breed the ſooner, and fill their hives, and ſwarms ſoon, and commonly work as long as later ſituations: for the weather generally turns cloudy in *Auguſt;* ſo they all give over work much about the ſame time. The chief breeding months is *April*, *May*, *June*, and *July:* the honey harveſt is little more than *June* and *July*. Sometimes they will make honey in *May* and *Auguſt*, if the flowers be throng, and the weather fine.

Bees

Bees when they begin to build, lay the foundations of their combs at the top of their hive, and work downward.

I juſt this very day, being the 10th of *November*, have been ſeeing one of my hives carry yellow loads; and I turned her up, and had the pleaſure to ſee more than three hundred cells ſealed up, and young Bees in every one of them; hatching very finely, as if it had been the month of *April*. As ſhe had plenty Bees, and I had one hive had not ſo many by the half, I took her off her ſtance, and ſet the one that had few Bees on it, and turned up the ſtrong one, and gave her ſeveral raps on her ſides, and took a weed and bruſhed the Bees off the combs, and they flew thick to their old ſtance, and run roaring into the weak hive, and ſhe received them in a friendly manner. I ſet down the ſtrong one, in the weak one's place, and ſhut her cloſe up round and round, admitting very little air, to keep her warm for ten days, to hatch out her young the better; for I have oft ſeen maggots go backward in their cells, in cold weather, although never mentioned by any writer, nor any common Bee-maſter that ever I ſaw. Both the above hives are the better by what I have done to them, the weak one I am ſure would have died of cold, having very few Bees, and the other breeding ſo faſt, might probably have died of famine, if they had been in the hands of many Bee-maſters; whereas now they are both ſafe from cold and famine.

I did the ſame with other two hives a week ago, and not one of them made any fighting. I very often reinforce weak hives in this manner,

both

both in ſummer and winter. The method of doing it is ſimple, and eaſy; not one of twenty will fight much. Many hives I did that way laſt year, and though I had thirty ſtalls laſt winter, I had not one dead; for whenever any one turned few in Bees, I reinforced her: and though it is thought by many, when I ſay that it is their own blame, that their Bees die, that I arrogate too much to myſelf, when I ſay I let none of mine die; it is not ſuch a miraculous work as they think: all I do, is when a hive turns few of Bees, and thereby is likely to die of cold, or by robbers, I give her a good number of Bees, and then ſhe is as ſtout as the beſt of them, and they who dare touch her will find themſelves quite miſtaken.

In caſe a hive loſe her Queen, which but rarely happens, I put either another Queen to her, or a royal cell, or ſome new laid egg, which of them I can get beſt at; if a Queen can be got, I put her to the hive firſt, the royal cell next, and an egg is the laſt ſhift: then if a hive is like to ſuffer by famine, I blame myſelf for that, for being ſo fooliſh as to have kept one that had not enough of food to bring her to *June*. However I am obliged to make the beſt of an ill bargain I can, and give her honey-comb plenty, which baffles famine.

What a pity it is to ſee thouſands of hives die in *Britain* every year by cold, famine, and robbers; and many by mice! when by a little attention, not one in thirty need be ſuffered to die: whereas I believe the fourth part dies yearly, one year with another, from the above cauſes.

Some

Some tell me, I may as well say I can preserve my own life, or the life of a beast, as say I can preserve a hive from dying! The case is no way parallel—a beast has only one life, and when it is out, it can by no means be put in again. But when the one half of the Bees in a hive dies, the other half is alive still; and add another half of Bees to them, they will be as vigorous and as young as ever: whereas let them alone with only their one half of the Bees the cold or age has left, then they are not able to preserve themselves from another cold storm, or a flight of robbers, but fall before them.

CHAP. VI.

THE HISTORY OF THE QUEEN BEE.

THE Bee called the Queen, so far as ever I could observe, has no sovereignty over the rest of the Bees. The form of government in a hive seems not to be monarchical, but a democracy; nor am I singular in this opinion; for both Monsieur *Reamur* and Mr. *Keys* are of the same mind. As a proof of what I assert, I have oft seen, when Bees swarm, the greatest part of them out of the hive, and lighted on a bush, before the Queen had left it; and when she did, she went directly to them. And if you spread a swarm on a sheet, and place an empty hive at any corner, the nearest Bees, whether commons or Queen, run directly to it,

and

and all the reſt follow. It is true indeed the common Bee will not ſettle in an empty hive without the Queen; neither will the Queen without the commons. The argument uſed by Mr. *Thorly* of there being but one Queen permitted to live in a hive, which he thinks amounts to a demonſtration of their government being monarchical, has no weight with me; becauſe one mother is capable to lay eggs enough to keep the hive full of Bees, and there is no need for any more. He advances alſo in ſupport of his opinion, that the commons of a hive expreſs great joy at the reſtoration of a Queen, after having loſt one: but it appears to me, their joy ariſes from their receiving a mother capable of perpetuating their ſpecies in the hive, and ſo keeping it from coming to ruin; which would infallibly ſoon happen, unleſs ſhe had been reſtored, or an egg to breed one, which is the ſame thing: but a hive could not ſubſiſt long without a mother, ſuppoſe ſhe had a magiſtrate. He ſays *, "Without a preſident or "ruler, they will do no manner of work, nei-"ther gather wax nor honey, nor other mate-"rials." I anſwer, a hive of Bees will work regularly, if they have even a new laid egg in the hive, to breed a Queen of; which muſt be twenty days before ſhe come out of the cell; I aſk who rules and governs them thoſe twenty days? However as it would be of little conſequence to alter her name; we ſhall ſtill give her the appellation of Queen Bee.

The

* Page 35.

The Queen is eaſily diſtinguiſhed from the other Bees by the form and colour of her body; ſhe is longer and larger than they are, and her wings are much ſhorter than theirs in proportion to her body; for the wings of both commons and Drones cover their whole bodies, whereas thoſe of the Queen ſcarce reach beyond her middle, ending about the third ring of her belly: her hinder part is by far more taper than thoſe of other Bees: her belly and legs are yellower than the common Bees: and her upper parts are of a much darker colour than theirs. She alſo has a ſting, contrary to the opinion of ſome writers, who may have been induced to think ſhe has none, becauſe ſhe is extremely pacific: one may handle and teaze her as much as they pleaſe, yet ſhe never draws her ſpear for vengeance; nay, I never could provoke her to do it, nor could ever ſee her ſting, but when I preſſed her. The wiſe Orderer of nature diſpoſes her to be of a peaceable temper; for were ſhe hoſtile in her diſpoſition, and drew her ſting on every affront, and left it in her antagoniſt, it would be of dangerous conſequence to the hive; as every Bee that leaves the ſting dies ſoon after; I know not if they live two days. In her deportment ſhe is ſolemn, and calm. A young Queen is a deal leſs than a full grown one, being not much longer than a common Bee, and is not ſo eaſily obſerved when ſought for. When three or four days old, ſhe is very quick in her motions, and runs very faſt; but when ſhe is pregnant with eggs, ſhe is very large, her body is heavy, and when travelling, ſhe drags

along in a very slow manner, and is not so very fit for flying. It is necessary every Bee-master should know the Queen, as sometimes it may be of great advantage to him: the readiest way to know her is to get a sight of her from some acquaintance, if it can be obtained; or search for her among some small swarms of Bees by the above description.

It has been disputed by many authors whether the Queen bees are males or females. The ancients, with some of the moderns, are positive that they are males, alledging that government is most natural by the males; and that the seed cast into the cell by them is sperm, and not an egg. The bulk of the moderns maintain, with weightier reasons on their side, that they are females.

The matter cast into the cells by the Queen appears (say they) to be an egg, and not sperm, from these reasons, viz. its being always of the same size and colour, and covered with a thin membrane; whereas it cannot be affirmed that the sperm of man or beast is always of the same quantity, and covered with a membrane.

We shall now consider the Queen as to the manner of her birth, and from what she proceeds: and in the first place, she proceeds from an egg, as do all the other Bees; but writers differ as to what kind of egg it is. Almost all agree in this, that the Queen lays a particular kind of eggs appropriated to the production of other Queens; and that without a royal egg be laid in a royal cell before the departure of the old Queen, (suppose there should be never so many common eggs) the hive would never have

have a Queen-breed, and consequently come to ruin. The author of the Natural History of Bees says, 'I have drowned several hives, the 'swarms in which could not be forced out by any 'means, and after examining all the Bees attentively, I ever found that there was but one single mother, and that this was the old one; 'the eggs or maggots of the young Queen-bees 'having, I suppose, been destroyed by some accident*.' Mr. *Keys* on that head says, 'that 'the gentleman might have taken a common 'egg, and placed it in a royal cell, and that a 'young Queen had been afterwards produced, 'I will not dispute; for there might be a Queen 'already in the hive unperceived by him, which 'might lay a royal egg in that cell, the working 'Bees having first taken away the common eggs. 'Let this be as it will, in practice it can be of 'no consequence or use, as he acknowledged 'that a common egg must be deposited in a 'royal cell. To do this the Bees must be 'drove, and some combs cut out; in the 'performance of which a real royal egg may be 'destroyed, and the rest of the young injured: 'the operation itself is likewise troublesome†.'

(As a particular knowledge of the Queen is very necessary in order to a right management of Bees, I hope the reader will excuse my prolixity on this subject.)

I shall quote Mr. *Debraw*'s doctrine on this head, as mentioned in the Universal Dictionary, when explaining the word Bee; he having

* Page 322. † Page 12.

found two Queens in a glass twenty days after a small swarm was put in it. He says, 'I conjectured that either two Queens, instead of one, 'must have been left among the Bees I had 'placed under that glass; or else that the Bees 'could, by some particular means of their own, 'transform a common subject into a Queen. In 'order to put this to the test, I repeated the experiment with some variation. I got four glass 'hives blown flat, which I thought preferable to 'the bell-shaped ones I had used before, as I 'could with those better examine what was going forward. I took a large brood-comb from 'an old hive, and after having divided it into 'several pieces, I put some of them, containing eggs, worms, and nymphs, with food, 'viz. honey, &c. under each of the glasses; 'and confined within each a sufficient number 'of common Bees, among which I left some 'Drones, but took care that there should be 'no Queen. The Bees finding themselves without a Queen, made a strange buzzing noise, 'which lasted near two days; at the end of 'which they settled, and betook themselves to 'work: on the fourth day I perceived in each 'hive the beginning of a royal cell, a certain 'indication that one of the inclosed worms 'would soon be converted into a Queen. The 'construction of the royal cell being nearly accomplished, I ventured to leave an opening 'for the Bees to get out at; and found that 'they returned as regularly as they do in common hives, and shewed no inclination to desert their habitation. But, to be brief, at the 'end of twenty days, I observed four young

Queens

'Queen's among the new progeny. On relating 'the result of these experiments to a member 'of this university, well conversant in the na- 'tural history of Bees, he deemed it necessary, 'that they should be repeated, in order the 'better to establish the truth of a fact seemingly 'so improbable, that the eggs destined by na- 'ture to produce neutral or common Bees, 'should be transformed into females or Queens. 'He started an objection, that the Queen Bee 'of a hive, besides the eggs she deposits in the 'royal cells, might also have laid royal or fe- 'male eggs either in the common cells, or in- 'discriminately throughout the different parts of 'the hive. He further supposed, that in the 'pieces of brood-comb, which had been suc- 'cessfully employed in the last experiments for 'the production of a Queen, it had constantly 'happened that one or more of these royal eggs, 'or rather the worms proceeding from them, 'had been contained. But the force of his ob- 'jection was removed soon after by the same 'success having attended a number of other 'experiments, an account of which would take 'up too much room here; and he was at last 'brought to admit, that the working Bees are 'invested with a power of raising a common 'subject to the throne, when the community 'stands in need of a Queen; and that accord- 'ingly every worm of the hive is capable, under 'certain circumstances, of becoming the mother 'of a generation: that it owes its metamor- 'phosis into a Queen, partly to the extraordi- 'nary size of the cell, and its particular position 'in it; but principally to a certain nourish-

'ment appropriated to the occasion, and carefully administered to it by the working Bees 'while it is in the worm state, by which, and 'possibly other means as yet unknown, the de'velopement and expansion of the germ of the 'female organs, previously existing in the em'bryos, is effected; and those differences in its 'form of size are produced, which afterwards 'so remarkably distinguish the Queen from the 'common working Bees. And finally, it ap'pears evident, from the experiments made by 'Mr. *Schirach* and myself, that the received opi'nion, the Queen lays a particular kind of eggs, 'appropriated to the production of other Queens, 'is erroneous. I shall now beg leave to point 'out the advantage that may accrue to the pub'lic from these observations, which is that of 'forming artificial swarms or new colonies; or, 'in other words, of furnishing the means to 'bring on a numerous increase of those useful 'insects: an object of some importance to this 'kingdom, as being the only means to prevent 'the annual exportation of considerable sums 'the purchase of wax, a great quantity of which 'is lost every season for want of keeping up a 'sufficient stock of Bees to collect it.'

'The practice of this new art, Mr. *Schirach* 'tells us, has already extended itself through '*Upper Lusatia*, the *Palatinate*, *Bohemia*, *Bavaria*, '*Silesia*, and even in *Poland*: in some of these 'countries it has excited the attention and pa'tronage of government, and even the Empress 'of *Russia* has thought it of such importance, 'that she has sent a person to *Kleen-Botzen* to

'be

'be instructed in the general principles, and 'learn all the *minutiæ* of this new art.'

Long before I had the account of Mr. *Debraw*'s experiments, I had often taken off swarms, and left no Queens nor royal cells in the mother hive, and yet they would breed young Queens, which surprised me much, how they had got them, as the received opinion was, they could not breed one if the old Queen was taken away before the hive had a royal cell: after seeing his sentiments on that head, I thought it told very well; and resolving to be certain as to that point, I made many experiments of my own in swarming time, and they all succeeded to my wishes: but in order to put it beyond all dispute, I shall relate one experiment I made with a hive this spring, full two months before the usual swarming time. I had a hive that was beginning to carry well and breed fast, but was not half full of Bees, and had only one Queen, but neither Drone nor royal cell; neither of which could be expected at that time of the year, being about the middle of *April:* I took out her Queen and the most part of her Bees, and left the old hive with only some common Bees, to provide themselves with a Queen, and hatch out the brood in the cells; they did not disappoint me, for as soon as the melancholy news were known in the hive, that their loving mother was torn from them, they mourned for their great loss for the space of two hours; but a general

* Mr. *John Debraw*'s Phil. Trans. Vol. LXVII. Page 15, &c.

a general council being called, the moſt experienced ſages among them reaſoned to this purpoſe: 'Whereas our mother, and many of our 'brethren, have been moſt cruelly and unexpectedly torn from us in ſuch an unnatural way, as 'has neither left us a young mother, or a pregnant mother cell, as we have commonly when 'we ſend off a colony by our own deliberate 'counſel; had a few of our beloved brethren 'been only taken from us, the loſs would have 'been but trifling, as our mother being among 'us, could ſoon have repaired our loſs again; but 'our beloved mother being gone, never to return, and as at preſent we have no pregnant 'mother cell, if we continue a very few days in 'this mournful inactive caſe, all our eggs will 'ſoon turn common Bees, after which, by no 'power of ours we can ever expect a mother 'again, and all we who are paſt the flower of 'our days will ſoon die of age, and thoſe of our 'beloved brethren will become a prey to cruel 'invaders, or being few in number, will die a 'lingering death by cold.——But though our 'caſe be bad, it is not deſperate, as we have 'among us new laid eggs, which, we all know, 'by building a mother cell about, and adding 'proper nouriſhment, we can raiſe a mother Bee 'again. Let us fall heartily to work, and build 'mother cells about one of thoſe eggs which 'you ſee at the edge of that comb, in the middle of our hive, which will be warmeſt.'

Whether the counſel was given in the ſame words, or whether ſome addition or diminution might be made, I will not poſitively ſay: in general it appeared to be taken by the whole

common-

commonwealth; for at the end of two hours after the Queen's capture, the Bees fell briskly to work, and wrought smartly for two days, (as their manner is in such a case) some forming the royal cell, and some putting a large quantity of whitish and thick liquid stuff into it, not unlike cream; and at the end of three days their royal cell was fairly formed; and the rest of the Bees sealed up the common Bees' cells, and all were throng at work ‡. On the fifth day I saw the royal cell well enlarged, and a great deal of the aforesaid white stuff in it, almost as much as a woman's thimble would hold; and and a white maggot lying on the top of it. On the seventh day the Bees sealed it up *: on the seventeenth day there came forth out of the royal cell a young Queen †, and on the twenty-fourth day the young Queen laid eggs again, and on the thirty-first day they were sealed up, and on the forty-third day there came out of the

‡ Instead of idleness, confusion, and sorrow, (as mentioned by *Thorley* and *Keys* in such a case) consideration and reformation take place, with the greatest assiduity and labour to put all to rights again. Another proof that they can advise about public matters without a Queen to preside.

* Mr. *Keys*, who is a keen advocate for royal eggs, (p. 12.) will in his next edition inform us where the Bees got this royal egg, when there was nothing but common eggs in the hive when the Queen left it.

† Mr. *Daniel Wildman*, nephew to *Thomas Wildman*, is widely mistaken, when he affirms that a royal Bee is five or six weeks in hatching.

the cell a new set of young again §. At the same time, the middle of *April*, I did the same with other two hives, and they both succeeded the same way. I shall just mention shortly one further experiment:—I took the Queen and the most part of the Bees out of a hive which had no royal cell nor drone in her; and in nineteen days she had a Queen, and the twenty-fifth day she laid eggs; and then I took the young Queen out again, and left the old hive with some new laid eggs in her; and eight days after she had a sealed up royal cell again, which I directly took out

§ I shall insert a paragraph of Mr. *Keys*, wherein he shews his ignorance respecting both the Queen and Drones. Paragraph 12, he says, "But this surprise "will be greatly heightened, by reflecting upon a fa- "culty still more wonderful, *viz.* that of appearing "to be endowed with a power of keeping in her body "eggs that have been impregnated several months "before; or (which amounts to the same) the seed "of the male, capable of vivifying the eggs at the "time of their exclusion: for though the Drones, "who are the males, are seldom suffered to remain in "the hive longer than the middle of *August*, yet the "Queen still continues to lay eggs, and produce "young, not only in autumn, but also in the next "spring, until *March* and *April*, in great abundance, "all by virtue of the autumnal impregnation." Mr. *Keys* says, "It is surprising and wonderful:" so it would be, were it true: but as he is so fond of wondering, I suppose by this time I have given him something to wonder at; and that is how my young Queen was impregnated by the males (as he calls them), seeing they were all dead seven months before she was bred, and she never saw any till six weeks after, and those were produced from her own eggs.

out of the hive again, and then she had neither Queen nor eggs, but I took a piece of comb with eggs in it out of another hive, and fixed in her again, and she immediately built another royal cell.

Some drone-pleaders may perhaps say, that suppose there were no drones in the hive when I took their Queen from it, that there might be eggs laid in drone cells, which would come forward to be drones assoon as the young Queen, and so impregnate her, and make her fit for breeding; but the contrary is the fact, for when the old Queen was taken out of the hive, there was not an egg in one drone cell: if there had been any such thing, I would have seen the Bees sitting upon the drone cells or comb, which they did not, as they did on the common Bees' cells, and the royal cell: besides I turned the hive up every two days, during the whole forty-three days, in order to see how long they were in building the royal cell, and sealing it up, and how many days it was before an egg became a Queen, and how old she was before she laid eggs, and how long they were before they became common Bees; besides I wanted to be assured whether a Queen needed the agency of the drones in order to become a mother, and I often turned the Bees over and over in the hive, with a small stick, searching for drone cells, and drones, but no such thing was to be seen till six weeks after this young Queen's birth, when she laid eggs in drone cells, and then the hive had drones; and as the above experiment was repeated again and again, it makes an entire evidence and a certain proof (and I affirm)

affirm) that the common Bees can raise any egg in the hive to be a Queen, when the community stands in need of one. The way they do is this, they make choice of a common cell with an egg in it, and put in some white stuff (with their mouths) of a thickish substance *, and begin

* Mr. *Thorley*, page 96, says, "That it is really "peculiar, and very different from that gross matter "which is employed in nourishing the other young, "I cannot but conclude, from what I have found and "taken out of the royal cell, of a very different kind "and quality, being of a gummy glutinous nature, of "a deep red transparent, and would rather dissolve "and melt in the fire, than crumble to powder." I also have dissected a royal cell that had proved abortive, after the Queen had received something like her form, but had gone back again, (for what reason I am not certain) and found that red matter in them (mentioned by *Thorley*) not unlike sugar-candy, as large as a pea, but of a hard tough substance, which would not break, but tear asunder, and no way tasted like honey. I have conjectured that perhaps this red matter, contained in those royal cells, which always proved abortive, might not be proper nourishment for the young Queen, and the Bees had not taken their usual way in placing it there; for though in general they work uniformly, yet not always; for example, take out a common brood-comb, and look in it, and you will plainly see common young maggots in the form of a semicircle, some with their middles uppermost, others with their middles undermost, and some with their extreme parts undermost, and others uppermost, and scarcely two lying in the same position: and look into a hive and you will see the combs built parallel from the entry, other some of a semicircular form: again some hives build their royal cells indiscriminately in the hive, some in the middle of a comb,

gins to build upon the edges of the cell, and enlarges it; so that on the third day it appears fairly on the outside of the comb in the form of (and may now be properly called) a royal cell. On the fifth day, the cell being well enlarged, and a great deal of the said stuff in it, the royal maggot appears in the form of a semicircle, great at the middle and small at every end, not unlike a new moon, swimming on the top and in the midst of the said stuff in the cell; and on the seventh day it is sealed up.

During this time it undergoes various changes; for a day after it is sealed up, being the eighth day, I have opened the cell, and found the maggot on the top of the white matter, (so often mentioned) and have taken it in my hand, and shewn it to some of my acquaintance, and it would have moved a little time, although no more like a Bee, than a turnip, being a gross white maggot. On the seventeenth or eighteenth day comes forth a pretty Queen Bee. Also I affirm from the aforesaid experiments, that the Queen Bee is capable of becoming a mother without so much as seeing a drone; and that the doctrine of all those (almost every

E writer)

comb, others on the sides, ends, edges, &c. and in some hives the drone-combs are in the middle, others at the edges of the hives; some hives have only half a drone-comb, others a whole one, and other some two. However as a conjecture I pass it; but this I affirm, that every royal cell which brings forward a Queen, (and not one in twenty misses) is filled with the very same kind of white and thick matter, resembling thick cream, as aforesaid.

writer) that affirm the Queen cannot breed without the agency of the drones or males, as they call them, is a mere fancy sprung up in their over-heated brain.

As to the use and employment of the Queen; in the first place, she is the alone mother in the hive, and a hive would soon come to ruin without her; like a nation that were all the females killed or banished out of it, although there were thousands of legions of men in it, every one knows it would soon be without inhabitants: the case with respect to a nation of Bees is exactly parallel, for if one had a hive full of Bees without a Queen, or an egg to breed one of, a few months would put a period to all their lives. The Queen is capable of laying eggs five or six days after her birth, and lays only one kind of eggs, and not different kinds, as writers have conjectured; and I own that the sound of one kind of eggs being raised either to be a Queen, or common, or drone, as the Bees think fit, is not so easily heard by some ears: but wherein does it sound softer, in asserting that the Queen can lay three different kinds of eggs. I do not pretend to account for it in a philosophical manner, but I shall only offer my humble opinion on that subject.

First, it is plain to every one that ever saw a Queen Bee's eggs, that as they come from her, they are the identical bigness and colour, and covered with the same membrane, although laid in different cells, as in common, drone, or royal cells; and that the change that takes place among them, may rationally proceed from these two causes, viz. the difference of the cells, and

different.

different kind of nourishment put in by the Bees: and the eggs as depofited by the Queen, in whatever cell, is neither Queen, common, nor drone, if I may be allowed the expreflion; but if the common Bees think proper, when they find an egg in a common cell, they put in fuch nutritive matter as they know will make it a common Bee; or if they want it to be a Queen, they enlarge the cell, and put in fuch nutritive matter as they know will nourifh it up to be a Queen; or if they find an egg in a drone cell, they put in fuch matter as will nourifh it forward to be a drone: and fo it would feem that nutritive matter, together with the kind of cell, is the thing that determines the kind of Bee; after which, adding a proper heat, it appears in due time fuch a Bee as they intended it to be; and in this cafe they have a power above any creature I know, and that is to make their eggs into any kind of Bees they pleafe; their eggs differ widely from the eggs of any fowl I know of, becaufe the kind of creature it is to be, is contained in the egg as foon as laid, and it needs no nutritive matter to nourifh it, nor could it abforb into the egg; all that it needs is a due heat to nourifh it forward.

That the working Bees, and none other, put in that matter, clearly appears from the beforementioned experiment, *viz.* that when there are new laid eggs in a hive, and neither Queen nor drone in it, yet the common Bees can nourifh up thofe eggs to be either Queens, commons, or drones, as they fee fit. What kind of matter this is is not fo eafily known; whether of a generative nature, or a kind of food, is the query:

if we say this matter is of a generative nature, then it must be sperm, and those that put it in must be males, and that those males must have three different kinds of sperm in them, *viz.* one kind to make eggs common Bees, and another kind to make eggs Queens, and a third to make eggs drones; and that at all times every Bee has those three different kinds of sperm at command to throw into any cell he pleases, which is contrary to the received opinion, which is, that the male of mankind and beast have only one kind of sperm, and not always power to eject it; besides it is put into the cell by the mouth of the Bee, and no sperm comes from that part.

There has been much dispute among writers on this point. *Thorley* says, it is that stuff which the Bees carry on their legs, mixed with water by the Bees: it does not appear to me, seeing it has neither the taste nor colour of that stuff. He says, that it is confessed by all hands, that the Bees do not breed till the flowers furnish them with proper food for the young fœtus, and they are seen to transport this matter daily to their hives. I must differ from him and all hands that confess that, for I have often seen the contrary: for instance, last *December* I had a hive which had new laid eggs in her, and cells new sealed up, in great numbers, and hatched them out young Bees; and it is no new thing, for I have seen the like in the middle of winter, and time of a storm, a dozen years ago; and I have seen some of my hives that I feed in winter build new combs, and breed young in them, and yet had carried in neither the said stuff nor water, as there were no flowers for them to work

on,

on, and had they gone for water, they behoved to light on ice, and they would ſeen how they got off it again. If the ſtuff they carry on their legs be uſeful for feeding young Bees in the cells, then thoſe bred in winter muſt be nouriſhed with that in the hive, which they gathered in ſummer.

Mr. *Debraw* ſays *, 'It is a whitiſh liquor put 'in by the poſterior parts of the males, or little 'drones' (as he calls them). That there is a whitiſh liquor put in the cell I grant; but that it is put in by ſtingleſs Bees, or little drones, I flatly deny; as alſo the aſſertion that there are ſuch things in being as little drones, or two different kinds of them; as ſhall be fully demonſtrated when treating of the drones ſeparately.

The Queen, as granted by all, (*D. Wildman* excepted †) lays all the eggs in the hive, as may be proven by the following evidences:

I. Hun-

* Univerſal Dictionary, Word *Bee.*

† *D. Wildman* maintains a very wild whim, one of his own framing; he has the honour to be the firſt venter of it, and it will certainly continue his own. He aſſerts, as quoted by Mr. *Keys*, ſection 17. that "the "opinion of the Queen being the general parent of "the whole ſtock is abſolutely without foundation. "He further ſays, that the common Bees couple to-"gether I make no doubt, though privately, and a-"part by themſelves: though they never were ob-"ſerved, (I add, never will) yet they certainly apply "themſelves to that buſineſs ſecretly, (within the "hive, or elſe abroad where there can be no wit-

 "neſſes)."

I. Hundreds have seen her lay eggs in common and drone cells.

II. None ever saw common Bees or drones lay eggs.

III. Take a Queen out of a hive, and ten days after take out all her royal cells, and she will never have another egg in her.

IV. If a hive want a Queen one month, she will never have an egg more in her, though she have never so many common Bees; but by giving her a Queen again, she will directly lay eggs, and the hive breed again. She lays eggs without the agency of the drones.

She is very prolific. *Swammerdam* beheld in the ovarim of a Queen-bee 5100 eggs at one time; and *Reaumur* says, that in 24 hours she lays 200 eggs, and that in the space of three weeks 6000 Bees are brought to perfection. Neither need this be thought incredible, if we consider that some cod-fish have had to the number of 9,344000 eggs in them *. Her prolificness

"nesses)." This hasty begot child will have few to patronize it; if its father does not strangle it soon, it will die of its own accord: Mr. *Keys* has lent it some lusty blows already, and wherever it comes it is sure to meet with the like treatment: its safest course is to stay with its father, unless it wants its own ruin, and his folly exposed.

* Nat. Delin. p. 130.

neſs ſeems to depend on the ſtate of the hive ſhe is in; and I have been apt to think that the increaſe of a hive ſcarce ever fails on the Queen's part; for in the four breeding months, *April*, *May*, *June*, and *July*, if the weather is good, all Queens breed ſurpriſingly faſt, if they have plenty of common Bees to nouriſh their eggs forward; and if you have a hive that by reaſon of few Bees does not breed faſt, if you add a large quantity of common Bees to her, ſhe will increaſe as faſt as any: yet it cannot but be allowed that there muſt be ſome more fruitful than others; though it is ſeldom a hive ſuffers by that cauſe. It is quite a miſtake, as has been already noticed, that bees breed only at ſuch times as they carry flowers to feed the young with; for many hives breed in the midſt of winter; yet it muſt be granted that they breed far faſter in times when they carry.

If Bees had not a power of raiſing an egg to be a Queen when they ſtood in need of one, how precarious would a hive of Bees be, if we conſider how tender an inſect a Queen Bee is, and how many accidents may befal her! If ſhe ſhould, when out taking the air, meet with any misfortune, ſuch as being trod under foot, or devoured by Bee-eaters (of which there are many), or chilled with cold, or by lighting at another hive, or by any other accident, then the hive would be directly ruined.

Again, if we conſider the large quantity of Bees in a hive at harveſt, (ſometimes 12000) and that hive reduced to 500 in *March* by cold, old age, &c. and yet the Queen then healthy: in ſuch a caſe, there is 24 dead for one living.

How-

How ready would we be to wonder how the Queen had been preserved! And many times I have seen a hive in spring, and not 100 Bees in her besides the Queen: and once I saw a hive with a Queen and only two Bees in her; and I scarcely ever see a hive want a Queen, if she gets fair play: the reason which appears to me why they are preserved so well is, because they are always in the safest part of the hive, being in the very midst of the Bees, so that the cold, robbers, or any other enemy cannot get at them till all the other Bees be destroyed.

But it appears to me that the principal reason of their preservation and continuation is, that the hive is seldom without eggs in her throughout the whole year, though generally they want them in *November* and *December*, yet not always. And as they have almost always eggs by them, if the Queen dies, then they can repair their loss in twenty-five days; for an egg can be raised to be a Queen to lay eggs in twenty-five days.

From what has been said it may be easily seen how a hive comes to want a Queen so seldom. And the reason why she ever wants one at all is, when a Queen dies, and there is no royal cell nor new-laid egg to make one of; then the ruin of that hive is inevitable, unless the owner lends his helping hand. I have thought that if the Queen should fall sickly, and no eggs in the hive, then the Bees must be in a very melancholy case, as there is nothing between them and ruin but the life of a very sickly Queen; and if she dies in such a critical juncture, when they have no eggs, then their hope is lost. I suppose that is the case with

those

thoſe hives which are deſerted by their Bees in winter, and yet have a deal of honey left in them; for it is a very rare caſe for Bees to deſert a hive when they have a Queen. Sometimes indeed I have had Bees deſert their hives in ſpring, when their honey was done, although they had young in their cells; but I never knew them to do that but one ſpring, when I had five hives that did it, and I often wondered how it happened, as they uſe commonly to die of famine when their honey is done.

The Queens are bred generally in ſwarming-time, as may be ſeen by turning up a hive at that time: there the royal cells preſent themſelves to view upon the edges or ſides of the combs; they are of an oblong and circular form when half made, not unlike the lower part of an acorn turned upſide down; and when ſealed up and finiſhed, near an inch long, and not unlike one's little finger end, if it wanted the nail, to look at. In ſwarming-time there will ſometimes be from one to ſix of theſe royal cells in a hive, though generally but two or three.

Many times in harveſt, when top ſwarms are taken, there are royal cells ſeen in them, which Queens had been bred in ſince they were ſwarms; it is probable the old Queens had come off the mother hive along with thoſe ſwarms, and had turned aged and infirm, and the young ſwarm had provided themſelves with young ones, as long as they had eggs to make them of.

I can account no other way for the ſucceſſion of Queens than this—when a Queen turns aged, the Bees conſider that if they do not improve

their

their time, and raise one of her eggs to be her successor, as long as she lays them, that she may soon either turn barren or die, and what will become of them then? therefore they perhaps have some instinct, and know about the time their mother will die, and that it is now time for them to provide for themselves; but if the daughter happen to be born before the mother's death, I know not how they will do in that case, whether they will have any natural affection to their infirm mother, as knowing she will not trouble them long; or whether she will share the fate of the poor drones:—I fear the worst. The sixth *October* last, I saw at the entry of one of my top swarms a dead mother, all torn about the wings; I was jealous they had not given her fair play for her life: she was a last year's Queen, for I brought her off with the said swarm.

I think a Queen lives about fourteen or fifteen months; for three or four of my own artificial swarms, their Queens died about the middle of *September*, and they were old Queens when I swarmed them in *June*, I suppose they were a year old when I swarmed them, and the Queens that took up house with their mother hive in *June*, 1787: or in other words, in *June*, 1787, a new hatched Queen came off with a swarm naturally, and set up house with them; and in *June*, 1788, was taken out of her hive with a new swarm again, and continued in her and laid eggs till *September*, 1788; at which time she being old and infirm, the Bees raised up one of her eggs to be a Queen, to succeed her; after which birth she was suffered to die

of

of age, or ſlain by her own children, as now uſeleſs, and not for any more public good.

When the Queen lays her eggs, ſhe puts for a moment her head into the cell where ſhe deſigns to lay them; if ſhe finds the cell empty, and there is not in it either honey, egg, or any embryo; ſhe turns herſelf immediately to introduce the poſterior parts of her body into the ſame cell, and ſinks into it, till ſhe touches the bottom, and then lays her egg, which is very ſmall, about half a line long or little longer, yet four times longer than it is big, a little more pointed at one extremity than the other, and planted by its leaſt extremity on the baſis, or the ſolid angle of the cell. This egg is formed of a membrane, thin, white, ſmooth, and full of a whitiſh liquor. After the pregnant Bee hath laid an egg in one cell, ſhe immediately goes to another, and lays in it the ſame manner, and ſo on, and will ſometimes lay a good many at a time. The egg continues three days in the ſtate the Queen laid it, the fourth day the Bees put in with their mouth a ſmall whitiſh liquor, of a clammy ſubſtance, which abſorbs into the egg, and then it changes its form into that of a ſmall worm, divided into ſeveral rings, laid on the ſame baſis, and twiſted round, ſo that the two extremities touch each other. On the fifth day it is advanced into a middling large ſize, ſo as to fill the whole breadth of the cell, and is thought to be fed on the fifth, ſixth, and ſeventh days, at the mouth, with honey, by the Bees; during which time it has not the ſmalleſt reſemblance of a Bee, having neither head, legs, nor wings. On the

eighth

eighth day it is close sealed up in the cell, and receives neither food nor air, and undergoes various changes, till on the nineteenth day it comes out of the cell, a perfect Bee. It is disputed among the learned whether this insect dies at the time of its transformation or not. I will not take it upon me to decide in such an intricate matter, only I know it is alive in its worm state; and I never saw but when I opened a cell at any time, I always saw the inclosed nymph to make a slow movement.

The Queen sometimes in the middle of summer takes an airing, and that but very seldom; for though I have spent many hundred hours amusing myself to see them carry on their delightful labours, yet I never saw a Queen go an airing, but four or five times: it is well it is so, for were she a gadder abroad, it might endanger her life, to the great detriment of the hive. Whether ever she airs herself in a fine winter's day, (when the Bees are fond of it) or not, I cannot say, for I never saw her.

The Queen has a great deal of respect paid her by her children, and also by any other Bees that may have been added to the hive; for Bees will rather die, than leave their Queen; the reason is very good, for when with her, they may have some hope of her and them being put in a way to thrive again; but were they to leave her, they cannot but soon come to ruin.

Their love for their Queen doth not seem to rise from blood-relation, but from her usefulness among them: did their affection arise from relationship, they would never kill any of their

Queens,

Queens, when they have more than one in a hive. It further appears by the same regard being shewn to her, when swarms are united, by those Bees which are not her relations, as by those which are. Again, if you take a native Queen from a hive, and put a stranger to them, they will be very fond of her; and should you return their mother to them again, they would fall on her like as many lions. *Reaumur* says, they are not attached to the person, but to the dignity of the Queen, which is too commonly true with regard to men.

There is only one permitted to live in a hive during the year, unless it be in swarming-time; when new hatched they will allow them to remain till a fit season occurs for them to go off with a swarm: but they must improve their time when it offers, for if they be too long in going off, they will lose their lives for their indolence. I never saw two Queens hatched out of one royal cell, I mean one after another; the eggs always are laid in common cells, and when they want a Queen they build a royal cell around it, and thereby get a Queen. Last summer I wanted three Queens to put to three hives that wanted Queens: in order to get them, I took a Queen from a hive, and put to one of my Queenless hives: the hive that I took the Queen from, in eight days had five sealed up royal cells. I took two of the royal cells, and fixed in the other two Queenless hives, and they became Queens to them in due time. A royal cell I left in herself to supply her with a Queen, the other two I dissected in order to see the progress of the maggots in the cells. I have often

taken a Queen from a hive, and they would only build one royal cell, ſometimes two, other times three, and in the above five cells, although ſhe was a very weak hive of Bees, and had thoſe five maggots in theſe cells turned all Queens, four of them would been killed, for they had not Bees to ſend off ſwarms with one of them.

CHAP. VII.

THE HISTORY OF THE DRONE BEE.

THE Drones are well known inſects by every Bee-maſter that takes the ſmalleſt notice of Bees, and ſcarcely need to be deſcribed. They are both larger and longer than the common Bees; their head is round, their eyes full, and their tongue ſhort. Their belly differs from the other two, being broader, and much more obtuſe; and they are of a darker colour than the reſt. They make a much greater noiſe when flying, than the Queen or common Bee, by which they may eaſily be diſtinguiſhed.

As to their ſex, ancient writers in general, philoſophers, hiſtorians, poets, and phyſicians, together with ſeveral modern ones, *viz. Butler*, *Purchas*, *Warder*, *Bradley*, *Reaumur*, *Maraldi*, *Debraw*, *Keys*, and others, are ſtrong advocates for the Drones being the male Bees. Some, as *Thorley*, ſeem to give arguments againſt

gainſt it: and Mr. *Schirach*, and his friend Mr. *Hattorf*, annihilate entirely the uſe of the Drones, and advance this ſingular opinion, (ſays *Debraw*) that the Queen lays eggs which produce young Bees without any communication with the Drones. Singular as their opinion is, it appears to be the truth, as I ſhall ſhew from good arguments: That the hives are repleniſhed with Drones at the ſeaſon of the year, as granted by all, when no Drones are in being, nor have been ſo for eight months before, ſeems to be a ſufficient argument to any rational creature, that the Drones are not the males.

But the Drone advocates alledge, that the Drones fecundate the Queen before their brethren kill them; and by which ſhe remains ſeven or eight months with perhaps 12000 impregnated eggs in her ovaria: certainly ſhe would be large all that time. But it would be needleſs to ſpend time on that ſubject, ſeeing I have formerly ſhewn how I have many times had Queens breed and lay eggs, and thoſe eggs become Bees; and yet that Queen was bred ſeven months after all the Drones were dead, and ſix weeks ere any were hatched; which I think is ſufficient to ſilence all the large Drone advocates. But we have Mr. *Debraw* creating little Drones, and alſo giving them power to live all the year, and to impregnate the Queen at pleaſure. I ſhall here give an account of his ſentiments and experiments on that head, as inſerted in the Univerſal Dictionary on the word *Bee;* where, when ſpeaking of the little Drones, he ſays, 'They have notwithſtanding eſcaped 'the obſervation of Mr. *Schirach*, and of his

'friend Mr. *Hattorf*, member of an academy in
'*Eufatia*, who, in a memoir he prefended in
'the year 1769, annihilates entirely the ufe of
'Drones in a hive; and advances this fingular
'opinion, that the Queen-bee of a hive lays
'eggs, which produce young ones, without any
'communication with the Drones. For what
'purpofe fhould wife Nature then have furnifhed
'the Drones with that large quantity of feminal
'liquor? To what ufe fo large an apparatus of
'fecundating organs, fo well defcribed by
'*Reaumur* and *Maraldi?* But I beg leave to
'remark, that thefe gentlemen feem to have
'drawn too hafty conclufions from their experi-
'ments, in rejecting the Drones as bearing no
'fhare in the propagation of thofe infects. Their
'obfervations, that hives are peopled at a time of
'the year when no Drones are in being, are no
'ways conclufive; as it is evident, that they had
'feen none but Drones of a large fize, their filence
'on the difference of the fize of them juftifying
'my remark. But to refume the narrative of my
'experiments: I had watched my glafs-hives
'with indefatigable attention from the moment
'the Bees, among which I had taken care to
'leave a number of Drones, were put into
'them, to the time of the Queen's laying her
'eggs, which generally happens the fourth or
'fifth day. I obferved the firft or fecond day
'(always before the third) from the time the
'eggs are placed in the cells, that a great num-
'ber of Bees, faftening themfelves to one an-
'other, hung down in the form of a curtain
'from the top to the bottom of the hive, in a
'fimilar manner they had done before at the
'time

'time the Queen depoſited her eggs; an ope-
'ration which (if we may conjecture at the in-
'ſtincts of inſects) ſeems contrived to hide what
'is tranſacting: be that as it will, it anſwered
'the purpoſe of informing me that ſomething
'was going forward. In fact, I preſently after
'perceived ſeveral Bees, the ſize of which,
'through this thick veil, (if I may ſo expreſs
'myſelf) I could not rightly diſtinguiſh, inſert-
'ing the poſterior part of their bodies each into
'a cell, and ſinking into it, where they con-
'tinued but a little while. After they had re-
'tired, I ſaw plainly with the naked eye a ſmall
'quantity of a whitiſh liquor left in the angle of
'the baſis of each cell, containing an egg; it
'was leſs liquid than honey, and had no ſweet-
'taſte at all. Within a day after, I found this
'liquor abſorbed into the embryo; which on
'the fourth day is converted into a ſmall worm,
'to which the working Bees bring a little ho-
'ney for nouriſhment during the firſt eight or
'ten days after its birth. After that time they
'ceaſe to feed them; for they ſhut up the cells,
'where thoſe embryos continue incloſed for ten
'days more, during which time they undergo
'various changes too tedious here to deſcribe.
'To evince the reality of this obſervation, and
'to prove that the eggs are fecundated by the
'males, and that their preſence is neceſſary at
'the time of breeding, I proceeded to the next
'experiments. They conſiſted in leaving in a
'hive the Queen with only the common Bees,
'without any Drones, to ſee whether the eggs
'ſhe laid would be prolific. I accordingly took
'a ſwarm, ſhook all the Bees into a tub of wa-

'ter, and left them in it till they were quite 'senseless, which gave me an opportunity to 'distinguish the Drones without any danger of 'being stung. After I had recovered the work-'ing Bees and their Queen from the state they 'were in, by spreading them on brown paper 'in the sun, I replaced them in a glass-hive, 'where they soon began to work as usual: the 'Queen laid eggs, which I little suspected to be 'impregnated, as I thought I had separated all 'the Drones or males; but at the end of twen-'ty days (the usual time of their hatching) I 'found to my surprize some of the eggs hatch-'ed into Bees; others withered away, and se-'veral of them covered with honey. I immedi-'ately inferred that some of the males, having 'escaped my notice, had impregnated only part 'of the eggs; but, in order to convince myself 'of the truth of my supposition, I thought it ne-'cessary to take away all the brood-comb that 'was in the hive, in order to oblige the Bees to 'provide a fresh quantity, being fully deter-'mined to watch narrowly their motions after 'new eggs should be deposited in the cells. 'This was done accordingly, and at last the 'mystery was unravelled. On the second day, 'after the eggs were placed in the cells, I per-'ceived the same operation which I have re-'lated in a former experiment; I mean the Bees 'hung down in the form of a curtain, while o-'thers thrust the posterior part of their body in-'to the cell: I then introduced my hand into 'the hive, broke off a piece of the comb con-'taining two of those insects, and kept them for 'examination, I found in neither of them any

'sting;

'sting; (a circumstance peculiar to Drones only) and upon dissection, by the help of a *Dollond*'s microscope, discovered in them the four 'cylindrical bodies, which contain the glutinous 'liquor of a whitish colour, observed by *Maraldi* in the large Drones. Having till then never observed any difference in the size of 'Drones, I immediately perused the memoirs on 'Bees published by Messrs. *Maraldi* and *Reaumur*, and found that they had remarked it frequently. The reason of that difference must, 'I doubt, be placed amongst other arcana of 'nature. I found myself therefore under a necessity, in my next experiments, to be more 'particular in destroying the males, even those 'which might be suspected to be such. I once more immersed all the same Bees in water; 'and, when they appeared to be in a senseless 'state, I gently pressed every one of them between my fingers, in order to distinguish those 'armed with stings from those that had none, 'which last I might suspect to be males. Of 'these I found fifty-seven, exactly of the size of 'common Bees, yielding a little whitish liquor 'on being pressed between the fingers. I killed 'every one, and replaced the swarm in a glass-'hive, where they immediately applied again to 'the work of making cells; and on the fourth 'or fifth day, very early in the morning, I had 'the pleasure to see the Queen-bee depositing 'her eggs in those cells, which she did by placing 'the posterior part of her body in each of them. 'I continued on the watch most part of the ensuing days, but could discover nothing of what 'I had seen before. The eggs after the fourth

'day

'day, instead of changing in the manner of 'caterpillars, were found in the same state they 'were in the first day, except that some of them 'were covered with honey. But a very singu-'lar event happened the next day about noon: 'all the Bees left their own hive, and were seen 'attempting to get into a neighbouring com-'mon hive, on the stool of which I found their 'Queen dead, having, no doubt, been slain in 'the engagement. The manner in which I ac-'count for this event is as follows: the great 'desire of perpetuating their species, which is 'most observable in these insects, and to which 'end the concurrence of the males seems so ab-'solutely necessary, made them desert their own 'habitation, where no males were left, in order 'to fix their residence in a new one, in which, 'there being a good stock of males, they might 'the better accomplish their purpose.

'If this does not yet establish the reader's 'faith of the necessity of the males bearing a 'share in the fecundation of the ova, the next 'experiment cannot, I presume, fail to convince 'him. I took the brood-comb, which, as I ob-'served before, had not been impregnated; I 'divided it into two parts; one I placed under 'a glass-bell, No. 1. with honey-comb for the 'Bees food; I took care to leave a Queen, but 'no Drones, among the common Bees I con-'fined in it. The other piece of brood-comb 'I placed under another glass-bell, No. 2. with a 'few Drones, a Queen, and a number of com-'mon Bees proportioned to the size of the glass; 'the rest I disposed of as before. The result 'was, that in the glass No. 1. no impregnation 'happened;

'happened; the eggs remained in the same state 'they were in when put into the glass; and, 'upon giving the Bees their liberty upon the se- 'venth day, they all flew away, as was found 'to be the case in the former experiment: 'whereas in the glass No. 2. I saw, the very day 'after the Bees had been put under it, the im- 'pregnation of the eggs by the Drones in every 'cell containing eggs; the Bees did not leave 'their hive on receiving their liberty; and, in 'the course of twenty days, every egg under- 'went all the above-mentioned necessary 'changes, and formed a pretty numerous 'young colony.'

What he has here said concerning those little Drones is a wild fancy, and what is also very unbecoming; his pretending to have seen so many of them brings him in to be very disingenuous.

I shall give three arguments against his experiments:

1st. Can it be thought that the prying eyes of multitudes in many generations should have escaped seeing those little drones (they being, according to his account, vastly numerous) thrust their posterior parts into the cells? Yet none ever saw them do it, except himself; while many have seen the Queen do it, though but a single Bee.

2d. It is well known the Queen is very long behind the wings, wise nature having made her so, in order that she might thrust her posterior part

part into the cells, and yet her wings scarcely touch them, nor receive the least injury. If these imaginary little Drones had to thrust their posterior parts into the cells in the same manner as the Queen, certainly their wings would have been made in the same manner short, and their posterior parts long and taper, which is not the case. Whereas were a Bee of any kind (the Queen excepted) to thrust its hinder part into a common cell, its wings or coats would come over its head, and be antic like, and injure both them and its body. Besides I scarcely think they could get into the common cells that way at any rate for want of room.

3d. Mr. *Debrace* grants that without a Queen or eggs, Bees will not begin to work, as well-knowing they cannot propagate their species without her: and yet he says, those Bees which wanted little Drones began to work, and the Queen laid eggs, and all went forward, till they were not impregnated, and then they gave over work, and deserted the hive. Certainly those sagacious creatures would have been as sensible that they wanted Drones at the very first, when they were put into the hive, and that they could not do without them, as they are sensible when they want a Queen, and that it is needless to begin work without her: and it might be added, that two different kinds of Drones in one hive does not appear to be probable, or serve any end.

But

But I shall narrate some of my own experiments on that head, which will put it, I hope, beyond dispute:

On *Sept.* 1st, I had a hive breeding fast; I took out all her Bees, (among which were only four large Drones, which I killed) and I put them in a hive that had nothing in her but empty combs: I waited ten days, when, by looking between the combs, I saw her have new-sealed up maggots in her cells. I then took all her Bees out, and shook them into a tub full of water, and recovered them gradually; and when recovering, I pressed every one of them, in order to see if I could find any of those little Drones, but could not find one; but all and every one of them had stings: they were in number 3000. After which I searched the hive I took them out of, and cut out all her combs that had eggs in them, and found they had new laid eggs, four days old eggs, and maggots in them. I then recovered the Queen and all the Bees, and put in the same hive again, which had not an egg in her now, and waited other twenty days, and saw her, in fine days, working very well, a sure indication she was breeding again; I then turned her up, and cut out one of her brood-combs, and saw in it new laid eggs, four days old eggs, and maggots, and some young almost fit for emerging out of their cells.

The very same day I made a further experiment:——I had a hive which I saw had some brood-combs in her, but she had not had a large Drone for four weeks before in her: she had not above five hundred Bees in her, which favoured

voured me, becauſe few in number. I took the hive into a cloſe place in my houſe, in order that not a ſingle Bee ſhould eſcape me; I then took all her Bees out of her, and immerſed them in water, and when recovering, I preſſed every one of them, and each Bee had a ſting, as in the former experiment.

I think the above experiments may ſatisfy any judicious perſon, that there is no ſuch thing in being as little Drones, unleſs in Mr. *Debraw*'s brain. And if Mr. *Debraw*, who can find fifty-ſeven in a ſmall ſwarm of Bees, will ſend me the odd ſeven, I will ſend him one of my beſt hives for them, and he will ſcarcely think he is ill paid. I add, I never ſaw a hive in ſpring, however few Bees in her, but ſhe bred ſome if ſhe had a Queen, though to be ſure few in proportion to her Bees.

By this time the reader will be very ready, no doubt, to aſk me the uſe of the Drones: I beg to be excuſed on that head, as I have not the leaſt idea of their uſe in a hive: they do not fecundate the Queen, for ſhe can lay and breed too, though ſhe never ſee them. Their heat does not appear to me to be neceſſary for hatching the young, as they are moſtly hatched before any are bred in a hive: and when Drones are in the hive, the weather is ſo warm, and ſo many common Bees in it, that they appear to have rather too much heat, by their lying out of the hives often.

I have many times had good hives with few or no Drones in them all the year; and *Keys* is quite wrong, when he ſays a top ſwarm will not do without Drones in her, for I am poſitive to the

the contrary, as in the ſummer, 1785, I took off four ſwarms of mine own in one day, with not a ſingle Drone in any of them, and they all throve well, and bred Drones in themſelves about four weeks after.

Although I cannot ſay what uſe the Drones are of to a hive, (unleſs it be to help away with a great deal of her honey, which they are very good at) yet the beſt hives have them ſooneſt in the year, they generally appearing in ſuch about the latter end of *May*, and the Bees put a period to their lives about *Lammas*, at which time I give them all the aſſiſtance I can. The way they kill them is thus—they pull and bite them with their teeth, and ſting them alſo: I have ſeen great havoc made of them in one day, as appeared by their lying dead before the door of the hive. But their moſt effectual way of killing them is their baniſhing them from the honey-combs, upon which the drones betake themſelves to the under edges of the hives in great numbers, and to the board the hive ſtands on; and ſometimes, though rare, I have even ſeen them come to the outſide of the hive, and cluſter there, about the bulk of a man's hand. When they are baniſhed thus, they are very dull and lifeleſs: and I have lifted up a hive from the board, and there they would have been ſitting cloſe on it, with ſcarcely three or four common Bees among them, and I have rode to death forty or more at a time.

We may now take a view of the diſadvantages attending the old, and alſo Mr. *Debraw*'s, principles on Bees, were they true; and next ſee

how a hive of Bees may be preserved from coming to ruin, according to my sentiments on them:

1st. The old principles on Bees say, that without a Queen or royal cell be in a hive, it will come to ruin.

2d. Mr. *Debraw*'s principles say, that without little Drones be in a hive, it will come to ruin.

3d. I say if a hive have only new-laid eggs in her (which may be easily got the greatest part of the year, in case she have none of her own) and common Bees, she will find herself a Queen, and so thrive.

According to the old principles it is easily seen that, in case a hive lose her Queen, when there is no royal cell in her, and no Queen can be got to put to her, (neither of which can be expected but in *June* and *July*,) she is entirely ruined.

According to the *Frenchman*'s scheme, there must be Drones in a hive at all times of the year to fecundate the eggs, otherwise the hive is useless. Supposing his sentiments to be true, (which however can by no means be admitted, seeing there is no such thing as little Drones) how perplexed would the owner be to know when there were little Drones in his hives! When he wanted to make an artificial swarm, he might bring off a Queen and common Bees with her; but how should he come to know whether

whether there were any, or a sufficient quantity, of little Drones among them, as they cannot be distinguished from the commons but by immersion and pressure, which would be intolerably troublesome, and next to killing the Bees, and not at all practicable? all that could be done would be to hope the best, that there were little Drones in her at any time of the year.

I say, if a Queen die in a hive, and that hive have some new-laid eggs in her, or some put to her, in case she have none of her own, she will nourish up some of these eggs to be a Queen to herself: and also by taking out a Queen and some commons out of a hive, (without a single Drone, large or small) and putting them in an empty hive, will make a swarm, and the old hive will breed herself a Queen again, if she have eggs in her.

(The reason why I have dwelt so long on the history of the Queen and Drones is because I had the old erroneous points held by writers on Bees to overthrow, and my own new principles to establish from arguments and narrations of facts.)

CHAP. VIII.

THE HISTORY OF THE WORKING BEE.

THE Working Bees are ſeen by every one that has them, and ſcarce need any deſcription. They are the leaſt of the three, and thoſe that work for the whole hive. A Bee is a flying inſect conſiſting of three principal parts, *viz.* the head, which is attached by a kind of neck to the reſt of the body; the middle or breaſt; and the belly, which is diſtinguiſhed from the other by an inſection in the middle. The head hath two eyes in it, which are immoveable, of an oblong figure, black, and tranſparent: the mouth or jaws, like the mouths of ſome fiſhes, open to the right and left, and ſerve inſtead of hands, to carry out of the hive whatever offends or encumbers them. They have a long tongue or trunk, with which they ſuck up the ſweets out of the flowers. They have four wings in all, and it is by them they fly, and make ſounds and hummings to one another, which is thought to be their whole organ of ſpeech: their wings are faſtened to their middle part. They have alſo ſix legs faſtened to the ſame part; the two foremoſt are the ſhorteſt, and with them they can unload themſelves: the two middlemoſt are ſomewhat longer; and the two hindmoſt are longeſt of all, and on the middle joint of them there is on the outſide a little cavity in the ſhape of a marrow ſpoon:

it

it is on this hollow that the Bees collect, by little and little, those loads they carry home to their hives. It is observable that neither the Queen nor Drones have this groove. The last part of the Bees, which is the belly, is distinguished with six rings: in the inside are two parts; the one is a little bladder or reservoir, in which is collected the honey that the Bees sip in the cups of the flowers, after it hath passed through the proboscis, and through the narrow pipe that traverses the head and breast of the Bee: this bladder, when it is full, is of the size of a small pea; it is transparent in such a manner that you can see through it the colour of the honey it contains. The other remarkable part is the sting, which is situated at the extremity of the belly of the Bee, and which is darted out and drawn in with great quickness by means of certain muscles placed very near the sting. The length of the sting is about two lines; it is a little bigger towards its root, than near its extremity, which terminates in a point: it hath the consistence of horn; is hollow within in the manner of a tube, wherein passes the venomous liquor, which being included in a bladder placed in the belly, and at a little distance from the root of the sting; this discharges itself near the point, and insinuates itself into the wound the very instant that the Bee pierces the skin. The Bee almost always leaves the sting in the wound, and it draws after it the bladder, and sometimes a part of the entrails of the insect.

These Bees are, I may say, the whole community, unless in the Drone season, which is scarce-

ly three months; all the other nine months there is none other in the hive but one single Queen. They are the Bees which build the combs; collect the honey in the fields, and bring it home, and ſtore it up in their waxen magazines. They nourith up the eggs to be common Bees, Queens, and Drones: they alſo guard the hive from all enemies of whatever kind; carry out all incumbrances that are in the hives, and kill all the drones, &c.

Notwithſtanding all that ever has been wrote and ſaid concerning Bees, their ſexes cannot poſitively be aſcertained as yet by any man: I for my part leave it to future enquiries, for it as yet remains a myſtery to me. And as to the Drones, I know not their uſe; only this I affirm as fact, that the Queen lays all the eggs, and that without the agency of the drones; and alſo that every egg can be raiſed up by the commons to be a queen, a common, or drone, as the commons pleaſe. I alſo affirm that there is no ſuch thing as little drones. I am alſo certain that the queen and commons can perpetuate their ſpecies between themſelves; which is concluſive they two are male and female, although no writer ever before aſſerted it.

It is ſaid of the ſnails, that they are all hermaphrodites, and that both the ſexes are contained in each of them.

CHAP.

CHAP. IX.

OF THE STING OF A BEE.

AS we are now to go forward to handle Bees, it becomes us therefore to guard ourſelves againſt their ſtings. In the firſt place, Bees ſeldom uſe their ſtings, unleſs provoked or affronted; therefore you muſt beware of giving them the leaſt offence, for they will hazard their lives rather than let an affront paſs unreſented: for exaſperate them near their hives, you may as well take a lion by the beard, or a bear by the tooth, as offer to capitulate with them: in ſuch a caſe the only thing to be done is preſently to ſcour off, and ſhelter yourſelves within doors, and peep out at them, till once their fury be abated, and the remembrance of the affront be obliterated; then you may renew your acquaintance with them, and if you come in an humble manner, and walk gently and ſubmiſſively among them, they will uſe you very friendly. In all things you have to do with Bees, do it in a ſoft, calm, gentle, and ſubmiſſive manner: come not among them in a raſh haſty manner; neither muſt you come puffing and blowing, nor with bad ſmells about you. Come to them in the ſame manner you would appear before your patron, when you want a favour at his hand, and not as before a duelliſt, unleſs you be armed cap-a-pee.

When

When Bees are offended at a perſon, the chief part they aim at to wound him in is the face and hands, being the places they know are moſt vulnerable. But in caſe thoſe places be covered, and proof againſt them, then they will ſurround him all about, in order to ſee if they can ſpy any unguarded place in his coverings, any aperture or crevice about his ſhirt, hands, breeches knees, &c. and if they find the leaſt opening in any of them, they will puſh in at it, and ſo leave their ſting, and very life, behind.

The hair of the head, beard, or eye-brows, are all very offenſive to Bees, any of which if they accidentally light on, (although in good humour before) they will ſting the very inſtant. It has been lately affirmed, that a perſon is in perfect ſafety among myriads of Bees, if he carefully keep his mouth ſhut, and breathe gently through his noſtrils only: and merely with this precaution, it is ſaid, the hive may be turned up, and part of the combs cut out. I do alſo believe, it is very good not to blow one's breath on them, when they are in the furious mood; but when combs are to be taken out, they muſt firſt be frighted into good humour, by rapping all round their hives; after which you may blow as much breath as you pleaſe on them, they will not in the leaſt reſent it, but will ſuffer you to handle them, or cut out their combs, as you pleaſe: and that is the alone way to tame Bees, viz. to frighten them; after which they will not in the leaſt offer to ſting, if you do not preſs them. When at work in the fields, they never offer to ſting, let you affront them as you pleaſe: you may

chaſe

chaſe them from flower to flower, and yet you cannot tempt them to ſting, but they will fly from you, as unworthy of their notice.

When you have any buſineſs to do about your Bees, which may provoke them to ſting, and yet muſt be done, ſuch as making them ſwarm, uniting hives, &c. then you muſt have on your harneſs, and keep it on as long as they are furious; but whenever they are frighted and ſurpriſed, by rapping on the hive, they will be very pacific, and never offer to ſting you. After which, throw off your ſafe-guard, and alſo your coat, by which you will be more fit for performing your buſineſs with them. When I take a ſwarm of Bees out of a hive, I firſt put on my harneſs, and then invert the old hive, and put an empty hive above her; then I rap the old hive all round, which confounds, frightens, and terrifies them ſo, that they turn quite peaceable, and never offer to ſting me more: then I throw off all my armour, and coat alſo, by which I have more air and freedom to finiſh my buſineſs with them.

In caſe Bees diſturb you much when walking among them, gently put them by your face with your hand, and move ſlowly away from them, and thruſt your head into a buſh, and they will leave you in a little.

All the harneſs I uſe is a piece of thin canvaſs, wove very ſlack, a yard ſquare; this I put over my head, and drawing it together about my neck, I fix it with a garter. I then put on a pair of gloves, cauſing a perſon to tie my coat-ſleeves cloſe on above them, ſo as not one Bee can get up betwixt my arms and ſleeves.

ſleeves. The canvaſs being wove almoſt as thin as a ſieve, permits me both to ſee and breathe. Indeed it is only ſome times I trouble myſelf with any incumbrances of that nature, for inſtead of that, I generally ſtrip myſelf ere I begin, when I judge I have wife and mild Bees to deal with; and many ſwarms have I taken off, and not received a ſting.

Mr. *Keys* ſays, there have been too many melancholy inſtances of men as well as cattle who have been ſtung to death by Bees. I never read nor heard one ſingle inſtance of any ſuch thing, unleſs of one who was put in a cage, and covered over with honey, on purpoſe for Bees and waſps to ſting him to death.

The ſtings of Bees have very different effects on different perſons; for there are ſome men to whom the ſting of a Bee does not occaſion any pain or inflammation; and they diſdain uſing any precaution, even when they are ſure of receiveing many ſtings. Others again are terrified for Bees, their ſting in them cauſing an exquiſite pain, and followed by great ſwelling. The ſting of Bees has very different effects on me at different times; the ſeldomer I am ſtung, the more pain I feel, and ſwell the more; if I am ſtung once in three weeks, I feel ſome pain and ſwell a little; but if I be ſtung once, twice, or thrice in a day, I value them not a pin: I have received twenty ſtings in a day, and ſwelled ſcarcely any. The reaſon I pretend not to account for, but leave it to thoſe of more penetration to diſcover.

Cure

Cure for the Sting of a Bee.

THERE have been many remedies preſcribed (to little purpoſe) to cure the wound received by a ſting. Oil of olives, or any mild oil is thought by many to be a cure; bruiſed parſley gives eaſe, ſay ſome; the honey taken out of the Bee that inflicted the wound is thought a good cure; the ſweet ſpirit of vitriol well rubbed in the wound will prevent pain or ſwelling, ſays Mr. *Keys*. Repeated experiments oft ſhew that the eaſe received from any of the above remedies is but ſeldom, and may rather be imputed to an accident than a cure; yet I make no doubt but they may give eaſe ſometimes.

The ſting and poiſon is ejected in a moment, and pain and ſwelling take place the ſame inſtant, when the cure is often far to ſeek and ill to find. The moment I receive a ſting, I pull it out, and takes a kail dock, aſh, or almoſt any green leaf which is ſooneſt got, and is always at hand, and bruiſes it a little, and rubs it in the wound. Sometimes, if near water, I waſh the wound, or apply a wet and cold cloth to it, and have thought it ſometimes gave me a little eaſe; but it is not one in a dozen I apply any remedy to at all, for it ſeldom makes me uneaſy, and I know a little patience and time compounded together will make an effectual cure.

CHAP.

CHAP. X.

OF THE APIARY.

AS a general rule, ſet a hive where ſhe will get as much ſun and as little wind as you can; and keep all cattle of whatever kind from her. The farther ſhe is from any other hive ſhe will thrive the better; not becauſe they will impoveriſh the flowers, for this is ſcarcely ever the caſe, but the farther from other hives the leſs danger from robbers; for in fine weather when there is no honey in the fields, and many Bees near other, they will conſtantly be trying one another's hives in the robbing way, altho' ſtrong hives ſuffer little or nothing by robbers, yet weak ones conſtantly are loſing Bees by them, as any one may ſee, where there is a multitude of them in one apiary: and this is the chief reaſon, and none other, that Bees do not thrive ſo well where there are many in one place, as where there are few.

Therefore I would adviſe any one that wants to keep a large quantity of ſtalls, perhaps twenty or thirty, or as many more as he pleaſes, to have no more ſtalls in one apiary than ſix; and if he can have that much room, each one of theſe hives ſix yards from any other; that is an excellent method to prevent ſcrabbling and fighting. I do not mean that Bees will not thrive well when thick ſet, for one may have four good ſtocks all within

within two feet of each other and do very well: all I mean is, that they will thrive the better by being far between, but cannot thrive the worse, as by the above: I have said six is to be set in one apiary, and you may have other six within a quarter of a mile of them in the same manner, and so on, you may cover *Britain* with them, that thickness, if you can, if flowers are within their reach. I think by this time Mr. *Keys* will be saying, Where is the food for such a prodigious number? for both Mr. *White* and he say, a field may be overstocked with Bees, the same way it may be overstocked with sheep. I do not deny but there is a possibility of it, but it will not be so by setting them as thick as I have directed.

In the honey season if we consider the vast number of flowers the earth produces in spring and summer, and that scarcely one of them but Bees gather of. If one pass by a clover, mustard, or heather field on a fine day in the honey season, the whole air smells of the sweetest nectar; the flowers of which are numberless, and the sockets like the sand on the sea-shore: and yet every socket has a little honey in it. I dare to say that one acre of either white clover, mustard, or heather, will produce twenty pound of honey in one day, besides almost every tree, corn field, and all kinds of weeds produce flowers.

When the flowers are sapped at their roots, and a fine sultry season, they are continually sweetening honey through their pores. A hundred hives which are well stored with workers, set in one village, will get all good weights and

thrive well; whereas in a cold or rainy ſeaſon, ſuppoſe there was only one hive in the ſaid place, ſhe will be a poor one, and it is not for want of flowers that honey is ſcarce in this land, but for want of good ſeaſons and labourers to bring it home. Mr. *William White* ſays, 'I have heard ſeveral perſons unacquainted 'with the nature of Bees argue, that a place 'may be overſtocked with Bees, as well as ſheep 'on a paſture; but I will aſſure my readers it is 'not ſo, for I have proved the contrary; for if 'there were an hundred ſtocks in one town, '(*viz.* a ſmall village) and it ſhould be a honey 'ſeaſon they would be all good weight; and if 'it ſhould be a cool ſhowery time in the height of 'the honey ſeaſon, if there were only one ſtock 'in that town, they would not be heavy enough 'to ſtand; for I can aſſure you there is plenty 'of honey one day, and none at all another.'

What has been ſaid here does not contradict the directions given to ſet hives thin, the deſign of that being to keep them from fighting in ſpring and autumn, for they do not rob in the ſummer ſeaſon. When they can get honey from flowers, they will not ſteal it, and you may ſet a hundred and fifty in one park, if you pleaſe, of forty acres large; and if you ſet each hive ſix yards from any other, they will find plenty flowers for themſelves in ſummer, ſuppoſe they ſhould fly two miles for ſome of them; only be ſure to ſet them as near as you conveniently can, for the nearer they are them, the more loads will they bring home in a day, and thereby fill their ſtore-houſes the ſooner.

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I have often thought, had I exactly my wiſh where to ſet Bees, it would be in a hollow glen, with a large wood on one ſide, a large garden on another, a white-clover field before them, and a large heather muir intermixed with a deal of whins and broom behind, with ſome wild muſtard and runches to fill up the corners.

CHAP. XI.

HOW TO CHUSE STALL-HIVES IN SEPTEMBER.

HAVING fixed on the apiary, let us next fill it with proper inhabitants: and we muſt be very pointed here, as our profit and pleaſure, loſs and vexation, in all our management of Bees, generally turn upon this hinge. Therefore you muſt be very attentive in chuſing your ſtall-hive; for if you keep good ſtalls you have done yourſelf a good turn, but if you keep bad ones, I promiſe you a great deal of trouble, and little ſucceſs, and ſoon a broken Bee-maſter.

You muſt conſider, that in *September* every ſtall ought to have as much honey in her as will ſupply her till next *June;* and as many Bees as will maintain heat in her, and thereby reſiſt a ſevere cold winter, and be ſo many able ſoldiers to defend her from invaſions in the ſpring.

As I intend to diſſuade every one from keeping hives that have not a ſufficient quantity of honey in them in harveſt to ſupply them till next *June*, I ſhall ſhew the riſks that are run by keeping bad ſtalls, and the little profit that attends them even when they do come through the winter and ſpring, which ſeldom happens. And in the firſt place, a bad ſtall, ſuch an one as has not a ſufficiency of honey and Bees as will ſupply it with both food and heat till *June*, is not to be truſted; for it is the greateſt prudence, in all the management of Bees, to keep always good ſtalls.

A hive that has not honey enough to ſupply her till *June* muſt be fed, otherwiſe ſhe will die of famine: and if a hive takes four pints to bring her to *June*, and has only two pints of her own, then you muſt give her other two, by which ſhe will coſt you as much honey, and a great deal of trouble, and often ſet your Bees a fighting, unleſs you be very prudent in your way of giving them their honey. At any rate, the Bees are ſure to take a good belly-full in the firſt place; and I am certain that in the beſt method that can be taken to feed Bees, they will ſpend more honey than they do when they have it to pickle out of their own poke-nook: not unlike ſome of a higher ſpecies, that are very moderate of diet in their own homes, but can make very merry when abroad, and nothing to pay.

By feeding in ſpring, when the weather is good, and no flowers in the fields, all the Bees in the neighbourhood will ſmell the honey,

honey, and very often occaſions great fighting; and it brings the Bees down from their brood, and many times periſhes them in the cells. I own, that by taking great pains, and giving them it properly, ſome of theſe inconveniencies may be prevented; but often it happens otherwiſe. And ſhould one feed them painfully till *May*, and inattentively miſs two or three days when their honey is done, then they will die at the mouth of honey-harveſt, and all your honey and trouble is loſt. Again, if you keep a hive not ſufficiently ſtored of Bees, they will dwindle away gradually by cold and age in winter, and probably become a prey to robbers in ſpring: and if ſhe ſhould come through, it will be long ere ſhe turn throng of Bees, and perhaps miſs ſwarming next ſeaſon. But to make ſhort work, a bad ſtall runs a riſk to die of cold, famine, and by robbers, and if ſhe eſcape thoſe dangerous rocks, will bring home but a ſmall freight next year.

But a well-choſen ſtall ſeldom but does well, and rewards the owner with a double-ſtock next year. She runs no riſk to die of cold, having plenty of Bees; nor to die of famine, being well ſtored with proviſions; neither by robbers, being filled with well-trained and armed ſoldiers, and bids fair for a well-filled houſe next year; having many workers; and many children next year, having a prolific mother and many nurſes.

By this time, I hope, the reader will take care what ſtall he keeps, and now wants to be informed what hives are fitteſt for ſtalls; I ſhall

therefore inform him what will be for his profit and alſo pleaſure.

If a hive be well ſtored with Bees, and 30 lb. weight, and not above three years old, it is all you need; if a top ſwarm, or one year old, ſtill the better: but you need not fear, though they be four or five years old, if they have theſe two eſſential parts of a Bee-hive—plenty of honey and Bees: but beware of the want of any of theſe two ingredients, leſt you rue when you cannot mend it; for if you want any of theſe two ingredients in your hive, I tremble to think what will be her fate next ſpring if ſhe have the luck to ſee it, for ſtern cold, grim famine, and the mercileſs robbers will find out where ſhe lives, and ſhew her not the ſmalleſt pity. But if thoſe two truſty brothers, honey and bees be in her, they will make theſe rogues run from her like lamp-lighters. Theſe two honeſt fellows do well together, for they chear up one another, and keep up other's hearts: but if one of them deſert the houſe in a great meaſure, the three rogues will fall on her again might and main, and the diſcouraged brother will become a prey to their avarice.

In order to know whether your hive be well ſtored of bees, turn her up, and by looking at her you will ſee if there is plenty of bees among the combs: and indeed a hive that is 30 lb. weight ſeldom wants bees enough. The way to weigh it needs ſcarcely be directed:—have a bauk and ſcales beſide her, and put her, without her board, in one ſcale, and your weights in the other, the ſame way as any other thing is weighed, and you will ſee her weight. You need

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not be afraid of their ſtings, if you go gently about them, eſpecially if the day be cold, and you take the early morning or evening: but for my part, I can do it at any time.

CHAP. XII.

HOW TO PRESERVE BEE-HIVES IN WINTER.

WHEN you have ſettled upon your ſtalls, whatever number, the more of thoſe kind the better, ſet them as I directed formerly, viz. every one ſix yards from another, if you can do it conveniently; but in caſe you have little room, and perhaps only three or four ſtalls, you may ſet them within four feet of each other. When you have fixed on a place where a hive is to ſtand, drive three ſtakes into the ground till the tops of them be within ten inches of it, and the foremoſt ſtake an inch lower than the other two; then ſet your hive on them; after which at ſun-ſet plaiſter the ſkirts of the hive all to the board with plaiſter-lime; next take a little piece of hard wood, and cut two ſmall holes in the under ſide of it, wide enough to let out and in the largeſt bee, but no more, for was it much bigger, the mice would go in at it: therefore you muſt be very exact with your entries; each hole ſhould ſcarce exceed a quarter of an inch high, and as wide: then fix them to the entry of the hive with a little lime; and next get a large quantity

quantity of pob tow, or ſtraw, if you cannot get tow; and cover your whole hive over with it, about eight inches thick: then fix it to the hive with ſtraw ropes, and put a large divet on the top of the tow or ſtraw, which will hold it cloſe down to the hive, and keep them both dry and warm: afterwards row up ſome of the tow or ſtraw juſt three inches or ſo above the entry, and ſix inches at every ſide, for the leſs of the hive is ſeen, the dryer and warmer it will be; and in the very middle of winter, if you put a bunch of ſtraw among your ſtuckens, and ſet the hive above all, it will be ſtill warmer. This being carefully done when the weather is dry in *September* or *October*, you need ſcarcely touch your bees till mid-winter, about which time you may lift every hive, and carefully clean their boards, with a table-knife, of all the rubbiſh or dead bees that may have gathered on them; at which time you will ſee what ſtate your hives are in; and in caſe any of them is reduced to a ſmall quantity of bees, you may ſtrengthen her by taking a proper number from any of your hives that is plentieſt of them: and if any of your hives be lighter than another, take the bees from her; and in all your uniteing of bees, ſtrive as much as you can to unite thoſe that are of the beſt natural tempers, for there is a great odds among them.

How to take Common Bees out of a Hive at any Time of the Year, to ſtrengthen weak Hives with.*

TURN her up, and ſet an empty hive on her, mouth to mouth; then rap the under hive all round with your hands in the manner of beating a drum; rapping on the parts of the hive to which the edges of the combs are fixed: for by rapping on the hive oppoſite to the ſides of the combs, you are ready to looſen them, and thereby make them incline to one another, and bruiſe the Bees between them, and alſo the young encloſed in the cells; and perhaps the queen may be a ſufferer alſo. When the hive is turned up again, in order to ſet her on her board, I have ſeen the looſe combs fall out; all which is a great loſs, and may be prevented by rapping in a right manner. The older a hive is, the leſs hazard there is of looſening the combs. The more bees in a hive, the ſooner will they fall a running: the rapping and concuſſion of the hive alarms them, as if an earthquake, and they run up to the upper hive in ſearch of a more ſafe habitation; the firſt few that enter it think they are ſafe, and roar, and thereby call and invite their brethren to the ſame comfortable retreat. They will ſoon run up into the empty hive: then lift up the edge of the receiver,

* By Common Bees here is meant thoſe that have no Queen among them, though they have Drones.

ceiver, which is next your right hand, and look diligently to ſee if you can ſpy the Queen going up among them; which if you ſee, you muſt return her to her own hive again. Do it in this manner—take a ſpoon, and put before the Queen, and cauſe her to run into it, along with ſome of her companions: after you have her in the ſpoon, take it, and put to the edge of the hive ſhe came from, and ſhe will run in again. But as ſoon as you have got as many bees out as you want, and have not ſeen the Queen go up with them, and yet are not certain whether ſhe be up among them or not, then turn up the hive that the bees are put in, and ſtir among them in order to cauſe them to run much in the hive, by which you will have an opportunity of ſeeing her, if ſhe be among them; but if after all your diligent ſearch for her, you ſtill cannot ſee her, it may be preſumed ſhe is ſtill in the mother hive: but you muſt not be eaſily ſatisfied on this point, as it would be of dangerous conſequence to the old hive to take her Queen from her; in caſe ſhe had no eggs it would entirely ruin her; therefore ſet down the hive with the bees in it, and let them ſtand, and if they have a Queen, they will ſtay as quietly in it as any other ſwarm, but if not, they will come running out in a confuſion, by which you may be aſſured they have no Queen, and are only all commons, and are what you wanted, and at this inſtant they ſhould be put to the hive you wanted to re-inforce.

How to put common Bees in a Hive, to ſtrengthen her.

HAVING got common Bees in an empty hive, turn it up, and ſet the hive you want ſtrengthened on her, mouth to mouth, and they will ſoon run up: after which ſet the united hive where the ſtrong one ſtood, and the ſtrong hive where the weak one ſtood, or in other words, change their ſtance.

Another Way of re-inforcing a Hive.

IN Summer, I have taken common Bees in ſpoonfulls out of the empty hive they had been put in, and laid them before the hive's entry I wanted to put them to, and if they received them peaceably, I continued to fill her with bees in this manner: but if they fought much, I returned the common bees to their mother-hive again, or tried if ſome other weak hive would receive them kindly.

Another

Another Way.

I HAVE only changed their ſtance, ſetting the ſtrong one where the weak one ſtood, as you will ſee in page 21.

All theſe different ways I have had them reinforced, and they have given me great ſatisfaction; and if done in a prudent manner, not one of a dozen will fight ſcarcely any, though indeed ſometimes ſome bees will fight, let us do our beſt. Even the ſame hive will not receive ſtrange bees one day without fighting, that will receive them kindly the next. I have oft ſeen a hive, when uniting, kill a hundred or ſo, and afterwards proclaim peace. But in Winter, I can unite as many as I pleaſe, and no fighting at all.

Some may aſk, where will we get all theſe common bees to ſtrengthen weak hives with? I anſwer, if you have been a wiſe man, and have choſen good ſtalls, you will ſcarce ever need this uniting, as every one will have bees enough of her own, and need none of your aſſiſtance, but even in the beſt choſen ſtalls ſometimes it will happen that they will be reduced in number *, and therefore ought to be ſtrength-

* The reaſon ſome hives come to have fewer bees in winter than others (although equal with them in *September*) is various:—If a hive in ſummer be but ſmall, and the ſeaſon good, the Queen may not have empty

ſtrengthened, and ſhould always be done. And if you have a hive that is reduced to perhaps 2000 bees, and another that has 12,000, by taking 5000 from the ſtrong hive, and putting to the weak one, they will have 7000 each, and having both thriving Queens, they will ſoon fill their hives with bees.

Laſt year, I had a thriving hive, in *January*, and I took 3000 bees from her to ſtrengthen a weak hive with, but ſhe ſoon hatched out more bees. In *March*, I took other 3000 from her; in the middle of *April*, I took other 3000; in *May*, I took 6000 from her; in *June*, I robbed her of 8000; and in *July*, I twice took 3000; all of which I ſtrengthened weak hives with.

This way of doing I call milking hives; for if a hive thrives, and you do not reduce her to too ſmall a number, but always leave a good quantity of bees in herſelf, ſhe will ſpare you 3000 bees *, every fourteen days, from the middle of *April* till *Lammas*; but ſhe cannot be expected to fill herſelf ſo full of honey, as if you took not her bees from her, and may rather be called a breeder, than a fat one, as ſhe will breed far more bees than another hive, having

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empty cells enough to lay in; and though ſhe may have a large quantity of Bees in *September*, yet many of them being well-advanced in age, will die of it according to their birth; and not having many bred in the latter end of ſummer, will have the fewer in winter. Sometimes Bees will be reduced by cold, or by removing them in an imprudent manner, and from other cauſes.

* A poſitive number is not here meant, as ſometimes far more may be taken, and ſometimes leſs.

few full cells of honey, ſhe will fill them with young bees.

But be ſure when you take any bees out of a hive at any time, always to leave plenty bees in the mother-hive; for by taking too many out, you may not leave enough to keep heat in the hive to hatch out the brood in the combs, and thereby they will periſh, which will be a great loſs; therefore beware of deſtroying one hive to mend another.

At all times of the year, whenever you have a hive reduced in number, be ſure to ſtrengthen her with Bees. In winter it muſt be done to preſerve the hive from cold; in ſpring, to make them hatch faſt, and preſerve from robbers; in ſummer, to make them hatch faſt, and lay up honey; for few Bees in a hive in ſummer will only diſappoint the owner: whereas many will have honey if it be to be got. Therefore in winter you muſt take care your hives be not few in Bees, for fear the cold reduce them by little and little, and periſh them at laſt. In ſtrong froſts lay a little tow at their entry, to prevent too much of cold air to get into the entry; but take great care they be not cloſe ſhut up, for as they have lungs, they muſt have a little air to breathe in, but by being cloſe ſhut up, many a hive is ſuffocated even in winter: therefore take this as a caution, and never let them want air no time of the year; but by applying tow or graſs to their entry, not preſſed, it admits air and prevents cold. A certain degree of cold is neceſſary for Bees in winter; that which pinches them and benumbs them ſo as to keep them in their hives is neceſſary, for

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when they get seldom out to exercise themselves, they eat but very little, though they constantly eat some.

The greater exercise Bees have, the more food they eat, as may be easily observed; for as soon as a hive gives over work, about the middle of *August* commonly, and a large quantity of Bees in the hive, and the weather still good, their flying about gives them an appetite, and their hives turn lighter very fast, till about the middle of *October;* after which they come seldom out of the hive, and eat but very little during *November*, *December*, *January*, and *February;* but in *March* and *April* they are keen of robbing and searching about for food, and thereby their appetite is very great, and they eat the remains of their winter store fast away. In the month of *September*, *March*, and *April*, I believe they eat as much honey as they do in the five cold unactive months. No doubt their consumption of honey is as great in the four principal working months when their exercise is great; but it is not so observable, because if much be eat, more is their income.

By the above computation, it is not meant that this is their exact way of spending, because it may happen that bad weather may keep them in their hives in *September*, *March*, and *April*, then their consumption will be less; and good weather happening in the winter months, may give them more exercise, and thereby occasion more food: I only mean that the above is their most common way of spending, according to their numbers; for often a well chosen stall at the beginning of *May* will have five or six

pound of honey in her, and ſo much the better; none ſhould be run out in *April*, or *May*, by three or four pound. Some writers have ſaid that in ſtrong froſts Bees eat none at all, but are motionleſs; 'and if ſuch a froſt continue for 'two or three months,' ſays Mr. *Stephen White* *, 'without intermiſſion, you may obſerve through 'your glaſſes that the Bees are all this time 'cloſely linked together in cluſters between 'the combs, if they are not altogether without 'motion; yet it is certain they ſtir not from 'their places while the cold continues, and 'therefore eat none at all.' Mr. *Keys* ſays †, 'It 'muſt be conſidered that Bees are capable of 'reſiſting cold only to a certain degree; that 'which reduces them to a lethargy or torpid 'ſtate is ſalutary; for thereby becoming mo- 'tionleſs, perſpiration and circulation of the 'fluids are ſtopped, and the conſequent diſſipa- 'tion prevented. In this ſtate any freſh ſupply 'of ſuſtenance is unneceſſary ‡.' That Bees eat

* Page 10. † Page 291.

‡ What a pity it is but ſuch doctrine was true; that Bees could feed on cold, what a nice cheap way of feeding, and of what conſequence would it be to Bee-maſters; it would be only keep them cold, and then keep as many hives as you pleaſe!

But alas, notwithſtanding the prolific brains of thoſe gentlemen that aſſert it, we have no other proof of it yet, than mere conjecture, and random affirmations, which ſtubborn truth and fact will not admit of as a clear demonſtration; nor hath the brighteſt genius by the deepeſt reſearches, (as yet) diſcovered a method to maintain Bees on any other thing than food; therefore

eat none at all for two or three months, as *White* ſays; and they turn motionleſs, perſpiration and circulation of the fluids are ſtopped, diſſipation prevented, freſh ſupply of ſuſtenance is unneceſſary, as *Keys* ſays, are miſtakes, as may eaſily be obſerved by any attentive obſerver.

1ſt. If Bees be long confined in their hives in winter by froſt, perhaps two or three months, if the hive be lifted off the board, there will be ſeen three or four rows of crumbles of wax, not unlike ſaw-duſt, lying juſt below the Bees, which are the ceilings of the cells containing honey, all broke into ſmall crumbles by the Bees, when they opened the mouths of them to get at the honey. Certainly, if motionleſs, and eat none, no poſſibility of ſo much ſtuff below them.

2d. When they come out after ſuch long confinement, they will be full of excrement, a certain ſign they have eaten.

3d. And in the middle of ſuch long froſts, I have had Bees lay eggs, nouriſh the young, and ſeal up the cells they were in. Certainly, with Mr. *Keys'* leave, we may affirm they had perſpiration, circulation of the fluids, and even food was neceſſary.

4th. Let Mr. *Keys* drive the Bees out of a honey hive, and put them among empty

therefore we are juſt where we were, and muſt ſtill follow the old faſhion; and (that is) keep our Bees warm, and allow them food always, till we want their death.

combs in another hive, and keep them juſt as cold as thoſe in honey hives beſide them, and eight or ten days will make him ſenſible whether Bees can live in cold without honey, and let him ſee food is not unneceſſary even in cold weather.

The difference of ſituations, diſpoſitions of places, qualities of hives, and number of Bees in a hive, all make a difference of heat and cold in hives; yet this we may ſafely infer, that the greater quantity of Bees in a hive, the leſs danger they will be in of ſuffering by cold. Therefore a hive ſhould be well ſtored of Bees in winter, and the fewer Bees in a hive, ſo much the warmer ſhould ſhe be kept. Mr. *Keys* ſays *, 'But here occurs the grand difficulty, *viz.* that 'of knowing what degree of cold will keep Bees 'in the beneficial ſtate;——and whilſt the' (plenty) 'Bees in one hive ſhall be conſuming 'their proviſion,' (by being warm) 'thoſe' (few Bees) 'in another ſhall be expiring of cold.'

The difficulty is not ſo great as ſaid, for keep as many Bees in a hive as you pleaſe in winter, ſhe will not be over warm, if keep her entry open, neither will ſhe conſume her honey to any exceſs, for ſhe will only eat to ſatisfy nature and no more; and no wiſe man will begrudge her that, if he wants her to live.

As to a hive that has few Bees in her, ſhe ought to be reinforced if Bees can be had; but if no Bees can be got to ſtrengthen her with, ſhe ſhould be placed and covered ſo as to make her

* Page 292.

her ſufficiently warm, that you may know the right medium. I ſay be not afraid of Bees being too warm in your apiary, if you give them ſufficient air; nor need you fear gluttony by too much heat; but keep weak hives as warm as to ſee every Bee in motion when you turn them up.

In ſevere ſtorms take care your Bees do not ſuffer by cold; turn them up and look into the hive, and ſee if your Bees be all alive betwixt every comb where they are cloſely ſitting and linked together; if they ſtir with their wings all is well, clean their board and ſet them down again, and cover them, and carefully keep them dry and as warm as you can, to admit air: but if inſtead of being cluſtered between the combs, they fall down in numbers on the ſtool, and ſome of the outſide layers between the combs ſtir not, then they are ſtarving of cold, and you muſt bring them into a warm room, and they will ſoon recover, and ſet them in ſome moderate warm place, and keep them there till the cold remove, and then ſet them in their old ſtance again. Do it an hour after ſun-ſet, and they will not ſtir out of their hive that night; for when confined in the hive ſome time, perhaps in a dark place, and they are returned to light and liberty they are fond of it; and many would come out and kill themſelves by lighting on the cold and wet ground: but by ſtanding out all night the cold would pinch them, and the light coming gradually to them next morning, would not ſurpriſe them ſo much, and after long confinement let them not out at any rate till a fine day.

In

In ſnow, when the ſun ſhines bright, and bees have been long confined before that by unactive weather, they are keen to be out, being excited by the glaring light, and heat of the ſun: eſpecially if the ſeaſon be advanced to *February*, they will come ruſhing out, if allowed, to their own deſtruction, and alight on the ſnow, the coldneſs of which gradually ſeizes them, and they die in multitudes: therefore in ſuch weather be ſure to ſuffer none to get out: prevent them by laying tow before their entries, and a ſtone before it to bear it to them, but ſo as to admit air; and let every part about the hive be carefully viewed, to ſee that they get out at no other aperture; for if they did, the cure would be worſe than the diſeaſe; by their coming out at any other part, they would alight on the ſnow, but thoſe that eſcaped the ſnow, would fly to their common entry, in order to get in again, but would be prevented by its being ſhut, and therefore would ſoon die alſo.

Many ingenious gentlemen have tried ſeveral methods to preſerve bees in winter: ſome have ſhut them up in cold out-houſes from *September* till *April*, and ſome from the firſt of *November* till *March*. Others put grates before their entries to admit air, but keep them in their hives.

The limits of this performance will not admit to ſhew the unſucceſsfulneſs of theſe inventions; ſuffice it to obſerve in general, that a long confinement is not healthy for them; beſides as they eat a little, it is neceſſary that they ſhould get out to void their ordure; for I have often

often ſeen bees that have been long confined ſo full of excrement within, that they ſwelled to a great ſize, larger than a queen-bee, and as ſoon as they got liberty to get out of their hives, being unable to fly to void their ordure, they would run over at the edge of their board, and creep about till they died in great numbers, and ſcarcely one in twenty ever for any more uſe. But when they get out now and then, in the winter days, they air themſelves, eaſe their bodies in flight, trail out their dead bees, and return to their hives again, and take themſelves a ſong, which is a ſign they are happy. Experience tells me, and I believe, almoſt all others, that bees thrive beſt by ſtanding out in the common method, with liberty to go out and in to their hives, when they find a call for it. They have the ſagacity to know when they may venture out without hazard; and they will come to the door of the hive, and eaſe themſelves, and return again to their companions.

Hives ſhould be placed on boards, for they are warmer in winter and colder in ſummer; beſides they ſuck up the water that the heat of the bees make, (which we call ſweating) or any other wet that may get in at any time.

Boxes are not near ſo warm as ſtraw-hives, therefore they ſhould have more covering on them by far.

Moſt all writers ſay, that a fine winter is dangerous for bees, and far more die than in a cold one, alledging that their going often out increaſes their appetites, and they ſpend their proviſion, and thereby often die of famine; whereas

whereas being long confined in their hives in bad weather, they scarcely eat any at all.

I own that in a fine winter, they eat some more food than in a winter that they scarcely get ever out by cold or cloudy weather; but in a fine winter the bees getting often out in sunny fresh days, it is greatly for their health, and they die not of cold; besides they fall a hatching, and thereby keep their hives fuller of bees. It surprises me to hear writers assert such mistakes; for experience, (which is better than conjectural reasoning) may convince every one to the contrary, that far more hives die in cold winters than in mild ones. I have sundry years seen, particularly in the winter 1779, which was a remarkable fine one, that year not a hive of twenty died, and they swarmed a month sooner than ordinary; whereas in the winter 1776, being very cold, there was a great death among bee-hives: if a countryman had four stalls in his apiary at *Martinmas*, the cold reduced them to three, or perhaps two, before *March*; and the few swarms that were the following summer, were both small and late.

When the frost is very strong so as to lay ploughs, and water freezes in houses, then you may set your hive in some out-house, and keep them there till good weather comes, and then set them in their stance again; but if covered well, and their entries stopped with tow, as directed, they will not be hurt with cold, altho' standing out in your apiary.

I have seen a hive that had been long confined (perhaps ten weeks) by cold, when fine weather returned, and the bees came out, very

great

great numbers of them would have died in a day or two, and the hive would have been greatly reduced: I judged that their long confinement had made them diseased.

CHAP. XIII.

OF THE PURGINGS INCIDENT TO BEES IN WINTER.

WHEN bees are long confined at any time of the year, they take a looseness, and purge greatly. Some writers say, they have this looseness only in the spring, by their feeding greedily on new-blown flowers; but it is a mistake; for they have it at all times, if long confined; for they are so cleanly, that they seldom or never void their ordure, unless when dying; which may easily be seen, if they fly over or light on snow or linen clothes, it falls on them in brown spots. Some give directions how to prevent them from taking that looseness, and also how to cure them that have it, and that is by keeping combs in the hives containing bee-bread or farina, imputing the disease to arise from their eating only pure honey. These gentlemen only discover their unacquaintedness with bees, for it arises from their long confinement, and from no other reason, as appears by common observation: if hives that wanted bee-bread only purged, then it might be imputed to that cause, viz. the want of that kind

kind of food: but hives that have plenty of bee-bread in them purge as fast as any, which lays that argument aside. If they purged only in spring, when they feed first on flowers, it might be conjectured that it arose from that reason, but it is so far from being the case, that they purge at all times when confined, and instead of purging more when they get flowers to feed on, they give it entirely over before ever flower-time comes on. If the weather be fine, and they can get only flown about, an hour or two, the cure is effected, as soon as their bellies are emptied of the ordure that has encreased during their confinement. I am never better satisfied than to see them rain it away when flying. The only method to prevent bees from having that purging is to let them always have their liberty; and the same is the cure when they have it, and that is to let them get out to void it.

But in case the weather be unfit for their coming out for a long time, you cannot help it by any method you can use.

It is certain, when bees are set in out-houses in storms, they of necessity must continue in the hives, and thereby cannot get out to void their ordure; but they are in the same case when standing in the apiary in such bad weather, as they cannot get out; and in both cases they are alike as to voiding their excrement.

Mr. *Keys* thinks cold foggy air is very pernicious to bees in winter, and asserts it as the alone cause of their excessive purging, for, says he *, "preserve

* Page 302.

'preſerve them from this' (air), 'and the froſt 'will bite in vain.'

I cannot believe any ſuch thing, for this reaſon—were cold foggy air to produce this ſevere purging in bees, then all hives that ſtood out in ſuch air would have this diſeaſe; whereas I know for certain that one hive in an apiary will have it in a ſevere manner, and very many bees will fall down to the board in her, and die of it; whereas another hive ſtanding juſt at her ſide, with the ſame number of bees in her, and partaking of the ſame cold foggy air, will be not in the leaſt hurt by it, but in a fine day after her confinement, will fly about, and eaſe their bodies of it, and ſcarce any one dies of it in her. Again, were the ſaid foggy air the alone cauſe of their ſevere purging, all hives that ſtood in dry rooms would have no ſuch diſeaſes, whereas it is certain that two hives, having the ſame number of bees in them, and ſtanding in the ſame warm and dry room, the one will have it ſeverely, and many of her bees die of it, and the other no ways injured by it.

Bees that have that ſevere kind of purging are always keen to get out of the hive to void it, which appears to me their confinement is the cauſe of.

There are two degrees of purging, the one all Bees have after confinement, and it hurts them nothing; the other only ſome hives have, and it reduces their bees greatly. In ſhort, I have often been ſore perplexed to ſee ſome of my bees dying conſtantly in their hives of this ſevere kind of purging, while others that ſtood

juſt beſide them, and were as much confined, yet had it only in a ſmall degree, and were not in the leaſt hurt by it, for as ſoon as the weather turned good, they got out and voided it, and were as lively and healthy as ever. And indeed in the ſame hive ſome bees will be dying of it when long confined, and the greateſt part of the hive nothing the worſe. But why all this perplexity, thinks I, about ſome bees being diſeaſed, while others beſide them are healthy? is it not apparent to common obſervation, that the ſame is the caſe among mankind? when a diſeaſe is in a land, in ſome cities death rides triumphant, while others ſcarcely feel the calamity. In ſome families, the ſmall-pox blaſts perhaps all the hopeful plants, while others eſcape with ſcarcely a ſcar from the awful foe. Thinks I, no doubt, there are ſome bees of a more delicate and tender conſtitution than others, and theſe become an eaſy prey to the contagion, while others of a more robuſt, ſtrong, and healthy body, bid defiance to the diſeaſe.

Upon the whole, confinement ſeems to me to be the alone cauſe of the ſaid purging, and flying out in fine days the ſpecific cure: but ſeeing we cannot prevent bad weather from confining them, and thereby bringing the diſeaſes on ſome hives, neither can we procure good weather to remove it. I freely own, I neither can prevent bees from taking diſeaſes, nor can I cure them when diſeaſed; but I, at the ſame time, profeſs, that I can prevent a great many evils that bee-hives are apt to fall into by imprudent management of them; and alſo that when a

bee-

bee-hive takes a dis-thriving, I can make her thrive again.

The reader need not be discouraged because he cannot cure his purging bees, for notwithstanding all that has been said, it is not one of a dozen of hives that is much the worse of it one year with another; and of those that have it let him remove the dead that falls down on the board, and if many die, strengthen the hive with more bees.

Before I leave this, I cannot but observe, that I never knew the Queen a sufferer by a loosends, I suppose it is because of her being always in the warmest part of the hive, and in the midst of the bees.

It is certain that if a hive be kept in an outhouse close shut up (so as to admit only air, but not to let a single bee out of her) during the five coldest months, they will often do very well next spring. In such a case, no doubt, they must ease their bodies in the hives on their boards, but I believe sore against their will, yet they must submit to necessity, seeing they can do no better.

If some of your hives be reduced of bees in winter, and you wish that they had more bees, and that they would breed fast, then you may give a strong hive 1 lb. of liquid honey, (which I call a reviving) by pouring it among the combs; which when doing, hold the hive a little to one side, and by pouring in the thin honey, it will run into the empty cells: the bees will be very fond of it, and it will so revive and rouse them, that they will fall a hatching immediately (having many bees to increase heat): and af-

ter twenty days or ſo that they are hatched out of the cells, take a good many common bees from her, as directed page 81, and re-inforce a weak hive with them, as directed page 83, &c. Perhaps the reader may think, better feed the weak hive, and thereby rouſe and revive her, and make her fall a hatching forward bees for herſelf, which would prevent the trouble of re-inforcing. No, that is not ſuch a good method, becauſe few bees in a hive in winter have not ſufficient heat to hatch out young bees with; and even in ſpring few bees in a hive can ſcarce bring forward any young for want of heat; in the middle of ſummer itſelf, few bees in a hive increaſe very ſlowly; for which reaſons, among others, I have been ſo keen of adviſing you to keep your hives always well-ſtored of Bees.

By the foregoing method I have made my bees breed faſt in winter, and early in the ſpring, when they were no more thinking of breeding, than of ſwarming.

In winter, bees may be found on the floor of the hive, that have died merely of old age, for as they enter the ſtage of life at different periods of the ſpring and ſummer, they conſequently depart from it alſo in all the various ſeaſons of the year.

When a hive has been long confined by unactive weather, and a fine day comes in the beginning of *February*, I have carried her to the warmeſt and quieteſt place I could get, generally ſome pleaſant green, upon which the ſun ſhone, and turned her up about 11 o'clock,-and ſet her down on a pair of ſheets, with the combs oppoſite to the ſun; and the ſun ſhining down between

between the combs among the bees, roufed them fo, that they would come out of the hive, and fly about, and play, and air themfelves, and cafe their bodies on the fheets and all around, and make it all brown fpots, and I have poured a little liquid honey among the combs, which would have cheared their hearts, and made them very happy, and alfo fit for a whiles more confinement: and they, to reward my generofity, at night, in the hive, would give me a chearful fong, and perhaps were concerting meafures to hatch me forward a new progeny.

The reafon I fet the crown of the hive on a pair of fheets is, that the weakly bees might rife the better from it.

After the bees are all got into the hive again, they are to be fet in their own ftance, and not to be fuffered to get out for other ten days, left they fhould fly to the place they were turned up at, and fome of them be loft.

No doubt, the reader will be ready to fay, better turn her up at her own ftance, and thereby prevent the trouble of removing her; and alfo the bees may get out next good day without any hazard of being loft at another place. Yes, the reafoning is very juft, and muft always be done where they ftand, provided it be a tolerable good ftance; but in cafe it be a cold or very wet ftance, many of the bees would perifh by lighting on the ground around them. The other I oft prefer, becaufe I can get almoft any part to fet them in for a fingle day.

Bees, after long confinement in winter, perhaps eight weeks, forget where they ftood, and muft take as new an obfervation of their fitua-

tion as if they were perfect ſtrangers in that place; for which reaſon, if I want to remove a hive, I often do it after long confinement.

Care ſhould be taken during winter that no mice neſtle about the coverings of the hives, and if they do, they ſhould be diſlodged: but indeed the only hurt ſuſtained by mice is when the entry is left ſo large, as they can get in at it, [the reader will remember I gave directions in page 79, to make their entries ſo little as a mouſe could not get in] for I ſeldom ever ſee a mouſe gnaw a hole through the hive to get in at. If they lodge in the covering, I ſuppoſe it is for heat; however it is good to be ſure, therefore diſlodge them, for mice are moſt pernicious enemies when they get into a hive, they deſtroy the combs, eat the honey and bees, and often ruin hundreds of hives in *Britain*, every winter. I have, in my younger years, ſuffered greatly by theſe invaders: one winter I loſt five hives by mice; but for many years ſince I have not loſt a ſingle ſhilling by the whole fraternity of them, merely by keeping little entries. In the cold months, ſnails often creep in at the entries of the hives, and lurk about the inſides of them, generally upon the hive, but not among the combs: I never ſaw them do ſcarce any hurt. When the hive is turned up in winter to know her ſtate, they are eaſily diſlodged, and large ones cannot get in when the entry is little.

CHAP.

CHAP. XIV.

OF CANDIED HONEY.

SUNDRY writers affirm candied honey to be very deſtructive to Bees. Mr. *William White* ſays, you may as well give them poiſon as give them candied honey. Mr. *Thomas Wildman* ſays *, 'a ſudden return of cold congeals or candies the honey in the open cells. 'On the return of warm weather the Bees return to the cells they had opened, and finding 'there a ſubſtance which is too ſolid to paſs into their ſtomachs, or which they cannot ſwallow, they throw it out of the cells in ſearch 'of good honey. The candied honey falls upon the ſtool or bottom of the hive, and by 'this means they make their own graves.' This is a great miſtake, that candied honey becomes the graves of Bees on their ſtools; for ſuch candied honey as they throw out of their cells is of a hard ſubſtance reſembling ſmall hail. but harder, and will break, but not in the leaſt tenacious, neither does it ſtick to the Bees as mentioned by him in page 242, where it is ſaid, 'the Bees could not ſtir without daubing themſelves with it, and by their endeavouring to 'red:

* Page 243.

'red one another of it, they daubed each other 'more. Their bodies were beſmeared with it, 'and their wings ſo loaded that they could not 'fly.'

I never ſaw any ſuch thing as honey that Bees throw out of their cells ſtick to them, they carry it out of their hives with their mouths; and it is ſometimes on or before their entries, like ſalt or hail: the ſtrongeſt hives carry it out, and I have ſeen all hives in ſpring throw it out.

The only loſs by candied honey is, it is for no more uſe to Bees, for they cannot eat it; but that it worries or daubs them, I deny; in caſe a comb in a hive be full of candied honey it is all loſt, for the Bees throw it all away, and no uſe can be got of it, unleſs the owner was to take it out and melt it on the fire in a pan, and ſqueeze it out and then feed his Bees with it; but I never do that, but let them make the beſt uſe of it they can.

The only way to ſuſtain no loſs by candied honey, is to keep good ſtalls that are full of Bees, which will keep the hive warm, and cover them well, and make them little entries, which is all you can do to prevent its candying.

CHAP.

CHAP. XV.

THE HISTORY OF AN UNCAUTIOUS MAN'S BEES.

IT is generally obſerved, and there is too much truth in it, that Bees thrive beſt with people for two or three years after they get them at the firſt. The way this happens is thus, when a perſon buys a ſtall at the firſt, ſhe is generally a good one, is 30 lb. wt. has plenty Bees and honey; then if next Summer be good, ſhe will probably ſwarm twice, and then he aſks his neighbour's advice, and he adviſes him to kill the ſecond ſwarm, and keep the firſt and her mother, which are good ſtalls, and bid defiance to the three capital enemies, *viz.* cold, robbers, and famine.

The ſecond ſummer being good, they both ſwarm twice again, and the owner thinks he is a thriving Bee-maſter, (as ſo he is.) He again, with his neighbour's advice, kills both the caſts or ſecond ſwarms, and ſtill keeps the two old hives and their firſt-born, which makes four good ſtalls. Again the third year is but a middling good ſummer, often cold and rainy: however as his ſtalls were good, two of them ſwarmed once, and the other two twice, in harveſt he again kills both his two ſecond ſwarms as uſual, and begins to think now he knows as much about Bees as any man, and

aſks

aſks no more his neighbour's advice how to ſet aſide his ſtalls; and thinks, that as he always kept the mothers and their firſt ſwarms, and they did well; therefore he ſets aſide the four old hives and their top ſwarms, which make eight ſtalls *. Now his counting faculty begins to operate, and he aſſures himſelf of twenty hives next year; but alas! how is he perplexed when he thinks his bees increaſing ſo faſt, his yard will ſoon not hold them! ready-wit, his boſom friend, relieves his agitated ſpirits, by informing him that it is only to make his garden larger. Now he is at great pains to get his bees covered and made fit for winter, and lets them ſtand in hopes of a good increaſe next ſummer, and fails too to make ſixteen empty hives, and as many boards to receive his next year's ſwarms.

A fine day about *Martinmas* cauſes the owner to take his friend along with him to ſee his flouriſhing garden full of bees, where he entertains him with a lecture on the profit of thoſe uſeful inſects; he goes by two or three of his hives, and they are flying ſmartly out and in, which pleaſes him well. The next he comes to is not ſo briſk, he may ſtand before her entry without being the leaſt injured by her ſtings; he excuſes her lazineſs, by informing his friend

. . . . . that

* The ſummer being bad, they had not time to gather enough of proviſion for the winter; only two of the old hives and one top ſwarm, were thirty pound ones, of the reſt, none had honey enough for winter; other ſome were ſcarce of Bees alſo, and not one of them ſhould have been kept for ſtalls.

that they do not come out of the hive all alike at the ſame time: however to ſatisfy him that ſhe is a good hive, he raps on her ſide to let him hear her ſound, but as ill luck would have it, ſhe will not anſwer that ſummons: he turns her up, changes colour, and ſays, ſurpriſing! ſhe has not a Bee in her, but ſome honey at the top of the hive *. What has happened her? ſays he; tells all his neighbours the aſtoniſhing news, turns a little more penſive about the profit of Bees: however he has ſtill ſeven, he wiſhes they may ſtand the winter and ſpring; a cold ſtorm comes on, and laſts eight or ten weeks, after which fine weather again, the Bees go an airing, and the good man comes to ſee how they come on now. Paſſing by ſome of them, he is pleaſed to ſee how throng they fly about, and rain away their ordure from them, as appears on every thing that is white. He ſees one at ſome diſtance, not ſo throng as he could wiſh, runs to her, fears the worſt, raps the hive, out jumps a mouſe at her entry, (which was rather large) turns her up, dead Bees half eaten, and a good many ſhorn combs on her board, a great many Bees ſitting very cloſe (rather over) betwixt her combs. The peaceable Bees never offer to fly at his face, he can view them as he pleaſes, and never receive a ſingle ſting;

* She was an old hive that ſwarmed twice, and was only fourteen lb. wt. and had but few Bees in her, and ſhould not been kept. Her Queen died perhaps when there was not an egg in the hive to raiſe another of, therefore the Bees left it.

ſting; he concludes ſhe is dead *, gives over making empty hives.

He has ſtill ſix, ſays, I wiſh they may not all die; in *March* four of his hives carry loads hard, the other two is as buſy, but not carrying ſo faſt; a Bee loaded in half an hour is a good deal for them, however the entries have full as many Bees about them, and rather to the rather, and far more dead ones, and many gallant ſoldier crawling about in his wounds before the gates of the hives. The owner thinks ſome man's Bees are for robbing mine, but they had better ſtay at home, ſays he, for my Bees kill them faſt. In a day or two after, at night, the good-man goes to hear how his Bees ſound; the four carriers pleaſe him well by giving him a good ſong, the other two are not ſo loud; he claps their ſides to make them ſpeak better out; they turn ſulky on him, and obſtinately refuſe to anſwer, he grips at them to feel their weight, but by pulling them up too haſtily, he almoſt falls backward, by their coming too quickly from the board; when recovered, he is ſtartled again to ſee other two of his hives full of nothing but deaf combs which the robbers had left †: he throws them from him as uſeleſs, and the

* She had far too few Bees in her to ſtand a cold winter, beſides ſhe was only an 18 pound one, and had the rogue Cold ſpared her, Mr. Robber and Famine would aſked where ſhe lived, the filthy Mouſe aſked his tithe, which the kind owner obliged him with, by keeping open to him a large door, which aſſiſted him and Cold greatly to rum the hive.

† Theſe two hives had few Bees, and were not able to reſiſt robbers, which if they had eſcaped them, they

the fall breaks all their combs †. When come to himself again, he says, I have still four yet, and am richer than when I began: the four carry briskly all *April*, and he thinks all danger is past now; but alas! eight days misty weather in *May* keep his Bees all close prisoners in their hives: a fine day returns again, and three of his Bee-hives fall to work heartily, as if they meant to hurry home all the honey in the neighbouring flowers, before another rainy day comes; the other is not so careful, she appears as if she did not value a good day much; not a Bee to be seen about her gates, except here and there one something like dead. The owner begins to quake again, says it is not possible she can be dead after carrying so much, is afraid to lift her from her board, must do it, she is motionless, and the board covered with dead bees, and her combs full of dead young §. O foolish man! why did not you ask your honest neighbour's advice, who would advised you to kill all

they would have had a good luck if they had missed Mr. Famine too in *April* or *May*; they should by no means been kept for stalls in harvest, having neither enough of Bees nor honey.

† Had the frighted man not been so quick in his nature, and preserved those two hives; and them that died formerly, they would been very profitable to put swarms in next summer.

§ This one was a 24 pound one, and had she missed that blast would have done very well; or had the good man given her 4 lb. of honey-combs in *April*, he might have saved a hive which would probably have made him other 30 lb. to it.

the five hives that was light and ſcant of bees, which at harveſt, one with another, was worth fifty ſhillings, but now is ſcarcely worth eight altogether; beſides all the vext hearts you have got with them: be ſure never to do the like again if you be wiſe, rather kill all your light hives, and purchaſe heavy ones with their caſh, ſuppoſe it ſhould take the price of two of your weak hives to purchaſe a ſtrong one; you will have more profit, and fewer to laugh at you in the end. Would people keep never any but thirty pound ones, their bees would thrive as well all along as at the firſt. I have given the above hiſtory to deter others from taking the ſame ſteps, which this imprudent man did.

CHAP. XVI.

OF FEEDING BEES, OR THE BEE-MASTER'S LAST SHIFT.

FEEDING bees I greatly diſſuade from, unleſs you have been ſo fooliſh as to keep weak ſtalls in harveſt, then feeding may be ſometimes neceſſary in ſpring; and when new ſwarms are confined in bad weather, it is thrift to give them a meal, and in caſe you are obliged to feed a hive in harveſt for a ſtall, when none of your own will do, by reaſon of a bad ſummer, nor can you get any thirty pound ones to buy, then you will be obliged to feed.

If

If in harveſt you have not as many thirty pound ones of your own as you want of ſtalls, then go through the country, and try to purchaſe as many of thoſe kind as you want for ſtalls: but in caſe the ſeaſon has been ſo very bad (which rarely happens) that you neither can have as many of your own, nor get as many as you need of good ſtalls, then you muſt feed in that caſe, and I chearfully give directions to do it, when you cannot do better, only let feeding be your laſt ſhift. Suppoſing you to want a ſtall, and have not one 30 lb. wt. but has three or four hives 20 or 24 lb. wt.; then take one of the beſt of them that is neareſt 30 lb. wt. and alſo take as many of honey-combs, and put to her, as will make 30 lb. wt. and ſo fit for a ſtall. The way to do it is this, take a board and ſet an eek (as wide as the hive) on it, having an entry in the eek; it ſhould be four or five rows deep; then take honey-combs, and cut them longwiſe ſo as to reach from one ſide of the eek to the other; if you have any that large, and as deep, as when you ſet on the light hive, the under ſide of her combs will touch the upper edge of the combs in the eek. All the combs in the eek muſt be placed in the ſame order they were in naturally in the hive they came from; I mean the cells that was uppermoſt to be ſo ſtill, and an inch and half from one comb to another, and fix them with ſticks the beſt way you can, ſo as to make them ſtand on their edges. Then at ſun-ſet lift up the light hive, and ſet her on the eek, the combs of them to run in the ſame direction as near as can be done, then ſhe will be 30 lb. wt. and a good

ſtall, ſeeing you could not do better, for the bees will ſoon fix comb to comb, and make them to lift all at once. Very readily they will carry the honey all up to the upper ſtory, after which you may take a knife, and cut away all the combs again if you pleaſe, or do it with a piece pack-thread, by making it paſs between the eek and hive, holding one end in each hand, and drawing it back and forward, as in the manner of drawing a ſaw; it will ſoon cut the joinings, and then ſet down your hive as before. But ſometimes the Bees think the honey is as well placed in the combs you give them, as they can place it, at leaſt they can put up with it in that manner, and will let it ſtay there till they gradually eat it out; but whenever done, take away the eek, and let them have only combs of their own building, for were ſo many empty combs left, it might retard their ſwarming next year; but if the hive was rather little, you may let them ſtay, which was the reaſon I was ſo particular in ordering how they ſhould be placed: but a prudent Bee-maſter will eaſily conſider what is moſt fit for to be done in this and many other caſes, which may happen in the management of bees, which no writer can foreſee. The reader will be ready to ſay, this is a fine way of feeding, for it does not tempt robbers by the ſmell of freſh honey, as it has the ſame ſmell of other honey-combs in their own hives; beſides it is done at once, and no bees are drowned, as too often is the caſe in the plate way of feeding bees; neither is it a continued toil, by giving it every day, as Mr. *Keys* directs, nor need the bees ſurfeit themſelves by it,

it, as they have it in combs, and are ſure it is all their own: but he will be ready to aſk, how am I to come by theſe combs? this is no difficulty, for if you kill any hives of your own in *September*, you will get their combs; but if you kill none, then purchaſe them from others that have them; and you muſt feed the ſame way in ſpring, if you have been ſo fooliſh as to need to feed in ſpring: and give a top ſwarm alſo a piece of honey-comb when ſhe needs it, when ſhe is new ſwarmed, and that is the far beſt way of feeding bees, therefore take this method by honey-combs. In this way you may make any hive a heavy hive at any time. I would adviſe a bee-maſter to keep always a large quantity of honey-combs by him in a large jar to ſupply any emergent occaſion; all old honey-combs, and all thoſe that may be mixed with much bee-bread, and young bees in them in taking time, ſhould be given to bees to take the honey out of them, as it would be for little uſe otherwiſe, and the bees will make good honey of it. The way to give them it is this, take a large eek made on purpoſe, eight rows deep, and place it on a board, and place the ſaid old combs in it, in ſuch a manner as the bees will get to all edges of them, and then ſet on a hive well ſtored of bees and lighteſt of honey, and they will ſoon make merry with it, and you may remove the combs and eek in two or three days, and you will find them honeyleſs.

But in caſe you need to feed bees, and have no honey-combs to feed them with, then you muſt take the next beſt method, and that is to feed the plate way with liquid honey.

Suppoſing you to have, in *March* or *April*, a hive that muſt be fed, then give her a ſupply of food in this manner:—take 2 lb. of honey and put in a pan, and put alſo a *Scotch* gill of water among it, and warm it in the pan till it be all well melted and mixed together, (ſo as they may lodge it conveniently in their cells) then pour it in a plate that will hold it conveniently, then take a ſtrong ſheet of brown paper, and pierce it full of ſmall holes; and cover the honey with it, and have a board made on purpoſe with a hollow cut out in the middle, ſo large as to contain the plate with the honey, that when the plate and honey is in it, the upper edges of the plate may fluſh with the board, and thereby not bruiſe any of the combs of the hive when put over it: having your board, plate, and honey all ready, then at ſun ſet go to your weak hive, and ſet down your feeding board beſide her; then lift gently the hive, and place over the honey, and the bees finding the ſmell, will come down and carry up the honey, and lodge it in their magazines for further uſe. The next morning, perhaps, if there were many bees in the hive, the plate will be honeyleſs. And you may ſet the hive on her own board again; but if ſhe had but few bees in her, give her honey in proportion to her number. Sometimes a cold night will not ſuffer the bees to carry up much of the honey: in ſuch a caſe, next morning ſhut them cloſe up, round and round, ſo as not a ſingle bee may get out, and let them ſtand ſo for two days, and they will in that time have carried up the honey. When a hive is feeding, never let any ſtrange Bee into her,

for

for it would bring multitudes, and make much ſlaughter and miſchief; which makes me ſo poſitive in ordering you to feed with honey-combs. In caſe you have neither honey-combs nor honey to feed with, you may give them a little ſugar and water mixed together, and feed them the ſame way you do with the honey in the plate and board, only they muſt have leſs at a time, and be conſtantly fed; whereas in feeding with honey in the plate way you ſhould give them as much at a time as will ſerve them twenty days. Great care ſhould be taken in all your feeding of bees, to give it ſo as to prevent their falling out about it; therefore never feed in the day-time, unleſs your weak hive be not within half a mile of any other hive.

I cannot paſs this ſubject without animadverting a little on *Keys* directions for feeding bees: he is at a great deal of pains (page 310) to prove that ale and ſugar will preſerve Bees from famine:—all true—who denies it? He is for feeding Bees in ſmall kexes, and propoſes to give a hive a full one every twenty-four hours; but in caſe they do not eat it out, to give them leſs next time, that there may be no danger of their overcharging themſelves. Some ſtickler may perhaps ſay—Seeing he ſays they eat to exceſs, why might not a hive which he had given a kex to, eat to exceſs, and thereby return him his empty kex, which would delude him ſtill, that one full kex was little enough for that hive, and he would always give them kex after kex, as long as they eat them out, although it might be to their ruin, as he ſays, (page 306.)

'Bees are like some other creatures of a more 'noble species, who not contented with a temperate enjoyment of abundance, feed to excess, 'and thereby lay a sure foundation for numberless diseases, often terminating in an untimely and painful death.'

If Mr. *Keys* means to give a Bee an exact meal, and no more, he must first ascertain how much weight or measure of sugar or honey refreshes a Bee at a time; and next count the exact number of the Bees in the hive he intends to feed; then he must weigh or measure as much food as will feed a single Bee, and give that Bee its livery in some curious instrument, and so give every one their exact proportion by themselves. Perhaps the aforesaid scrupulous person may still urge and say, This would be a very troublesome business. But Mr. *Keys* has an answer at hand, p. 311. He says, 'So is 'feeding poultry and pigs; let the farmer's 'wife refrain from it three or four days, and see 'how fat they will be.' If the scrupulous man still will be obstinate, he may say, that the Practical Bee-master* says, page 162. when criticising *Thomas Wildman*, for uniting two hives, which may be done at once, never to be repeated more, 'this method requires too much 'leisure and patience to be generally followed.' And he may also pretend that the Practical Bee-master and Mr. *Keys* are quite different in their doctrines on that head, namely the Bee-master is so afraid of trouble, that he will not unite a hive,

* Practical Bee-master, by *John Keys*.

hive, (tho' greatly profitable) altho' it is done at once; whereas Mr. *Keys* is keen for feeding Bees daily let it be never so troublesome.

The truth is, give a hive never so small a quantity of food to eat at a time, the Bees that get first at it will have a belly-full, and the most part of the hive never touch it. Besides feeding Bees daily is a daily trouble, and daily brings robbers to plague the hive and kill some of her Bees; whereas giving Bees as many honey-combs at a time in harvest, winter, or spring, is doing your business well for once, never to trouble you more. Mr. *Keys* has another most curious way of feeding Bees, which he calls public feeding, and that is to put honey in a board full of holes, and set it out in the apiary, and let your whole Bees at it. This is a new fashion indeed, but I hope few will follow it, unless they want a general massacre among their Bees: for whenever Bees can get honey in any other thing than flowers, (I mean out of their own hives) they directly fall out about it, and much fighting and slaughter ensues. It is true indeed, I have sometimes fed them that public way, but for the most part to my loss; and cannot recommend it as practicable.

Directions will be given to know when they must be fed, at the different seasons, as we go through them.

But I am weary of writing on so disagreeable a subject, and hope my wise readers will take advice, and keep good stalls in *September*, and thereby scarcely ever need to seek directions in this chapter, called, THE BEE-MASTER'S LAST SHIFT.

SHIFT. And I conclude this chapter with asserting, that he is a wise man who keeps good stalls, and thereby needs not to feed his Bees.

CHAP. XVII.

OF THE WARS AND ROBBERIES OF BEES; WITH DIRECTIONS HOW TO PREVENT THEM FROM BEING ROBBED.

ALL Bees have a martial spirit, and strive to enrich themselves at the expence and ruin of their neighbours; for when the weather is good, and no flowers in the fields for the Bees to work on, they will venture their lives, and rob for it; and then the hives that have few Bees in them are to be pitied, for not a hive in their reach is left unassaulted, and, as among men, the weakest goes to the wall; for strong hives, when attacked by robbers, give them a terrible reception, and scarcely one that they get hold of gets off to tell their neighbours tidings. And the siege laid against a strong hive is soon raised, and the hive nothing the worse, perhaps scarcely loses a score of Bees when the wars are ended.

Various reasons have been assigned for their going a robbing one another: the bulk of writers impute it,

1st. To

1ſt. To a hive in harveſt not having a ſufficient proviſion of honey in herſelf for the winter; ſhe therefore tries to enrich herſelf, to the ruin of her neighbour.

2d. Dr. *Warder* aſſigns another cauſe of their fighting, which is the neceſſity that the Bees are reduced to when their own hive has been plundered at a ſeaſon when it is too late for them to repair the loſs by any induſtry of their own in the fields.

3d. But their fighting and plundering ought chiefly to be imputed to their inſatiable and ardent thirſt for honey; for in ſpring or autumn, when the weather is fine, but no honey can be collected from plants, and is to be found only in the hives of other Bees, they will venture their lives to get it there. I believe the pooreſt are keeneſt of robbing: but in ſuch weather as was mentioned all hives go a robbing, whether rich or poor.

4th. Another reaſon of their robbing is when there is a large quantity of Bee-hives in one place; for every hive tries the ſtrength of all the hives in its neighbourhood, and they all go a robbing who to rob faſteſt; whereas four or ſix hives only ſtanding in one place, are ſoon tried, and they find out one another's ſtrength, and make no further aſſaults, which was the alone reaſon I adviſed to ſet hives thin.

5th. But

5th. But one great reaſon which provokes Bees to rob is, when hives are fed; for the robbers ſmell the freſh honey, and come for a ſhare of it, and will not take a refuſal, tho' it ſhould coſt them their lives, as every one may know that has done it (in an imprudent manner): the robbers coming often for a ſhare of the ſupplied honey, and finding that there is honey in the combs, aſcend them alſo, and claim an equal right to both, which often makes the cure worſe than the diſeaſe: which is a ſtrong argument againſt keeping light hives for ſtalls.

If a hive that has not many Bees in her is attacked, ſhe ſometimes will reſiſt to her power; and you will perhaps ſee four or ſix brace of warriors before the entry wreſtling in a moſt furious manner, twiſting each other round and round, and ſtriving for victory: if the robber can get clear from the native, it is generally what it wants; but often one of them is ſlain by the other thruſting his ſpear into the moſt vulnerable part of the body; and ſometimes the Bee leaves the ſting in the wounded, which becomes fatal to both. But in caſe the robbers find they gain ſome advantage over the natives, then they come in great multitudes, and pour in their forces at the gates of the city, and ruſh into the remoteſt rooms, and tear open the cells, and carry off the richeſt treaſure; and if the native Queen be ſlain in the engagement, it is thought the Bees join the robbers, and unite with them, and ſo carry off their own ſpoil.

The

The robbing time is ſooner or later according as the ſpring or autumn is more or leſs favourable; but it is generally twice a year in the ſpring and harveſt. The moſt of writers ſay, that there is more hurt by robbing in autumn than ſpring. I cannot ſay with reſpect to thoſe who live in very early parts, when the flowers is ſoon blown, and ſoon over; the flowers coming in ſoon in ſpring, afford the Bees work, and conſequently keeps them peaceable among their neighbours; but when they are ſoon gone, and the weather ſtill good, it provokes them to plunder. But experience teaches me, that I ſuffer far more by robbers in ſpring than autumn, for I never yet had a ſingle hive ſuffer much in autumn by robbers; whereas in ſpring I have had (in my unexperienced years) a good many robbed out root and branch.

The way I account for it is this—in ſpring there are far fewer Bees in a nive, than in autumn, and ſo are not ſo able to defend their property, as they are in autumn, when they are far more in numbers.

Alſo in ſpring their honey is near done, perhaps quite exhauſted, which neceſſitates them to filch about for it wherever they think they can find it: but in autumn, although they may not have a ſufficiency for winter, they have preſent ſupply, therefore preſent neceſſity doth not force them to ſuch an unlawful ſhift.

Sometimes many hives will go a robbing another hive, and then all is confuſion; and rage and great ſlaughter takes place: they will be flying like ſo many fiery dragons, ready to at-

tack every one; and whoever dares obſtruct their flight, ſhall feel their poiſonous ſpears in a moment. In ſuch an unhappy time one dare ſcarcely go near them, unleſs he is reſolved to receive wounds from all quarters. When they are engaged thus, their ſound in the air is eaſily known.

The people's actions will their thoughts declare,
All their hearts tremble, and beat thick for war;
Hoarſe broken ſounds, like trumpets harſh alarms,
Run thro' the hive, and call them forth to arms;
All in a hurry ſpread their ſhiv'ring wings,
And ſit their claws, and point their angry ſtings;
In crouds before the hive they all do light,
And boldly challenge out the foe to fight.

We ſhall firſt ſhew the ſigns by which you may know when a hive is attacked and ſuffering by robbers, and then how to preſerve her from them.

You will perceive Bees going out and in to the hive that is receiving the injury, early before other Bees are fallen to work, and at even, when other Bees have given over working, they will alſo be doing the ſame at the hive that is committing the robbery, which you may perceive, if ſhe be near you; for theſe plunderers find this the beſt time for their

their purpoſe, becauſe they meet with the leaſt reſiſtance.

The firſt time of the year that Bees get flown about, and ſcarcely any flowers in the fields, is the time they go moſt fiercely a robbing; but if they meet with ſtrong hives ready to engage them in battle-array, the wars are generally ended in two or three days. I have ſeen them about the middle of *March*, in fine weather, rob ſo violently for two days, in ſo much that I have thought by their appearance they were determined to root every hive out within their reach: but by the weather changeing to cold or rainy, or both, kept them in their hives for eight or ten days, by which time the flowers were ſpringing faſt, and the weather changing again, and permitting them to go out, they would never have remembered their former wars, but would have fallen throngly to work, and therefore robbed no more that ſpring. Again, I have ſeen in early ſprings, when the flowers were as ſoon blown as the Bees could go out of their hives in ſearch of food, and finding materials to work on among the flowers, they would not have robbed any that ſeaſon——a happy circumſtance for the Bee-maſter.

Whenever any of the ſigns of a hive's ſuffering by robbers is obſerved, an end ſhould be immediately put to their wars; or, which is better, their robbing ſhould be prevented before the wars begin: therefore I ſhall firſt inform you how to prevent any hive from becoming a

prey to robbers, and next ſhew how to terminate their wars when engaged in them.

It is the want of a ſufficient number of Bees in a hive to defend her that is the alone cauſe of her becoming a prey to robbers, as I have told you already in page 77, that a ſtrong hive of Bees never ſuffers much by robbers; therefore in the end of *February*, or beginning of *March*, turn up every one of your hives in a cold morning, and you will diſcern at one view (by looking down between the combs) the hives that have plenty of Bees in them from thoſe that have few; and if you ſhould have three hives that are well ſtored of Bees, and one that has few, then take a thouſand Bees from every one of the three hives, as directed p. 81, 82. and put to the weak one, as directed p. 83, which will make her fit to repel any daring foe; and the ſtrong hives will be little worſe of the loſs of a thouſand Bees: I often take as many Bees from one ſingle ſtrong hive as is ſufficient to ſtrengthen a weak one with. The reinforced hive being now made up of different Bees, if left ſtanding ſtill in her old ſtance, ſome few of the new-comers are ready to fly to their mother hive again the next fine day; therefore to prevent it, I often remove the reinforced hive a mile or ſo from where ſhe ſtood, and lets her ſtand there for two or three months, which thins my own apiary of Bees, which is another preſervative from robbers; for the more hives ſtanding in one place, the more Bees are yearly killed by robbers.

But

But in case you have a hive that has few Bees, yet dare not venture to reinforce her, (and indeed you must not be too venturesome till you can handle Bees middling well, lest you make the cure worse than the disease) then remove her (weak as she is) a mile from any other hive, and she will do very well, standing herself alone, and none to disturb her; whereas if she be left in the midst of ten or twenty hives in the fierce robbing time, ten to one if she continue long a living hive.

I have oft had the greatest satisfaction imaginable in removing weak hives out from among many others in robbing time. I have seen a weak hive beset day after day with robbers, and resist them to her power, but having few Bees to fight, and carry on the work, and keep heat in the hive, and some being killed daily in battle, would, instead of increasing, as they should in *March* or *April*, rather decline; and if they were not killed quite out, they never did much more good; whereas when I have seen a weak hive attacked in that manner, I have directly removed her a mile from any other Bees, and she would have been very happy to find, that instead of war and rage, peace and harmony was restored; and the very first day she was set down, she would set about reforming whatever was disordered in the hive, by burying all the dead that were slain in battle during the war, and mending every ragged comb and breach about the hive, and would have begun to work, and wrought peaceably and keenly according to their numbers, and come forward to have been a strong hive in *June*, and

ſometimes ſwarmed, which was all won money, for if ſhe had ſtood in the midſt of her enemies, ſhe would have either been killed outright, or worth very little at harveſt.

The moſt of writers direct when Bees are ſuffering by robbers, to make their entries ſo little as one or two Bees can only paſs out or in at a time, alledging that the native Bees are thereby able to defend ſo ſmall a gate, and thereby reſiſt the robbers; but if, ſay they, notwithſtanding the reduced entrance, the war is not ended, then ſhut up the entry of the hive that is receiving the injury, ſo as not a Bee may paſs out or in, and let her ſtand ſo for two or three days, by which the robbers coming day by day, and not finding admittance, they will give over further attempts, and you may again open the ports as ſoon as the coaſt is clear of pirates. For my part, I never ſaw much advantage by theſe methods: the native Bees cannot bear confinement long when the weather is good, and whenever the entries are again opened, generally the robbers renew their attacks. At beſt it is very troubleſome, and ſeldom gives much ſatisfaction; but reinforcing and removeing in ſpring is an effectual cure, and done at once. In autumn all hives that are troubled much with robbers, it is a ſign they have but few Bees; therefore take them immediately for your uſe, for your right is better than the robbers is; and I never mean to direct to keep a ſtall that has any defect in her, in order to be cured, and teach how to cure her. I only mean to inſtruct how to mend a hive that has taken ſome dis-thriving in your hand at a ſeaſon of the

the year when if you kill her, ſhe would be of little value.

In ſpring all methods ſhould be taken to mend weak hives of whatever diſeaſes they may be labouring under, as the honey harveſt is at hand, and they being properly cured, will requite the owner by their further labours. But in autumn a weak hive (of whatever kind) ſhould be immediately taken; for the longer ſhe ſtands the worſe will ſhe turn, and all mending of weak hives then is doing what you can to loſe both what honey you give them, and alſo all they have of their own, beſides all your trouble; therefore I give no directions how to ſave weak hives from robbers in autumn, but only this one, and that is, remove their Bees by death, and their honey into your warehouſe; which is the alone cure I preſcribe at this ſeaſon of the year. But to return to the ſpring, ſtrong hives are very ſeldom attacked, and when attacked ſuffer little or nothing by robbers; which is one ſtrong reaſon, among many others, for keeping none in *September* for ſtalls but what are ſo.

I ſhall here quote a revery from the Practical Bee-maſter, where the reader will ſee a perfectly new ſcheme to preſerve Bees from robbers: 'When a ſtock is beſet day after day,' ſays our author *, 'it is a ſign that the robbers have 'taſted deep of the nectar; in this caſe it will 'be beſt to take it, if light, and to drive the 'Bees, and unite them to another hive; but if 'weighty,

* Page 287.

'weighty, let it ſtand, and kill the robbers: if 'they are not killed all in one day, two or three 'days may be taken, keeping the Bees ſtopped 'up all the while; but it will be beſt to finiſh 'them, if poſſible, in one day, leſt in revenge 'for their diſappointment, they ſhould fall upon 'ſome of your other ſtocks:—a good method 'to prevent it is to irritate all your other ſtocks, 'by thruſting a twig into each of their hives.'

I hope I need ſcarcely to point out to the moſt of my readers the abſurdity of ſuch prepoſterous, wild, and extravagant directions: every one at firſt glance may ſee the direful conſequences of ſuch a pernicious practice. If Mr. *Keys* means the deſtruction of all robbing Bees, his buſineſs may be done at once by ſmoaking every hive in his reach, without giveing himſelf the trouble of killing and ſlaughtering day by day; for it is certain that all Bees go a robbing in good weather, when they can get no flowers in the fields to work on: and if in ſuch weather one ſhould view his Bees, he will ſee ſtrange Bees robbing at every hive; and if he were to have ſix hives, and appoint ſix men to kill every ſtrange Bee that attempted to go in at their entries, he might kill on as long as there were Bees in the neighbourhood; and his neighbour taking the ſame method, it would be kill who to kill faſteſt, and next to footing Bees out of the land:—for inſtance, were 20 hives in one apiary, every one of them would try to rob another; and were you to kill the one half of the Bees, the reſt would let you ſee they did not value you, but would rob on ſtill; and ſhould you ſtill think, I will

kill

kill 16 of the hives to save the other four, the remaining few would still try to rob each other.

Mr. *William White* speaks to better purpose, when he says *, 'If there are several stocks of 'Bees in a garden, and one of them goes a robbing, when the rest hear the conquering sound, 'they will immediately join the victors with all 'their strength and might.'

'Sometime ago I went a few miles to visit a 'relation, and stayed a few days. Returning 'home, before I got to my house, I perceived 'there was mischief broke out among my bees, 'and upon going into my garden, I soon perceived the matter, which was as follows:'

'One of my neighbours had five stocks, and 'nine of mine joined with them, and had killed 'four stocks out of the five, which I was very 'sorry to see, as I could have prevented it if I 'had been at home by using proper methods.— 'I was acquainted with a neighbour that had a 'stock robbed, and falling in a passion on the 'account, he threatened to kill all the robbers, 'be it as it would; so he stopped them quite up, (the hive that was receiving the injury) 'and 'made a fire before the hive, by which improper method numbers of poor industrious creatures perished in the flames, which was a barbarous action; for he not only killed the robbers, but also a great number of his own bees, 'for he had several other stocks; but this may 'be imputed to nothing but want of judgment, 'as

* Page 79.

'as it might have been remedied by a much better method than so cruel a one, as the putting 'such a number of industrious useful creatures 'to a grievous death, for there is not one action 'of their lives, but tends to the manifest benefit 'of mankind.'

By keeping very little entries in robbing time, prevents the robbers from going so easily into the hives, as a small force will defend a narrow passage against the power of a great army. But I conclude here with again repeating the grand cure, which is, either reinforce or remove the attacked hive, but rather do both to her (if you conveniently can) as soon as you see she needs; and I assure you satisfaction by those methods, but cannot promise you success in any other way.

CHAP. XVIII.

AN UNCOMMON DISASTER, WHICH SOMETIMES, THOUGH RARELY, HAPPENS BEES.

I SHALL here narrate a very strange disaster which happened to four of my hives last spring; which, for the singularity of it, I hope the reader will excuse me for relating here.

In the latter end of *March* I had four hives that had but very few Bees in them, and also very little honey, and consequently could neither have defended themselves from robbers nor famine.

famine. To put them in a way of defence from both, I supplied every hive with a sufficiency of honey to bring her to *June*, and also after two days reinforced her with Bees to defend her from robbers; after, in the first week of *April*, I took the four hives a mile from my own apiary, and placed them in a sunny quiet place among whins, which were beginning to bloom, and near some fallow trees whose palms were out, so that when the weather was fine, they had food at their door without the trouble of much travel. At the same time I set other four good hives beside them, which had plenty of both honey and Bees of their own, and thereby needed none of my assistance (happy hives are such!) As soon as they were well set down among the whins, the weather turned very good, and my four mended hives fell briskly to work, and wrought throng for twelve days of fine weather. The other four good hives began to work too, but wrought in a more slow manner; for, for one loaded bee that went into the good hives, there went three into the mended ones; I supposed they were in a manner extremely happy to find their case all on a sudden so agreeably changed, *viz.* from poverty to plenty, from a few bees that could neither keep heat to hatch with, nor defend from robbers, to a numerous hive which could answer both ends, and also being placed among plenty flowers to work on, while bright *Phœbus* failed not to complete their happiness by shining pleasantly to invite them out: they wrought throng for twelve days as I said, and I turned every one of them up to see how they were breeding, and I was as

happy

happy as them to ſee they were hatching forward a numerous young brood in the cells; each hive had more than a thouſand ſealed up cells in her, while the ſtrong hives had not above the one half of that number: thus they went on in this proſperous manner during the ſaid good weather; then the weather ſet in very bad and cold for other eight days, inſomuch that when I was carrying one hive, my hands turned ſo cold that I could not hold her.

Good and pleaſant weather comes round again, and my ſtrong hives fell briſkly to work; while ſcarcely a bee was to be ſeen at the entry of any of my mended hives: I was ſurpriſed at it, as knowing it was neither for want of bees nor honey; I then turned them up, and by looking down between the combs, I ſaw plainly that the young were all going backward in the cells. I waited other eight days, and none of the hives ever carried any at all, while my ſtrong ones carried throng. I then turned them up again, and cut out a large piece of comb with maggots in it, and found every one of them dead, and going backward in the cells: as it was ſuch a caſe as I was perfectly a ſtranger to, I could not know the cauſe how it happened; neither did I preſently know what method to take with them next. I conjectured that every hive having got ſo many bees, and ſo much honey added to them; at the ſame time placed in the midſt of good paſture, to which the ſun added his comfortable preſence, all which completed their happineſs, and ſet them a thinking ſummer was at hand, and now they ſhould ſet to prepare for it, by hatching

forward

forward a numerous brood, which they accordingly had done, and had a vaſt number in their cells, conſidering the ſeaſon of the year, and the ſhort time they had; and alſo their number was not very great, although they had a moderate quantity. I alſo conjectured that as the Queen had been made prolific by the heat in the hive, to lay great quantities of eggs, the bees had alſo to go off in large quantities a foraging among the flowers for freſh farina to ſeal the maggots up in their cells with; and when ſo many were abroad, the few that remained at home could not keep a ſufficient heat in the hive to nouriſh up ſo large a brood: but perhaps thought I, the principal reaſon was the unexpected return of ſo ſevere a cold at this ſeaſon; by which they were not able, by any power of theirs, to keep a ſufficient heat in the hive (during the cold) to hatch out the young: further thought I, if they had conſidered that in ſo ſevere a cold, (which they had little expected to meet with after ſuch a noble proſpect) their whole bees could not cover the whole brood with a proper heat, therefore they would been wiſer to have taken a proper care of the inmoſt bees about the centre of the hive, and thereby preſerved a part inſtead of loſing the whole. However thinks I, they acted no worſe here than ſea-faring men, when in great hazard of loſing their ſhip, cargo, and lives in a ſtorm, by being over-laden; yet are loth to abandon any part of their ſhip or cargo, expecting (with my bees) every hour better weather, and thereby would ſave the whole.

You have seen I have given the excessive cold the whole blame of the above disaster which happened to my four hives. I had next to consider what to make of them, seeing the most part of the cells were full of rotten eggs and perished maggots: I waited other two weeks to see if the bees would desert that part of the hive, and lay eggs in other empty cells, and thereby repair their loss, but they did not, but continued close upon the dead maggots. I suppose they did that, because there were some cells here and there, with live maggots in them, but very few; for one live maggot there were forty dead. I resolved to let them stand still in the same case they were presently in, in order to see how the bees would do further in such a deplorable case; whether they would abandon the hive entirely, or if they would try to tear out the stinking maggots, and I thought that would save the combs. I waited till the beginning of *June*, and the bees turned very few, the old ones dying of age, and few or none to supply them; they decreased very fast from the time of the disaster to the beginning of *June*, they carried loads and bred some, but very little. When I turned them up in *May* and *June*, and looked down between the combs, I was unable to do it for the stench that the rotten maggots produced. I then saw plainly that they never were to turn to any account the way they were presently in; for though they were beginning to tear out some of the consumed maggots, and lay eggs in their place and increase a little, the season was going away fast, and consequently they would be of little value at the end of summer,

mer, perhaps not have 3 lb. of honey, whereas I could make far more of them another way, seeing they had a queen. I then immediately proceeded and took all the bees out of one of the hives, and put in an empty one; I next took all the bees (which were very numerous) out of one of the strong hives, which I told you was standing beside the mended ones, and put in another empty hive also. I then set down both the hives containing the Bees, in the very spot where they stood when in possession of their own hives, in order that they might keep their old stance: and then I took the hive containing the stinking maggots, and with an instrument made on purpose, cut out all the pieces of combs, containing the stinking maggots, among which were 200 young bees coming forward, in some of the cells which the bees had cleaned out; but I paid no regard to them, but cast them into my empty-comb barrel, that the cells might be made into wax, the next time I made that commodity. After that, I took the numerous bees which I had taken out of the strong hive, and put in the hive which I cut the combs out of, and set the bees exactly where they stood when in possession of their own hive, and they being numerous, soon filled her full of combs again. I then took the heavy hive, which was almost full of maggots in the cells, and had also, I judged, 10 lb. of honey in her: I then took the few bees which came out of the stinking hive, and put in her, and set her down in the place where the few bees stood before, and covered her well, and gave her a very little entry, in order to keep her warm to hatch out the young,

and in ten days time she hatched out a most numerous brood, and they were both thriving hives. I did exactly the same with the other three sinking hives, and changed their bees with three of their strong neighbouring hives, and they all did well, and gave me satisfaction, which I esteemed an excellent cure for so desperate a case. Though I have dwelt long on this subject, I beg the kind reader will bear with me a little longer, till I make a few remarks which may happen sometimes (though I hope seldom) to be useful to him in such a case. Some will be ready to say, if this be the consequence of your so much recommended reinforcing hives, you shall have all the pleasure and profit of it for me, I am done with it or ever I begin. Have patience a little, I pray you, and I will try to make you a proselyte, or you shall say me shamefully nay.

1st. I told you my hives were very bad ere I reinforced them, I am sure not worth two shillings a piece.

2d. After I mended them, I would not have taken sixteen shillings a piece for them, and had they escaped that unforeseen rock, there was none other for them to dash on, for they were proof against robbers and famine; certainly you would not advise a farmer to sow no more seed, because perhaps one year in twenty, his corn was mostly shaken with the wind; nor would you dehort the sea captain never to set to sea again, because there was a new found out rock, where only one ship was greatly

greatly damaged on, while hundreds escaped, especially as there was now a beacon set on it.

Had I not reinforced them, I would have lost them at any rate, and all I would have lost had I lost the whole, would have been only the common Bees I put to her, which would have been but a small loss; and even at the last her Bees having a Queen, I valued worth five shillings, so I was no loser, only that unhappy cold prevented me from being a very great profiter. Besides, were I afraid to meet with such an accident now, I could prevent it from happening, or mend her to better purpose after it took place. To prevent such a thing happening to Bees is to keep your hives very warm in spring, and if cold weather happens, shut their entries up, so as to prevent too great admittance of cold: and if such a thing were happening to a hive, as soon as known, cut out all her dead maggots, and add some more Bees to her immediately, and she will directly hatch again; and that is the cure will give you satisfaction.

Indeed I mean never to be discouraged by any such accident, but on the contrary, to use methods to make them hatch as fast as ever I can at all times of the year, especially in spring; and at the same time (when cold weather) to keep them warm, which will prevent the like disaster.

I am certain that the same disease happened to sundry of my neighbours Bees last spring, (which were neither fed nor reinforced) for I saw one of my neighbours hives which went

well in the beginning of the ſpring, but gave over carrying at the ſame time mine did, and did little or no buſineſs all the ſummer, and at *Lammas* I turned her up, and ſaw that they had not got out all her ſtinking maggots even then. But I think it is a diſtemper which rarely happens, and when it happens ſhould be immediately cured by cutting out the ſpoilt combs, and adding more Bees to her: therefore in ſpring, whenever you ſee a hive that was a good carrier (and wants not food) turn to carry almoſt none at all, then directly turn her up, and look down between the combs, and take a ſmall ſtick, and put in among the thickeſt of the Bees where the ſealed up maggots will be, and with your ſtick rub off the head of two or three of the ſealed up cells, and if freſh whitiſh maggots appear, with two browniſh eyes, you may conclude the brood is coming forward: but if only a blancht maggot appear, or perhaps the cell ſeems to be empty below the covering, then if you can ſee twenty cells in this bad condition, you may conclude the brood is going backward, and you ſhould cure the hive as above directed.

What I mean by giving the above relation is, to let my readers ſee that weak hives, when fed and reinforced, breed as faſt, if not faſter, than good hives, and alſo that ſuch diſeaſes happen Bee-hives, although not reinforced; and likewiſe to teach them how to prevent the like from happening their Bees; and alſo how to cure that diſeaſe in a hive when it has it.

It was not the reinforcing and feeding that killed the maggots, but the cold alone, as is certain

certain from my neighbours hives having the ſame diſeaſe, tho' neither fed nor reinforced; and I have had great numbers of hives reinforced, and do extraordinary well, and not a maggot go backward.

I cannot here paſs unobſerved what I ſaw among my Bees this day, being the 27th of *January*.——For ſeven weeks before this a ſevere ſtorm of froſt and ſnow had been upon the ground; during which time not a Bee could go out of their hives: I had a dozen of hives ſtanding in one place, where they were all covered over with ſnow, (the moſt part of the ſaid ſtorm) inſomuch that the tops of the hives were ſcarcely ſeen. The ſtorm being ended, and this day being a bright ſun about 11 o'clock, I carried the twelve hives to a pleaſant quiet green, where I turned up every hive, and ſet her on her crown with her mouth to the ſun, which ſhone down between the combs, and rouſed the Bees ſo, that in a few minutes they flew as thick about as if it had been the middle of *June*, and aired themſelves, and eaſed their bodies; and I with a ſmall ſtick ſearched ſome of the hives, to ſee if they were breeding any, and had the pleaſure to ſee in one of them more than 200 ſealed up young in their cells: I alſo with my ſmall ſtick rubbed off the coverings of two or three of the cells containing the maggots, and ſaw them fairly formed, and perfectly freſh; and they will in other eight days time be out of their cells, (a fine young brood) and I expect they will continue to hatch on; I wiſh them good ſpeed; I have ſet them down, and covered them well, and ſhall keep them warm,

warm, and do all I can to encourage them to go on in ſuch a thriving and agreeable employment: I had another hive breeding the ſame way, but had not ſo many Bees in her, and thereby had fewer maggots.

I hope none ever after will aſſert that Bees cannot breed but when there are flowers in the fields for the Bees to gather off to nouriſh their young with; for mine have been breeding faſt in the middle of a ſnow-wreath, and yet have not ſeen a flower theſe ſeven weeks, nor do I expect they will for other five.

All the twelve hives were a deal better of the airing they got this day, for at even they ſang chearfully; and I make no doubt but it will encourage thoſe that have bred none yet, to begin now, and thoſe that are begun, to go on: beſides, as they got their bodies eaſed, they are fit for another month's confinement, ſhould bad weather take place.

Some may be ready to ſay, ſeeing all along you maintain that Bees ſhould be properly kept warm, eſpecially in ſpring, to prevent too much cold from periſhing the brood in the cells, and you alſo as poſitively aſſerting that Bees will ſometimes hatch young in the middle of winter, even in ſevere colds; please inform us what preſerves the brood from periſhing in the middle of winter, in the greateſt colds, when a leſſer degree ſometimes is fatal to them in the ſpring? In anſwer I obſerve, that it is a certain degree of cold within the hive that periſhes the brood, and not cold without the hive. Beſides that, it is the hives that are fulleſt of Bees, and well covered over, with almoſt a

thut

ſhut up entry, that hatch in winter. The Bees never coming out of the hives preſerves a conſtant ſufficient heat to bring forward the brood; and ſuppoſe they breed in winter, it is but few in proportion to what they do in ſpring, and thoſe broods are in the very centre of the hive, and well ſurrounded with multitudes of Bees: but thoſe that go backward in ſpring are generally in hives that are not full of combs, and thereby their houſes are colder, neither have they ſuch great numbers of Bees, and at that ſeaſon perhaps too many of the Bees leave the brood, and go in ſearch of farina to ſeal them up with in their cells; by all which cauſes the brood may be colder in ſpring, though not ſuch cold weather, than they are in winter, in far greater degree of outward cold.

CHAP. XIX.

DIRECTIONS HOW TO MANAGE BEES IN MARCH, APRIL, AND MAY.

THERE is a very great miſtake which generally prevails in the ſpring among many Bee-maſters: whenever a fine day happens in ſpring, good hives carry loads faſt, and the Bee-maſter thinks they are doing very well, as do they are; but perhaps he has another hive that is a good weight, and well ſtored of honey, but

but has very few Bees in her, and consequently her Bees carry very few loads: which when the owner observes, he concludes she has eat up all her honey, and thereby is unable to work, unless she be presently fed, (for you are to observe, he dares not lift the hive from the board to see her state) therefore he, with all the speed he can, gives them a large meal of honey, to prevent them from dying of famine, the smell of which brings robbers (which are flying about in search of provision) in vast numbers to the hive, and they finding there a ready well-drest dish of good wholsome food, every way fit for their stomachs, (and few native Bees to defend it) they are not too ceremonious about who provided it, or who shall pay the reckoning, but e'en take a good hearty meal, and go home, and tell their brethren where they will meet with a well-covered table, and few to defend it, and then they will go in multudes, and eat up all that was given to the hive, and afterwards ascend the combs, and make equally free with them, and so rob and steal on till the hive be entirely ruined; which loss proceeded merely from the owners want of judgment: as she had plenty of honey she needed no feeding, but as she had few Bees she should have been either reinforced or removed, or, what is still better, both: but had he let her alone without feeding, she would perhaps have done very well, as no robbers would have been invited to her, they might not have made so free.

In the first week of *March*, in a cold morning, gently turn up all your Bee-hives, and carefully clean their boards, at which time you

ill ſee if they need feeding or reinforcing: if hive then is a good weight, and plenty of ees in her, ſet her down again, and draw a tle lime mixed with hair carefully all round r ſkirts *, and ſtill keep on her little entry to efend her from cold and robbers; then give r a large new covering of tow or ſtraw, in ſe her old one be much deſtroyed, the ſame ay you was directed to cover them in page 80, id ſhe will probably need no more of your ſiſtance till ſwarming time. But if ſhe have w Bees, reinforce her, as directed page 83; id if ſhe have little honey, perhaps not as uch as will ſerve her till the honey ſeaſon, ſhe uſt be fed.

The way to know whether a hive in *March* s as much honey as will bring her to the ho- y ſeaſon cannot poſitively be fixed: the alone ay is, if you poiſe her betwixt your hands, ſhe ll perhaps feel very light. Sometimes a hive ll give almoſt over working, and then the ſe is deſperate, for they are by this time much tarded in their breeding and working, but if u hit the nick of time of this calamity, and give

* The reaſon I direct to be ſo careful to lime the rts and covers of the hives ſo pointedly at this ſea- n of the year is to keep the Bees as warm as you n in order to make them hatch faſt, for it is a great vantage to keep them warm when hatching in cold ather, and in cold days and evenings in ſpring, the ry ſhould be ſhut up ſo as to admit air only in or- to keep them warmer, and cauſe them to breed t, and preſerve the maggots from periſhing in the ls.

give them a hearty meal, they will fall presently to work; therefore although a hive in *March* have 3 lb. of honey of her own, yet give her other 6 lb. of honey comb, and she will never trouble you with feeding her more. I say, any hive that you judge will need feeding, give her as many honey combs, the way you was taught in page 111, as will bring her to *June*; but if you have not honey combs, then give her liquid honey, as directed in page 114, and never give them too little, for fear they should run out, when you are perhaps not judging any such thing; but if you give them it liberally, they are faithful stewards, and will not waste it, but return you your own with usury: and be sure to feed Bees before ever their own stock of honey be near exhausted; for if their stock be near done, and the honey season not near at hand, they are discouraged, and so breed and work very slowly; but when so bountifully supplied before ever their own stock be near done, it makes them hearty, and carry on their work as briskly as the strongest hives: but hives that have plenty of provision of their own to serve till *June*, never give them any food.

In *March*, if you have a dozen of hives in one apiary, and all very good thriving hives, and no flowers in the neighbourhood, they will be much troubling one another by trying one another's strength in the robbing way, therefore I would advise you to remove six of the weakest of them to a mile's distance from their present stance, to some convenient part, as near flowers as you can; suppose you should set them at the south side of some dike, or in a wood, or among

mong whins, or any quiet ſunny remote place: they being there ſet, will not be moleſted ſo with robbers. I have often done that way myſelf, and greatly to my ſatisfaction: no doubt, every one cannot have ſuch an opportunity; beſides, many are afraid of thieves ſtealing them clear off; therefore every one muſt do according to their ſituation. But I have often had many one ſtanding in the midſt of muirs, and among whins, and in a clover field, and cattle going round and round them, and yet never loſt one by thieves but once; and I am certain I never loſt five ſhillings by cattle turning them over, for I generally ſet the boards on the ground, and if any cattle accidentally puſh them off their board, as they are not high, they ſuffer but little by ſuch diſturbance. When I am among my induſtrious ſervants, ſtanding in ſome quiet and remote place, and ſee them carry on their work with ſo much ſimplicity, alacrity, and chearfulneſs, and ſinging ſo ſweetly, they are fit to make me join the concert, and ſing

What's this I hear makes ſo melodious ſound,
Surely I've got on ſome enchanted ground;
'Tis Canaan's inſects that I here behold,
Whoſe legs do glitter like the yellow gold.
The whins and broom in lyſtre here do ſhine,
Whoſe yellow tops regale thoſe flocks of mine.
Here ſilver ſtreams in flow'ry valleys glide,
And rows of willows deck the river's ſide:
Here lambkins play upon the ſunny braes,
And ſweeteſt nectar ſmells on clover lees.

Here are the fields with Nature's colours dight,
Grateful to ſmell, and pleaſant to the ſight.
Retired pleaſure ſoothes and calms the mind;
A noiſy world oft leaves a ſting behind.

Sometimes in ſpring a hive will loſe her Queen, and ſo will never do any more good. The way to know when a hive wants a Queen, and cannot raiſe one to herſelf, is, her Bees will immediately ceaſe from working as ſoon as all the young in the cells are ſealed up, and one may wait an hour at her, and ſcarce ſee a loaded Bee go into the hive: they conſume their own honey faſt away, and generally an aroſed number of bees croud about the entry of the hive; and if ſhe has been long without a Queen, and you turn her up and ſearch among the cells, for to ſee maggots in them, there will be none.

As ſoon as you obſerve any of theſe melancholy ſigns, directly cut out from ſome of your other hives that you can come eaſieſt at, a piece of comb three inches ſquare, that has eggs in it; then turn up your queenleſs hive, and ſet her on her crown, and with your left hand ſhed two of the combs a little aſunder, then with your right hand put in the piece comb between them, obſerving that the cells be put in the hive in the ſame order they were in their native hive—I mean the cells that were uppermoſt to be ſo ſtill; then pull out your left hand from between your combs, and they will return to their natural poſture; and ſo hold in the piece comb containing the eggs, then ſet down

down the hive again, and the bees will be very happy that they are now put in such a state as that they can raise up another queen to themselves, and so perpetuate their species; and they will soon effectually fix the piece comb to the two combs it was put in between, and fall immediately to work, and build a royal cell about one of the eggs, and thereby raise themselves up a young queen, which will be to them as life from the dead. Sometimes in such a case, they will build two or three royal cells. I suppose the reason is, that they think if one prove abortive, another may hit; whereas when they build only one, if the maggot go back, they will have none to supply.

But if in spring you happen to have a hive that wants both a queen and new-laid eggs in her, and thereby cannot raise another, and so is in a desperate case, if she have few bees in her, then take them all out, and put them to some of your weakest hives, and keep the hive with the combs in it till you have a small swarm, and put them on it, and it will forward them greatly.

If in spring you have a hive that has few bees in her, and also little honey, and you cannot get bees to reinforce her, nor honey to feed them with, suppose you could get the bees; as she has very few bees, little honey or sugar will serve her, therefore remove her from all other bees, and give her a little food once a week, and perhaps she may come forward to be a good hive in harvest.

In *May*, if cold, rainy, cloudy, or misty weather happens to continue for eight or ten days,

then the bee-maſter ſhould look well to his flock, and ſee that none of his hives be ſuffering by famine, for at this time their family is greatly increaſed, and they have many mouths, and thereby eat the remains of their winter and ſpring proviſion faſt away; and ſometimes even the very beſt of hives will be in danger; therefore in ſuch weather in *May* or even *June* give every hive a little honey or ſugar every day, (in a ſmall kex* thruſt in at the entry of the hive, which the bees will eat up) in order to prevent all ſuſpicion, for now is the mouth of honey-harveſt to them; therefore preſerve your labourers, for as ſoon as the muſtard is bloomed among the corn, or white clover ſhines upon the lees among the lambkins, an hour of a fine day will refreſh them well, and put a period to your future feeding.

In ſpring, when the flowers are beginning to open, the bees will viſit them, and carry yellow loads from off them; and whenever one loaded bee is ſeen go into a hive it is a ſign the flowers are beginning to ſpring, and there will never be a fine day during ſpring, ſummer, and autumn, but they will conſtantly carry on their beloved

* A kex is a ſmall trough made of the joints of any plant that is pithy or hollow; one made of elder will do very well, and is eaſy got: Chuſe thoſe joints that are longeſt, and not above one year's growth; with a knife make it a little flat on the under ſide to ſtand on the board: take the pith out of the upper ſide, ſo as to hold the honey, leaving a little of it at every end to prevent the liquid from running out.

beloved labour, and work with the greateſt diligence and chearfulneſs.

The firſt day in ſpring I have ſeen a bee-hive carry any, I have only perhaps ſeen three or four loaded bees go in to her, the next day probably eight or ten, and ſo on; they gradually increaſe in numbers of loaded bees as the flowers increaſe in the fields, and the bees turn numerous in the hives, and about the beginning of *May*, when the whins and broom, and many other flowers ſhine yellow in the fields, then a ſtrong hive of bees is all yellow loaded about her entry, (a very pleaſant ſight to ſee) and I have counted 100 loaded Bees go into one hive in a very few minutes.

Where the hives are all good they carry much alike, but they carry in proportion to their number of Bees: in ſome apiaries where there are four hives ſtanding, one of them will perhaps have twenty loaded Bees go into her in five minutes, another fifty, a third ninety, and the laſt 120, all in the ſame ſpace of time. But in the height of the honey-ſeaſon they carry extremely faſt, running out and in with the greateſt precipitation and hurry, and their loaded Bees cannot be counted; whereas before the honey ſeaſon, tho' they work very fully and conſtant, yet not in ſuch a great hurry.

Were I to purchaſe a hive in *May*, and coming to an apiary in a fine day, where there were perhaps four hives, I would cauſe four men to ſit down, one at every hive, for ten minutes, and each man count how many loaded Bees went into his hive during that time, and pitch upon her that had the moſt number go

in, provided she had some honey in her, and were none of the oldest.

The village I write from is none of the earliest, but I have had hives in it have nine or ten *Scotch* pints of honey in them in remarkable good years; but I esteem her a good hive that has four *Scotch* pints of honey in her.

Bees begin to carry sooner or later according to the goodness of the season and springing of the flowers. In 1779, I saw my Bees carry in the middle of *February*; and some hives swarmed that year in *May*, and my father had two top swarms, that each one of them swarmed again twice. The honey was very plenty that year, it sold at four shillings the *Scotch* pint, and some at three and sixpence, but ever since that year the current price of honey has been about five and sixpence.

Some years since I have not seen my Bees carry any loads till the middle of *April*, and they did not swarm till the beginning of *July*. I cannot pass over the year 1787 unobserved, which was a remarkable year for both flowers and honey; the white-clover heads, that year, where the ground was rich, were like small white roses for bigness. The most part of top swarms swarmed again.

That year I bought a hive (which was lying out, yet had not swarmed) from a neighbour of mine, on the first day of *August*, and took all her Bees out, and put them in a hive whose Bees died out of it in the spring, and so had only empty combs in it: the Bees were very numerous as they had not swarmed, and they cleaned out the hive in two hours, insomuch that I could

could have taken up a ſmall handful of wax crumbles off the board, which they had cleaned off the mouldy combs. The flowers being vaſtly rich of honey, and bright *Phœbus* playing his part, favoured them greatly, inſomuch that on the ſixth day after the Bees were put in the hive, I took them all out again, and the hive was 15 lb. heavier than when I put them in, ſo that they had gathered two pounds and a half of honey every day for ſix days running, which I eſteemed a remarkable gathering, which made me inſert it here. As ſoon as I put in the Bees in the ſaid combs, I put a large eek to her, and they filled it up with new work, the moſt being filled with fine ſealed up honey; and by looking down between the combs, I ſaw about 100 ſealed up maggots, which is a proof that in the height of ſummer the brood comes faſter forward, they being ſealed up in ſix days, whereas they commonly take ſeven.

When a large ſwarm of Bees is put in a hive that has empty combs in her, there being no young in the cells, the Bees have plenty empty barrels to put their liquor in, and have no other thing to do for ſome days after they are firſt put in but only gather honey, as they have no young to nouriſh up, nor combs to make to hold their honey; therefore their whole buſineſs is to collect honey, and they fill their hives ſurpriſing faſt. I am certain that if a large ſwarm be put in a hive with empty combs in her, ſhe will collect more honey the firſt week, than a ſwarm of the ſame largeneſs put in an empty hive will do in two. A ſwarm put in empty combs in the height of the honey-ſeaſon, where

where they have plenty cells to put their liquor in is like some able fishers who have plenty barrels to stow their herrings in as soon as catched; whereas a swarm put in an empty hive has both her cells to make, and the liquor to bring home, and fill them with, like the poor fishers that in the time of the drove have their barrels to provide, and then the herrings to catch to fill them with; for the honey-season is the same to Bees, as the drove is to the fisher.

If you have any very light hives in harvest, perhaps not above four or five pounds weight; take their bees out of them, and keep them carefully till next summer to receive swarms; and also all hives that may have died (by your neglect) in winter or spring, by cold, robbers, or famine, preserve them safe and clean from mice, spiders, &c. and put swarms on them in summer also, but too old hives, I mean those above four years old, I would not advise to keep them in order to put swarms on. In winter sometimes it happens, (though seldom, if well chosen) that the Bees of a hive will entirely desert it, and leave perhaps two or three *Scotch* pints of honey in it, I would not advise to keep such to receive swarms, but the heaviest combs, if in one side of the hive, may be carefully cut out, (which will be useful for feeding with in *March* if needful) and the empty ones, or those that are but partly filled with honey, may be left in her in order to receive a swarm next summer, and the Bees will soon fix all the combs, and mend all their breaches, and so make them to their pleasure. Often I have a hive that the one half of her combs is perhaps

two,

two, three, or four years old, and the other half in her only one.

Perhaps some readers may think that there is a vast deal of trouble in managing Bees, *viz.* to feed hungry hives, and to reinforce those that have few Bees, to preserve them from cold, robbers, mice, and many other enemies, and it is enough to fear one from commencing Bee-master. No doubt there is a good deal of trouble attends bad hives as well as any other thing that is bad; but the whole trouble arises almost allenerly from keeping bad stalls; for good stalls need very little trouble, and afford a deal of profit yearly to their master. I have known some countrymen that scarce knew any thing of the nature of Bees, and never fed any, and knew very little about the wars of Bees, and scarce gave themselves any trouble about them, unless to divert themselves to see them carry, (happy men!) and to place a hive over a swarm, or make and sell their honey, and give them a good covering for winter, and yet they would have made three or four pounds sterling of their Bees yearly. The alone cause from which their good luck arose was their always killing all their bad hives in *September*, and at the same time keeping the prime and best of hives for stalls.

In the latter end of *May* or beginning of *June*, your stalls being well chosen in *September*, and still continued good, it may be presumed they will be turned very numerous of bees, and throng at labour in good weather, as the mustard and white clover will be making the very air to smell of honey, which will make them eager on work during the day, and sing

for

for joy through the night. Now is the honey-ſeaſon, and farewel famine and robbers, for when there is honey in the flowers, they will never think of robbing; for I have ſometimes poured a little honey on their boards to ſee what they would make of it, but they would paſs by it as below their notice, and flown eagerly to the fields: they will omit no opportunity, but improve their time while it laſts, well knowing that if a change of weather take place, it will ſoon lay an arreſt on their labours. As they increaſe in number their entries ſhould be gradually enlarged, and care ſhould be taken that too little an entry retard not their work, nor rub the loads off their thighs as they go into the hive; but thoſe that are not ſo numerous in Bees, their entries ſhould be ſtill kept little to keep out the cold from damaging the brood: alſo their covers ſhould ſtill be left on the hives to keep out the heat in ſummer, as well as to keep it within the hive in winter; for cold and heat to exceſs are both prejudicial to Bees.

The entries to ſtrong hives in warm weather ſhould be very large, three inches long, and one high is little enough; it may be made that large by working in a piece wood in the hive (when it is made) four inches long, and one and a half deep, having a notch cut out of it three inches long, and one deep, as above, which may be leſſened or enlarged at any time of ſummer (according to need) with a little lime. This ſort of gate which extends in breadth is better than one that hath the extenſion of it to the height; for when the loaden weary bees pitch upon the board before it, and running forward

to

to go in, if they fall not directly oppoſite to the door, they are apter to go wrong than right; and after going a good way round the hive in ſearch of the entry, muſt return, which is a fatigue, and hinders them in their work; whereas when it is thus broad they will rarely miſs it. Large entries in warm weather are very beneficial to bees, it gives them air, and thereby makes them carry on their work with more eaſe and pleaſure; whereas when their entries are ſmall, and a vaſt number of bees within, the heat is very great and fit to ſtifle them, and cauſes them many time (eſpecially after a ſhower has ſent them quickly home and into their hives) to come running out in multitudes for air, and incommodes them greatly in their work.

You will remember that in page 139, I told you that I had given twelve of my hives an airing on the 27th of *January*, and that two of them were breeding faſt, in the following page: I ſay all the twelve hives were a deal better of the airing they got this day, for at even they ſang chearfully; and I make no doubt but it will encourage thoſe that have bred none yet, to begin now: they have not diſappointed me, for this day, being the 13th of *February*, I turned up one of the twelve, and ſaw a very large brood in the cells, for three of the combs were lined on every ſide with ſealed up maggots, and I judged they had about 100 young incloſed in the cells. I am of opinion that a good many eggs were laid that day and the following night that I gave them the airing; and if they had not been rouſed that day by the warm ſun, perhaps they would not had half ſo many young in their

cells

cells yet; alſo every one of the aired hives are breeding faſt juſt now: no doubt good hives that were not aired then will be breeding too, but I believe not near ſo faſt.

CHAP. XX.

OF THE SWARMING OF BEES.

NOW we ſhall give our opinion of the profit or loſs attending the ſwarming of Bees, with directions how to further it, when it may be profitable; and alſo how to ſtop it, when it may be hurtful. You know I have all along been adviſing you to deal always in good hives, which will ſeldom fail to give you ſatisfaction, and far better have no bees at all, than have bad hives. I ſtill give you the ſame advice in ſummer, therefore ſtrive not to have many ſwarms, but good ones, I mean rather have one good ſwarm or hive, than three bad ones; but in caſe you can have both, many and good, with all my heart, ſo much the better. Many bees in one hive in ſummer is the principal thing you muſt aim at, and in caſe you have ſome hives that in the beginning of ſummer are ſtill ſcant of bees, you will do well to reinforce them even then, as well as in winter or ſpring. Firſt, there is no certain rule whereby we may know when a ſwarm will be profitable and when not. Much depends on the goodneſs or badneſs of the

the ſeaſons, and alſo the early or lateneſs of them, and the good or badneſs of the old hives, and the early or lateneſs of your ſituation, and the large or ſmallneſs of the ſwarms:—Juſt as theſe combine in favour of, or againſt, your Bees—ſo will they thrive or dis-thrive.

Some early years bees will ſwarm very ſoon, perhaps in *May*, then they are ſure to do well if the weather be favourable. In general hereabouts they ſwarm about the laſt three weeks of *June*, which is a very good time; and in 1787, I made many artificial ſwarms the laſt week of *July*, which did well, and filled their hives full of work, and ſtood the winter, and ſwarmed naturally next year: but indeed the flowers were remarkably rich of honey that year; and it is not one year in ten that ſwarms will do any thing worth while ſo late.

As we cannot aſſure ourſelves of a certain rule when ſwarms will do well, we muſt be content with the moſt probable, and hope the beſt.

If you have a hive that increaſes faſt of Bees in the latter end of *May* and beginning of *June*, and Drones appear in her; and as ſometime before ſome water appeared on her board, about or within the entry, (which we call ſweating) of an inſipid taſte, occaſioned by the increaſing heat of the Bees, the water will now be dried up by the ſtill greater heat in the hive, by the bees turning more and more numerous; and the Bees about eleven o'clock forenoon will fly about in a reeling manner, and make a motion and noiſe about the fore part of the hive: this motion proceeds from numbers of young

bees, which make their firſt appearance out of the hive, and fly off from the entry, and when in the air, turn their heads to the hive again, and fly round and round in a circular manner, and take a view of their ſtance, and all around them, and then light at the hive again, and go in; by this they are diſcerned to be young bees, as alſo by their colour and ſize, they being of a whitiſh and mouſe colour; whereas the old ones are black and ſhining: they are alſo ſome leſs, tho' not a great deal, than old Bees.

Sometimes before a hive ſwarms, tho' they lie not out in cluſters, yet every morning when they come abroad to work, a great many of them will ſtay about the door upon the board, and ſcatter themſelves around the entry of the hive in a large circle; and many will climb up the fore part of the hive: this they will probably do for ſeveral days before they ſwarm. Likewiſe when they give over in the evening, you will perhaps ſee ten or twelve Bees ſtanding in and about the door of the hive, with their poſterior parts outward and bended up, and their wings in a continual motion, making a humming noiſe.

Writers differ widely among themſelves as to the reaſon which cauſes Bees to ſwarm: the moſt part agree that a hive never ſends off her firſt ſwarm, before her own hive be full of combs and Bees, ſo as ſhe can work no more for want of room. Other ſome maintain ſtrenuouſly that they will ſwarm when there is plenty room in the hive for them both to work and continue in it. Mr. *Keys*, in p. 96, maintains,

that

'that however capacious their hives may be, the 'Bees will certainly swarm——plenty of room 'induced mine to swarm——We may further 'notice, that in hollow trees, and under the 'roofs of houses, which afford the Bees unli-'mited room, yet it is well known' (never by me) 'that even in these situations they always 'send out swarms.'——His doctrine is perhaps full as sound in the next paragraph, though it does not coincide with the preceding, when he says, 'On the contrary, when honey is to be 'met with early, and in plenty, and the bees 'have abundant spare room, it is a great chance 'if they swarm at all.' And in page 115, he says, 'If for several years together swarms come 'late, and perhaps some stocks do not swarm at 'all, tho' the seasons be tolerably good, it may 'be taken for granted that the hives are too 'large, or the stocks too many; on the contra-'ry, if the swarms be too early, and but scanty 'in number, it indicates the hives to be too 'small.' Page 118 it is said, 'When a stock 'is not wanted to swarm it should be raised as-'soon as the bees begin to work briskly.' Very good:—we shall take it for granted that Mr. *Keys* means in the three last quotations that want of room causes Bees to swarm, and enlarging the hives prevents them. Altho' they be not just so consistent as one could wish with his former assertion that 'plenty of room induced mine to swarm.'

I have sometimes thought his book in general is not unlike a heap of uncleaned corn, that consisted of good grain mixed with chaff; for there is a deal of good observations made, and

directions given in it, altho' (a pity it is!) there are some gross errors in it, and pernicious directions.

My opinion upon the matter is, that want of room is the principal reason that determines Bees to make ready for swarming, and also to swarm the first time, when other circumstances concur; altho' it will not hold absolutely at all times.

'The principal reason why they swarm is the 'want of room; therefore in colonies where 'they are not at all straitened they seldom or 'never swarm except (says Mr. *Rusden*) thro' 'distaste, disturbance, or mismanagement.

'And in hives they swarm not merely for 'want of room without other concurring cir-'cumstances, such as a king in readiness, mul-'titudes of subjects, prospect of plenty, together 'with weather which is inviting.'

It appears to me that a hive of bees, when they have plenty of room and are very numerous, are well satisfied with their condition, and love not to make any change as long as they have room to build cells to lay eggs and deposite their honey in; this is all they want. But as soon as every cell in the hive has either an egg or honey in it, and no more room in the hive to build cells for these purposes, and plenty honey in the flowers, and bees to collect it, and a pregnant queen to lay multitudes of eggs, but no room to hold either of these in the hive: then the bees see that they are under a necessity either to give over breeding or working, or perhaps for some time both; or otherwise raise up a royal cell about one of their eggs, which in

in due time will come forward to be a queen, and so make them capable of sending off a young colony, as the weather and other things assist. Then the royal cell is built and coming forward, and by the 12th day of its age a great many more young bees have emerged out of their cells, and the hive not being able to contain them for heat and want of room, they cluster in large quantities about the entry and upon the board or fore part of the hive, and carry on but very little work, as there is still no room to stow any more honey. Then about the 14 or 16 days age of the royal cell, the weather being very favourable for swarming, and the community now knowing that they are doing very little the way they are presently in for want of room, and as there will be a young queen bred in the hive soon to be the mother of one of the hives, they think it most prudent for the old mother to go off with a swarm directly, rather than wait for the birth of the young queen.

As soon as agreed on, the weather being good, the old queen goes off immediately with a swarm and leaves a pregnant royal cell, which will produce a young queen in perhaps two or three days to supply the old hive with. The old queen going off with the swarm is capable to lay eggs immediately that very day as soon as there is a piece comb built to depositе them in; for I have oft seen the like in a top swarm the second day after she had swarmed I have seen a large piece comb in her, and some honey in a few of the new-built cells; and also more than two score of new-laid eggs in the

other cells, which made me think it was the old queen that came off with the top swarm; for I thought had the young queen in the second day of her age come along with the swarm, she would not have been capable to lay eggs till about three days after, being then five days old, in which age she is capable of becoming a mother.

I have many times seen, in a second swarm, which I was certain had a young queen in them, that not a single egg would have been laid for two or three days after they commenced a swarm; but I judge a hive seldom swarms till she have a young queen bred in her, and so has two queens, one of which must go off with a swarm the first favourable opportunity, or otherwise it will cost one of them their life for their delay; and when bad weather had set in for eight or twelve days after a hive was ripe for swarming, I have sometimes seen a dead queen thrown out before the entry of the hive, and she would not have swarmed or another queen was bred; the bees perhaps, in a fit of despair, thought the weather would never mend, and that it was foolish to think of swarming and dividing houses, for who would go off to a toom house to perish in it in such unfavourable weather; therefore they, out of their too hasty-drawn conclusions, gave up with all natural affections, and most barbarously murdered one of the queens, (perhaps their own mother, reserving the new-hatcht one for themselves) and tore out all the drone-maggots from the cells, root and branch, and sometimes (altho' exceeding

ng rare) killed a good many of their brehren.

But altho' it is certain that bad weather continuing very long after a hive is ripe for swarming will sometimes, tho' very rare, dispose the bees to kill one of the queens, and thereby make them unfit to swarm when the weather turns good; yet in general they do not do it, for it is well known that a hive will be fit for swarming, and just beginning to rise in order to swarm, but a black showery cloud arising, will prevent them that day; and cold, cloudy, or showery weather continuing for perhaps other ten or twelve days will keep them from doing it: and yet after whenever the weather turns good, and they get a blithe blink of the sun, they will hurry out in great haste, and swarm.

Small swarms are not worth keeping single by themselves, for they seldom ever turn out to any good account; and a hive that has few bees in her, if she swarm, her swarm should be returned to her again, or both her and her swarm bees should be enlarged with other two hives that are both full of bees.

Strong hives will send off large swarms, and still be good themselves; therefore they may be kept separate, and both do very well, if not too late in the season; but should the owner chuse to prevent her from swarming, he may, as soon as she turns throng of bees in the latter end of *May*, give her an eek 3 inches high, and whenever she fills that, and turns throng again, give her another eek, and so on during the summer, by which he will prevent her from swarming, and she will, in this way of being always enlarged

larged as she grows throng, and kept in one apartment, make a grand colony *, and collect as much honey (if not more) than she and her swarms would have done altogether, suppose she had swarmed once or twice, and each one of them all been kept separate in hives by themselves.

My opinion is, that whenever the cells are turned so full of eggs, maggots, and honey, so as the bees soon will have no more room to stow their honey in; then the bees build a royal cell about one of the eggs, in order to raise a queen; and if the weather be very tempting†, and honey plenty in the fields, then about the 14th, 16th, or 18th days age of the cell, the bees perhaps will swarm; but if the weather be but middling good, then they wait or the young queen be born and fit to fly off with the swarm; and in that case I know not which of the queens goes off with the swarm, nor which stays

* By colonies I mean a very large number of bees in one family, either dwelling in different apartments, with communication to each other, or in one single hive.

† Extraordinary good weather will tempt bees to swarm oftentimes when they are not perfectly ripe for it; for in such weather they are keen on swarming, and a good many will swarm in one fine day, some of which, it is likely, would not have swarmed for eight days to come, had not the weather provoked them to it. Some of which the old queen went off with the swarm, and left a pregnant royal cell in the hive, to supply her with a queen.

ſtays with the mother-hive, any of them, I ſuppoſe, will anſwer any hive.

It is well known, perhaps ſome will ſay, many a hive will lie out in great cluſters about her entry, upon the board, and fore part of the hive, as large as a ſwarm, ſometimes for ten, twelve, or ſixteen days, and then ſwarm after, and ſometimes not ſwarm at all that year, and yet the weather extremely good, and a great many hives keen on ſwarming.

I anſwer, perhaps that hive has been long of building a royal cell, and will not ſwarm till a princeſs be born; but it is ſeldom that a hive that lies long out does not ſwarm at the laſt, if the weather ſtill continue to be favourable. But it may happen that the maggot contained in the royal cell has turned abortive, or been deſtroyed by ſome accident, and the bees are preparing another royal cell, or elſe thinking that the ſeaſon is too far ſpent for them to divide now, and ſo have laid the thoughts of ſwarming entirely aſide; for were there never ſuch a large heap of common bees in a hive, they will not ſwarm without a queen to go along with them, (and indeed without a queen they cannot conſtitute a ſwarm) and alſo another or elſe a royal cell to leave in the mother-hive.

It ſeems to me that the principal reaſon that a hive of bees lies ſo long out oftentimes with great multitudes of bees about her, and yet does not ſwarm, is their not having a young queen bred as yet, and thereby two, whereby one might go off with the ſwarm, and another to remain in the old hive; for I am of opinion, that whenever there are two queens in a hive,

and

and multitudes of common bees, and an inviting ſeaſon, that they linger no longer, but immediately go off in a ſwarm.

Sometimes (but very ſeldom) a hive will ſwarm the firſt time when none is expecting it, and very few ſigns of ſwarming about her; ſhe will do it when ſhe neither is lying out, nor very full of bees. In ſuch a caſe there has (no doubt) been a queen bred ſooner than their ordinary method, and it is no argument againſt the general rule, that bees ſwarm commonly the firſt time for want of room.

Very warm weather will cauſe hives that are not very full of bees to lie out, but whenever cold weather returns, they will go all into their hives again, and draw themſelves cloſe together among the combs, and alſo deſiſt from making a noiſe. Although a hive be very full of Bees, and lie out in large quantities a long time in warm weather; yet the return of cold will make them all flinch into their hives again, and the owner thinks now all hopes of ſwarming are loſt, whereas, perhaps the next fine day (if a queen is bred) they will hurry out and ſwarm.

From what has been noticed we may ſee, that the owner cannot be certain of the day in which his bees are to ſwarm, nor whether they will ſwarm at all, becauſe he knows not whether there is a royal cell coming forward at all, or if coming forward, what time the young queen will be bred, or even when fit for ſwarming, whether the weather will permit them to do it; therefore whenever a hive in *May*, *June*, or *July* (the common ſwarming time) turns pretty throng of bees, works briſkly, and ſounds loud

loud at night after they give over work, with ſome drones appearing and flying about in the heat of the day; the bees alſo make a reeling motion and noiſe now and then in the heat of the day before the hive, as formerly obſerved; then the owner may hope that there is a pregnant royal cell coming faſt forward, or perhaps what is better, a young princeſs already in the hive; if the former is the caſe, the hive will not probably ſwarm till the queen be out of the cell, unleſs the weather be very tempting; but if the latter, they will ſwarm the firſt favourable opportunity; therefore as the owner is uncertain which is the caſe, he alſo cannot poſitively know the day when they will ſwarm, for which reaſon he muſt give them a conſtant attendance every fine day, from eight o'clock in the morning till three in the afternoon, when their throng will be moſtly over, till that agreeable event takes place, which moſt every one wearies for.

Of Hives to receive Swarms.

AS to the proper houſes or habitations in which bees work, which we call hives; they have been made of different materials and forms, according to the different taſte and inventions of men in all ages. *Meliſſus* king of *Crete* is repreſented to have been the firſt that invented and taught the uſe of hives for bees to collect

collect honey in; which is become so beneficial to the health of man. History affords several instances of honourable persons in former ages who have been so delighted with these excellent creatures, that several of them caused hives of horn to be erected in their gardens, that they might with greater ease and admiration behold their works. But in later times hives have been made of glass, by which we may more minutely observe their curious works and operations. Hives also have been made of wood of different forms and constructions; sundry ingenious gentlemen have made hives of both wood and straw, to consist of different apartments, and inhabited only by one swarm, which are commonly called colonies: all of which may be done to satisfy curiosity, but is not of so great utility as the simple, cheap, and easy got, single straw hive; glass hives serve to let us see how they work, but the light incommodes them in their work, and they are also too cold in winter, and so brittle, that they are easy hurt, and never will be rendered to public use. Colonies, that is, one family of bees living in two or three different apartments, I do not much approve of, for these reasons, the partitions between room and room, prevent a gradual heat to overspread the whole family, by which some of the rooms may be too cold, and in winter the bees will draw all to one apartment, by which the rest is intirely empty and exposed to cold, and thereby their honey may candy and turn useless. The colony method is contrary to their way of doing, for give them their own will, then they always lodge in one

one apartment, if it is capacious enough to hold them; beſides they lay their eggs and hatch them forward in the middle parts of the combs and hives firſt, gradually enlarging the brood around the centre of the hive, whereby they get them the better ſurrounded and defended againſt all hazards and inconveniencies, and by the greater heat there, than more outwardly, they get them the ſooner and ſafer hatched. It is certain that cells in the middle of ſummer are ſeen in the outmoſt combs in the hive, containing young, but it is after all the inmoſt cells are ſo full that they cannot hold any more eggs; certainly every one in the family will beſt know what part to act when they are all in one houſe together; whereas, when they are obliged to perform their office in two or three diſtinct apartments, they are not capable to execute it ſo well; alſo when a bee comes home loaded and weary from the fields, they ſometimes have to travel up one or two pair of ſtairs till they win to the uppermoſt ſtory to ſtow their burden in, which fatigues them greatly. Colonies as yet have never been, and I think never will be, extended to general uſe, although it is near two centuries ſince their firſt invention, by *John Geddy*, Eſq. My humble opinion is, that a large number of bees, lodged in one ſufficiently large ſingle hive, being all in one apartment, will thrive better and collect more honey than when they are divided into either two ſeparate hives, and thereby become two diſtinct families; or put in two or three diſtinct boxes with communications between each box, and yet only one family. Single box hives well made, will do

very well for bees, and when painted will laſt a long time, and are proof againſt mice, only they are warmer in ſummer and colder in winter, and thereby are not ſo much brought into general uſe as ſtraw hives. Were I determined to take a ſwarm in harveſt, I would put her in a box hive, for I think they make honey ſome faſter in them than in a ſtraw hive, as it is perfectly ſmooth and clean: at firſt the Bees have nothing to do but begin immediately to build their combs in it; whereas in ſtraw hives, eſpecially when ill made, they have many times much work to gnaw and bite off all the ſtaring looſe ſtraws in the inſide of the hive, which conſumes ſome of their time that ſhould be employed to better purpoſe in ſuch a ſeaſon.

I have ſeen in ſome years when the bees had ſwarmed very liberally, that the owners would have been much put to for want of hives to hold their ſecond ſwarms in; there is no great need for being much diſturbed in ſuch caſes, for when you are deſigned to kill them in harveſt, and all your empty hives filled, you may put them in a great many other things which they will work in, ſuch as any kind of box, or half barrel, or large jar, or pot of any kind, if large enough; for the Bees are not nice, they will work in any place in ſummer, for you are to underſtand, that although making honey and honey combs is ſo natural to them, inſomuch that they can work at no other manufactory; yet the ſhop they make them in is not ſo, for they can work in almoſt any part, if room enough, and not too cold or wet; even darkneſs itſelf

itself is no impediment, but rather renders their habitation more agreeable.

In some things bees are very prudent, and discover a deal of wisdom and sagacity, witness their wisdom in building their combs in such a regular form, with a proper distance between one comb and another. Some cells appropriated for nourishing up the young, and others more capacious for holding their honey, also they know when a blast or shower is preparing; for should a black cloud appear when they are in the field at their work, they quit their labours and fly home in the greatest hurry and precipitation; and should it be very windy, they carry small stones to balance them in their flight, as I have seen in such cases the stones (smaller than pease) lying before their entry which they had dropt at their arrival.

And left their airy bodies should be cast,
In restless whirls, the sport of every blast,
They carry stones to poise them in their flight,
As ballast keeps th' unsteady vessel right.

VIRG.

but it must be confessed that though they are very sagacious, as appears in some things, yet in other some of their conduct they appear to be mere dunces and arrant fools; for often in a showery day when the sun gets out his head and shines with a blithe blink for an hour or so, they will swarm and light on some high branch of a tree, and were they left to their own discretion in such a case, the sun hiding his head, and a severe shower of rain and wind at the same time happening, would drown and dash them

uſeleſs; and often they will begin to work and build combs, even hanging on a branch, or among the cleſts of ſome tree, or perhaps on ſome chimney-top, &c. where (had they their wits about them, they might ſee) they would be expoſed to ruin by the next blaſt of wind or rain.

And by the by, here I cannot but aſk thoſe profound heads, who ſometimes tell us very gravely and wiſely, that bees thrive beſt without our care, and need none of our aſſiſtance; what will become of that hive hanging dadding in the wind and rain, which nature took up to that uncommodious habitation. But here perhaps they will hide their heads, and contradict themſelves, and do every thing in their power by art, to lodge them in ſome commodious artificial habitation: but why all this? does not art make hives, and lodge ſwarms in them? does it not chooſe proper ſtalls, and cover hives to preſerve them from cold and rain, robbers, mice, &c. in ſhort, if art did not aſſiſt nature, I doubt much if we would have a living hive in *Britain* twenty years hence, were we to leave all the hives as they are; ſome of the old ones might ſwarm for a year or two to come, but by ſettling on ſome improper place, they perhaps would be moſtly killed in ten days time; but ſhould ſome ſwarms accidentally or by ſearch, find out ſome more commodious habitation in buildings, rock, or hollow trees, the winter with his cold, ſnow, rain, and mice, would put a period to their lives, and the old hives would ſoon rot and die of age. Well, as art is ſo neceſſary in the management of bees, let us make uſe of it,

provide

provide proper houſes or hives for our approaching ſwarms.

Straw hives are eaſieſt got, and have been recommended and uſed by almoſt every bee-maſter in former ages; they are coldeſt in ſummer and warmeſt in winter, which is enough to recommend them.

As to their form, I have ſeen them about *London*, and they are made very thick and ſtrong of the rolls of ſtraw; and ſome narrower at the mouth than in the middle, by which the combs are ſupported with fewer ſticks in them than when they are as wide at the mouth as at the middle. The top of the hive is not of a pyramidical form, but betwixt that and a circular; ſo that the hive is ſomething of a globular form, and the nearer it is to that, the warmer are the bees.

As to the ſize, one that holds five forpets of *Berwick* meaſure is a very good one, and will hold a pretty large ſwarm; but there is no exact rule to know what hive will be exactly filled by a ſwarm; much depends upon the following ſeaſon, if the ſwarm is early and large, it requires the larger hive, but if late, the hive ſhould be ſome leſs. If a ſwarm be put in one of the above ſize, and the bees fill it ſoon, and want more room, it may eaſily be enlarged by putting an eek below it; but if it be not filled quite full, it will probably not be weight for a ſtall, in which caſe there will be no loſs, but if it be not full of combs, and yet weight enough for a ſtall, it will do, though not quite full of combs.

A hive when made ſhould have a piece of wood wrought in the undermoſt roll, four inches long, with a notch cut out of it three inches long and one high, for an entry to the Bees to go out and in to their hive. Wheat or rye ſtraw makes good hives; and the heads of the ſtraw ſhould be cut off; the rolls ſhould be very hard drawn and wrought together by brambles or ſmall willows, ſplit down the middle, and properly dreſt, having the pith taken out of them: the hives ſhould be made as ſmooth as poſſible, having no projecting or ſtaring ſtraws; which if not properly cut or ſinged away, (which ſhould always be done when the hives are rough) would coſt the bees a great deal of trouble to gnaw away when they are firſt put into them. After the hives are made, and if need be, ſinged gently with a wiſp of ſtraw, four ſmall ſticks ſhould be run croſs the hive, in order both to keep the hive firmer, and ſupport the combs from falling down by their own weight, and alſo to prevent them from going out of their proper place when the hive is any way diſturbed or turned up and rapped on. The firſt ſtick ſhould be put in two rolls above the entry; and the ſecond two rolls above the firſt, exactly to croſs it in the centre of the hive; the third ſhould be put in two rolls above the ſecond, and alſo to croſs it and the firſt exactly in the centre of the hive; the fourth and laſt ſtick ſhould be put two rolls above the third, and ſo as to croſs all the other three in the centre of the hive: by this method of putting in the ſticks ſo as to croſs each other in the centre of the hive, whatever way the combs be

built

built they cannot miſs to be ſupported by the ſticks. The moſt people put in a middle ſtick to ſtand perpendicular, in order, ſay they, to ſupport the hive from ſinking down under its own weight; I never ſaw any good it did, but often ill, for which reaſon I never uſe it: it can bear no weight unleſs ſtanding ſtreight up, and the under end on the board; and whenever the hive turns old, and ſways to one ſide, the middle ſtick is uſeleſs as to bearing weight; beſides it bears ſome of the combs next it to their fellows, and thereby diſplaces and injures them: and often I have ſeen, when a hive was ſet down on its crown in a hurry, that the weight of the hive would have reſted upon the top end of the middle ſtick, and borne it back again into the hive, which would alſo have puſhed back the combs that were fixed to it, and thereby done much hurt; for all which reaſons never uſe a middle ſtick.

For every good ſtall you have provide two hives and two boards, and ſhould not every hive ſwarm twice, (as indeed I would ſeldom ſuffer them oftener than once) yet you can be at no loſs to have ſpare hives by you, as they may be uſeful to you when you reinforce a hive, &c. Your boards ſhould be made of well-ſeaſoned-wood, and if you can get a deal-board about 18 inches wide, and 22 long, and inch and half thick, which being well planed, and made even on both ſides, it makes an excellent board. When the board is foul, and wants to be cleaned, it needs only to be turned upſide down; beſides, as it has no joining in it, the drought in ſummer does not make it chink and

rive

rive ſo as one that is made of different boards; but in caſe you cannot conveniently get boards all of a piece, then take two pieces of boards of the ſame length as above, and nine inches wide, but only three-fourths of an inch thick, which when joined will make the ſame breadth; and take two pieces of board 18 inches long and 11 broad and 3-4 thick, and nail them on the other two boards, which will make a very good board, altho' not all of one piece.

An old hive, if not rotten or torn, will do very well to put a ſwarm in, eſpecially one that you are determined to ſmoke in autumn: if it is muſty, holding it over the fire a little will ſweeten it, and the Bees will be fonder of it than a new one.

In handling bees at any time, particularly when driving them, or managing a ſwarm, boldneſs and gentleneſs are both neceſſary; every motion muſt be done deliberately and without hurry; the operator may drink a cup of good ale, and rub ſome of it over his face and hands: alſo be careful not to bruiſe any of the Bees.

When a ſwarm is flying in the air, or ſettling on a buſh, or ſo, they are not apt to ſting, but are very gentle and mild, their minds being entirely engaged in their preſent buſineſs, they have no time or inclination to quarrel: but as ſoon as they are ſettled on any place, they look upon it as their caſtle, and whoever attempts to ſtorm it in a rude manner, is ſure to meet with little mercy from the inhabitants.

The morning before a hive ſwarms the Bees oft come out of the hive in large numbers, and cluſter

cluſter upon the board and fore part of the hive, and carry on their work very ſlowly. Immediately before they riſe in a ſwarm you will ſee numbers of Bees flying before the hive in the reeling way, and obſerve their increaſe and noiſe grow greater: thoſe about the entry will begin to make greater ſtir. You will alſo ſee them thronging in great haſte out of it, and thus they will continue to do till they are all come off.

It is a very ſurpriſing thing to ſee them coming out of their mother-hive, and deſerting her ſo faſt with the greateſt hurry and precipitation imaginable, inſomuch that they can ſcarce clear the way to one another: a ſtranger to the nature of Bees would be ready to conclude that there was ſome dreadful enemy within murdering every one it could come at, and that the Bees were flying before it for their life; or elſe leaving ſome diſagreeable habitation, in which there was nothing but poverty and war, and going to ſome plentiful place, where they would be more happily accommodated: but the reverſe is exactly the caſe, for they are going of their own accord with the greateſt chearfulneſs from their deareſt friends, and alſo from a well-ſtored houſe with plenty proviſion in it, to ſeek their fortune in the wide world, where they will have both their houſe to pleniſh and fill with proviſion, in caſe the fickle weather will permit them.

It has been an ancient cuſtom, when a ſwarm of Bees are riſing, to make a tinkling noiſe upon a pan, kettle, or the like; the practiſers of which alledge, noiſe makes them ſettle the ſooner,

er, and prevents their flying away. A great many others look upon it as an uſeleſs ceremony, and rather prejudicial. (My opinion is that noiſe prevents them from hearing one another's ſound, and thereby from underſtanding one another's intentions; therefore in ſome caſes it may be uſeful, and in others hurtful) when they are coming regularly off their mother-hive, and ſettling deliberately on any thing near her, in this caſe noiſe would be very prejudicial to them, therefore it ſhould not be made, as it would prevent them from hearing one another's ſound, and knowing each other's intentions. But when they fly long and high in the air, and ſeem as if they intended not to ſettle, but to be upon a march, then give them a ſerenade, and make all the noiſe you can upon drums, kettles, or whatever you can, not to make them a compliment upon their departure, but if poſſible to confound and frighten them, ſo as that it may perhaps either diſpoſe them to ſettle, or return to their mother-hive again. It has been known that when a ſwarm of Bees has been flying away, the diſcharging a gun among them loaded with powder only has diſpoſed them to light immediately: the report, I imagine, has perhaps been taken by them for thunder, which they are always afraid of, and puts a ſtop to their mirth and ſchemes, and thinking it was to be an immediate rain, it was moſt prudent to take the neareſt lodgings.

Sometimes (though ſeldom) a ſwarm will fly clear away, notwithſtanding all the methods you can uſe, eſpecially in very fine calm weather when they have had liberty, ſome days before they

hey swarm, to roam and fly about in search of a commodious habitation, which if they have found, it is not easy to hinder them from going to it; and indeed sometimes it cannot be done at all.

When the weather is very fine before they swarm, they oft send out scouts and spies in search of a proper habitation for the swarm to go to, and if they, in their search, find a dead hive in any deceiver's yard, or empty place about the roof of a gentleman's house, or a church, castle, or trunk of a tree; especially if bees have wrought combs in it the summer before, but have died out of it in winter, they will esteem it a happy chance, and send off a squadron of Bees for three or four days before they swarm, in order to clean it all out, and make it fit for the swarm's reception the first favourable opportunity. At such places I have seen a good many Bees going out and in, and cleaning out all dead Bees, broken crumbles of wax, or whatever would annoy them: and sometimes there would be Bees at such places from two or three different hives, all laying an equal claim to the supposed habitation; and they would have been fighting and killing other, and a good many slain; and it has been known that two swarms have flown to such a place in one day.

Many instances there have been of a swarm of Bees flying in a streight line to a dead hive standing within their reach in a neighbouring apiary; the dead hive having been left standing by the owner either out of ignorance, as not knowing she was dead; or if certain, never dreading

dreading the bad consequence: but they a
also sometimes left on purpose by rogues, in o
der to entice their neighbour's swarms, whic
is the same as, if not worse than, stealing
swarm.

Mr. *Maxted* says, there is a law against su
fering a dead hive to stand in an apiary;
there is, it is a very just one; but if there
none, there should be an act of parliament mad
against such a pernicious practice. Sever
times such cases have been tried in courts of ju
tice; and some judges have punished such
practice, which was perfectly right. But
lately heard of a case of that kind which wa
tried in a court, and the judge let the aggresso
go off with impunity, alledging that every man
had liberty to keep in his own yard what he
pleased; by which he shewed his ignorance
for were such a practice suffered to prevail,
none would be sure of a swarm of their own
Bees; for a dead hive left standing in an apia-
ry all the summer, seldom misses of a swarm
coming to it.

There has also been much trouble to know
whether the old hive was dead or not that the
swarm went in to: as to that I know for cer-
tain that a swarm will not fly a mile to a living
hive to light on her, altho' they will fly four
and more to light on a dead one.

Indeed I have seen a swarm go on to a
living hive, that stood in the same apiary,
but this was rather accidental, the Queen
returning home in confusion perhaps might
take another hive for her own, and in such a
case there is sometimes, tho' not always, a great
battle,

battle, and many slain, often the Queen among the rest: but sometimes I have seen them agree very well at the first, and make a good colony, when properly raised with a very large eek: at other times I have seen when a swarm had gone on another old hive, that they would have remained very peaceably, and the swarm come off the next day.

When a swarm flies away with a design for some habitation their spies had been previously at, they fly in a streight line to it; therefore run or ride along with them as long as you can, for sometimes they will fly very slow, so as you may keep company with them: but in case they never mind you, but bid you farewel, you'll perhaps be loth to return the compliment, but would fain meet with them again; therefore follow them in the same line, without turning to any side, by which if they happen to light on any thing, such as a dike, hedge, or bush, you will have a venture to find them; but if not, still go forward, and if the line lead you to any garden where Bees are standing, tell the owner your case, and if he is an honest man, he will give you leave to look at his bee-hives before him and witnesses. The way to know if your swarm is gone into any of his dead hives (if he has any dead) is, you will perhaps see some small crumbles of wax not unlike saw-dust, lying before the entry and on the board of the hive, which the Bees have cleaned off the combs; if you see that about any hive, you have some reason to suspect, and may demand a further search, which if granted, turn up the hive, and with a small stick search among the combs for young

Bees in the cells, as directed in p. 138, which if you find, it is a ſign ſhe was a living hive before, therefore claim no right; but if there are no ſealed maggots in the hive, then you may claim her; which if he refuſe to give you, then immediately, as long as the hive has no young in the cells, apply to a magiſtrate, and lay the caſe plainly down to him, inſiſting on that noble argument as a proof of the man's hive being dead, ſeeing ſhe had no maggots in her cells. If the magiſtrate do you juſtice, you will get the hive, and the man puniſhed for his covetouſneſs in not returning you your lawful property. But if ſhe is not lighted in the firſt apiary you come at, you may ſtill go forward, if you think there is another apiary in the ſtreight line, and if there is, do as in the former apiary. You will by keeping the line have alſo a venture to come on the ſwarm by the way, in caſe they tired and took a reſt on any place; but if ſome gentleman's place, church, or any other building be in the line, view them attentively as you go along, enquiring at all you meet with if they ſaw a ſwarm of bees flying; for often knowledge is got by being prudently inquiſitive, and none will readily take it ill for you in your hurry to aſk them ſuch an uſeful and lawful queſtion.

If they have ſettled in any of the buildings mentioned, directions will be given how to take them out in caſe 16th.

When a ſwarm of bees are ruſhing out of their mother-hive, before they be all out, it is very common that ſome of them which come firſt out will be beginning to ſettle upon ſome things,

thing, perhaps some branch of a tree, or a hedge, or gooseberry-bush, or potato shaw; for there is scarcely any thing but they will light on, they will settle on whins, nettles, kail, dikes, trunks of trees, and even on red land, for they pay no regard to the beauty or ugliness of the place or situation where they settle: it is in vain to think to decoy them to settle in a hive or any place, unless you get hold of the queen, and that cannot be done when they come off of their own accord.

It appears to me there is no certain rule among the bees who shall come first out of the mother-hive when they swarm, whether queen or commons, or who takes the lead, and rises first upon the place to settle on: I suppose it is among Bees as in some other assemblies not too ceremonious, where those that are next the door come first out, whether queen or commons; and when they settle, they seem to go on the same plan—the first Bees, whether queen or commons, that accidentally light on any place, lay the foundation of the swarm, and the rest all follow, and build upon it; for proof of which I have seen the most of the common Bees settling upon a bush, or ever the queen had left the mother-hive, and as soon as she left it, she would immediately flown to the increasing swarm, and joined it. Again at other times I have seen, when there was but one queen came off the mother-hive yet the Bees would have settled in two or three different clusters, and of different sizes, at some yards distance from one another, in that case the queen could only light at one of them, and which ever

one it was ſhe hit upon, (whether the largeſt or ſmalleſt) ſhe continued there, and the other queenleſs cluſters gradually aroſe, and joined her increaſing company, till they were all united in one entire ſwarm.

Some adviſe, whenever the ſwarm is beginning to ſettle on any place, and is as large as a man's fiſt, if it can conveniently be done, to place a hive immediately over them, and they will go directly up to it. This, I think, is too precipitate a ſtep, for if the queen be not come there as yet, it will both diſturb the bees, and perhaps may retard or perfectly hinder her from lighting among them; beſides when a perſon is going among ſuch a throng, and diſturbing them when their minds are ſo much taken up upon their preſent buſineſs and ſtate of affairs, they may perhaps think, What is this bulky animal doing among us? we want none of his company, we can hold no communion nor carry on any traffic with him; he has neither wings to carry him to the flowers, nor a proboſcis to cull their ſweets, nor has he proper cavities in thoſe two long and large hinder legs of his (rather like trees than any thing elſe) to hold the balls of farina on; he is ſuch a heavy lump, and a monſtrous dead weight, that were he to creep with theſe four legs of his upon our waxen edifices, they would ſink below him, and bring immediate deſtruction on both us and our building:—What has brought him here among us? we are got into bad company; let us retire from hence, and ſeek out a more quiet and remote habitation, where we will enjoy, what we moſt deſire above all things, a retired life. Beſides,

fides, when the owner is going among them while a great many are lighting so fast as yet on every thing around the place where they are settling, a few of them may be trod to death, and such a thing may happen as the queen may suffer among the rest; therefore I think it is far better to let them be fairly settled, and something quiet, before you proceed to hive them; however as soon as they are all fairly settled in a cluster, no time should be lost, but a hive should be immediately placed upon them with all convenient speed, in order to prevent their rising again; for it is thought, as soon as a swarm is fixed, they send forth spies to search out a more commodious habitation, which if they find, they return immediately, and inform the whole community, and they rise and fly off to it.

And it is also known (as formerly noticed) that a hive sometimes for two or three days before the swarms sends off spies to search out a convenient habitation for the swarm to go to when ready, and supposing it to be the case that they know where they are designed to take up house before they swarm, yet when they come off, they generally settle on some part in order that they may be gathered altogether, and thereby more fit for a remove: but if they find a commodious lodging placed over them in some miraculous manner they know not how, they are often very happy to find it, and immediately range themselves in it and begin to work; but if they are intent upon some previous fought out habitation, it takes some pains to keep them in the hive you supplied them with. If one swarm

is in the air flying, and another hive be preparing to rife, ſtop her by throwing a ſheet over the hive, till the other be fairly ſettled, after which remove the cloth from the other hive.

Now as to the hiving of ſwarms, here a large field opens itſelf to our view, and ſuch multitudes of different circumſtances will occur when bees ſwarm, that there cannot be particular directions given preciſely to anſwer every caſe; but we ſhall give ſeveral directions how to manage them when ſwarming in the moſt common caſes that occur on ſuch occaſions, from which the prudent bee-maſter may learn how to manage his bees in almoſt every caſe.

CASE FIRST.

If you have a hive in the beginning of ſummer, that by computation you judge ſhe has 12000 bees in her, and alſo 10000 maggots in the cells, and another hive that has only 3000 bees in her, and 1000 maggots in her cells, by which you have a very ſtrong hive and a very weak one, and perhaps you wiſh they were both ſtrong alike, or both equal of Bees; then you may take 9000 bees from the ſtrong hive, as directed, page 81, and reinforce the weak one with, as directed, page 83; by which every hive will have 13000 bees and maggots in her, and ſo equal in number, and in eight or ten days after a great many of the maggots will be turned into flying bees, ſo that they will be much about the ſame number of loaded bees go into each hive in the ſame ſpace of time: or you may exchange the whole bees of both the hives in the following manner: drive all the 12000 bees out of the ſtrong

ſtrong hive into an empty hive, as directed, page 81, then drive all the 3000 bees out of the weak hive in the ſame manner, then turn up the 3000 bees with their mouth uppermoſt, and the ſame inſtant, place the heavy hive containing the 9000 maggots on her, mouth to mouth, and they will ſoon run up and be very joyful to go into ſo well a pleniſhed houſe; then ſet her down in the ſame ſtance the weak hive ſtood before the exchange, by which the 3000 bees will juſt be where they were, and not have a new ſtance to acquaint themſelves with: then give her a very little entry to preſerve heat in her to hatch out the maggots with. Next, place the weak hive containing the 1000 maggots, over the 12000 bees, and after the bees are all up, ſet her down where the ſtrong hive ſtood before, and they will both thrive well. I have often done this way myſelf, both in ſpring and ſummer, to my ſatisfaction.

CASE SECOND.

If a ſwarm ſettle on any thing that can be brought to the ground, then ſpread a ſheet on the ground near the place where the ſwarm is, and lay two ſticks on it, about a foot aſunder; then bring the ſwarm and lay her upon the ſheet betwixt the ſticks, and gently cover it with a hive *; the edges of which muſt reſt upon

* Some adviſe to rub the hive before it be placed over a ſwarm with a little honey or ſugar and ale mixed together, or ſome ſweet herb, in order to allure the

on the hicks, which will prevent it from crushing any of the bees, and alſo will have both air and acceſs to go out and in to the hive; then cover the hive with a cloth to keep out the too great heat of the ſun from incommoding the bees, and thereby (as has ſometimes been the caſe) provoked them to riſe and ſeek out a more cool and comfortable habitation. If they like their new houſe they will ſoon go up into it and fall heartily to work, unleſs upon trial they alter their mind, and reſolve to leave it. Sometimes I have ſeen them ſtay two or three hours in it, and begin to work a little, and yet after riſe and ſettle on ſome other place, or go to their mother hive again; and ſometimes (I ſuppoſe when they have had a previous habitation fixed on) they will fly clear off, therefore keep a watchful eye over them till the heat of the day is over, when it may be preſumed they will not riſe again. As ſoon as your ſwarm is fairly up in their new houſe, then place them on a board and carry them cautiouſly to where you deſire them to ſtand, for the ſooner they are ſet in their ſtante the ſooner will they be acquainted with it: indeed a few ſtragglers will fly about the place where they were firſt ſet down on the ſheet, but they will ſoon either find out the ſwarm, or return to their mother hive, any of which will be no loſs. As ſoon as you have ſet down the ſwarm in its proper ſtance, let her

ſtand

the bees to it the better; the doing of which can do no hurt, but I ſeldom uſe them, as ſeeing they do little, if any good.

ſtand with the cloth on her till night, in order to keep off the too great heat of the ſun from incommoding the bees; then at night draw a little lime mixed with hair all around the ſkirts of the hive, (except the entry) which will fix her to the board, and alſo prevent the acceſs of cold or vermin from going into her; then cover her with three divets or turfs to defend her from rain or too much heat till harveſt.

CASE THIRD.

When a ſwarm comes off a hive, and ſome of them return to her again, (by any cauſe whatever) and thereby the ſwarm is too ſmall, then drive ſome of the bees out of the ſtock, as directed, page 81, and reinforce the ſwarm with bees, as directed, page 83.

CASE FOURTH.

If a ſwarm ſettle on the trunk of a tree, or ſide of a wall, or any thing that cannot be brought to the ground, if they are within your reach, take a hive and invert it, and gently preſs it upwards, ſo as to incloſe as many bees in it as you can, not to bruiſe them againſt the tree or wall, then with your hand above the bees, gently pull them down into the hive, and then ſet down the hive on a ſheet in the ſame manner as in caſe 2d; and if the queen be in the hive, as probably ſhe will, the remaining bees and thoſe that are flying about will ſoon gather to her; but ſhould a good many bees return again to the place, as ſometimes they do, although they want a queen,

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then pull them into another empty hive as formerly, and ſet them on the ſheet, juſt beſide the other hive, with an open edge next it, and they will ſoon run all into the hive that contains the queen: any that flies about or may light again on the tree or wall, may be diſturbed with a twig or weed, and the noiſe in the hive will ſoon call them home.

CASE FIFTH.

A ſwarm hanging on a ſmall branch of a tree may be cut down or ſhaken into a hive or cloth.

CASE SIXTH.

Sometimes a ſwarm ſettles ſo high on the branch of a tree that it is not eaſily come at, a long ladder may be uſed, or one that is a good climber may ſpeel the tree, and get as near it as his prudence will direct; then fix a ſmall rope around the branch, and next cut it through with a very ſharp knife or fine ſaw, and tow it down to a ſheet as in other caſes; but if you cannot get it cut down, ſhake the bees off the branch, and it may perhaps diſpoſe them to ſettle on ſome more convenient place, where you can get at them with more eaſe.

CASE SEVENTH.

Sometimes a ſwarm will divide and ſettle on different places, but if they are allowed a little time, they which want a queen will gradually arife and join thoſe who have one; but ſhould they

they continue in two different parts, they may be hived feparately, and if they both ſtill continue in their hives, it is a ſign each one has a queen, and thereby will if permitted make two different hives. In this caſe if you have two old hives that have not ſwarmed, but are very full of bees, then drive all the bees out of them, as directed in page 61, into two empty hives each ſet the bees in a hive by itſelf, and they will make two large and good ſwarms: then ſet them down, each ſwarm where they ſtood before, when in poſſeſſion of their own hive; next put the two ſmall ſwarms on the old ſtalls, and they will be very happy to find ſuch an agreeable change of fortune; and give each one of the ſtalls a ſmall entry to keep heat in the hive, as in other caſes of a ſimilar nature. When you take the bees out of your old hive, you will ſee if any of them have a royal cell, (you will know it by the deſcription given of it in page 45) which if they have, you may keep the queen of one of the ſmall ſwarms for any other uſe, and put on the common bees, which will ſoon hatch out the royal cell, and thereby get a queen to the old hive; or you may take out the royal cell and fix it in a lying-out hive, (the ſame way you was directed to fix in a piece comb to breed a queen of in page 146) which will ſoon get her a queen and cauſe her to ſwarm: but ſhould you have no old lying-out ſtalls to exchange their bees with the two ſmall ſwarms, then put both the ſmall ſwarms together in one hive, which will make a good one; do it in this manner, take the hive that has the ſmalleſt ſwarm in it, turn her up, and cauſe the bees to fall a running in

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the hive, by which you will discover the queen; then cover her, along with a hundred or so of her companions, with a drinking glass, and she and them will run to the top of it; then lift the glass out of the hive, and place it on a handkerchief, and keep the queen and her companions in it close prisoners. Next take the common bees in the hive and turn it up, and set the other swarm on it mouth to mouth, and they will soon unite in the upper hive; or you may with a smart stroke on the hive, shake out the common bees on a sheet, and immediately cover them with the larger swarm, and they will soon run into it *. Next take the queen with her companions,

* This is the only way of uniting swarms, by taking away one of the queens; (let Mr. *Key* say what he pleases, page 162) for should they be put together, having both the queens, a dreadful battle often happens until one of the queens is slain; although I grant that sometimes they will kill one of the queens, and perhaps not a dozen of common bees; but there is no need for running the smallest risk, when, should you have your wish, you will be no profiter; besides you save a queen for further use, if a hive should need one: therefore when directing to unite two swarms, I always mean the common bees of one of the swarms to be put to the other swarm, and it is not properly two families joined in one, seeing they have only one mother; but the common bees coming to them like orphans without a mother, in an humble supplicating manner, seldom but find grace, and are received into favour, and partake of the privileges of the family; whereas when they come with a mother, they want to defend her, and murder all the native bees, and the natives mean to kill the whole invading family.

companions, and put in a box with small holes in it sufficient to admit air, but not so large as to permit the bees to escape. In this box a little piece honey comb should be put to supply the bees with food till you perhaps may have need of the queen to put on an old hive, or to any other swarm. In this way you may preserve a queen during all swarming time, which may sometimes be very useful should a queen be wanted. The box with the prisoners in it should be kept in some moderately warm place, to keep the bees safe from cold; sometimes I have kept a queen and about 100 attendants with her for several days in a thin lawn handkerchief, tied in the manner of a purse, with the bees in the middle of it, by which I could see the state of them through it.

CASE EIGHTH.

If a hive be not ripe (that is not very full of bees) and yet swarm, then both herself and swarm will have few bees in them; then if you have two old hives that are full of bees, you may exchange one of their bees with the small swarm bees, and exchange the other strong old hive's bees with the weak hive that swarmed bees, in the same manner, you are directed to change them in the preceding case: or you may reinforce both the weak mother and the swarm that came from her, as directed, page 83, if you can get common bees from some very strong hives that can spare them without hurting themselves: or you may take all the bees out of the old hive, and secure the queen prisoner, as directed

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rected in the preceding case; then put all the old hive's common bees to the small swarm, which will make her a good hive; then turn up one of your very strong hives, and give her some raps on the sides, and carry her to two or three yards distance; then set down the old hive that is empty of bees, but full of maggots, where the strong one stood, which will receive the bees of the strong hive which was in the fields, and also those that flew out of her when turned up, carried, and rapped on; which will supply the stall with bees, and give her a little entry, and at night put the prisoner queen to her. But should you have no bees to do any of the above ways, you may take the swarm's queen prisoner, and return the common bees to their mother hive again; for in this case one is better than two.

CASE NINTH.

A swarm, when off, sometimes, though seldom, (I suppose by the queen mistaking the hive) will go on to another living hive standing near her, and then generally a dreadful battle takes place, and perhaps the stranger queen is seized on in an instant by the native bees, and murdered without a fair trial: in such a time I have seen more than a hundred bees all wrapt together about the bigness of a small apple around a queen in such a firm manner, that I would had great difficulty to separate them from her. Some writers say, they are her enemies which encompass her, each one of which is mad to be first at her with their spear. It is probable

robable it may be the cafe, that they are ene-
nies that furround her in order for her death;
ut perhaps alfo her friends may encompafs her
o preferve her from the rage and fury of her e-
nemies. Sometimes I have feparated them
rom her, and taken her prifoner without the
eaft wound. However, if ever you fee at any
ime a bunch of bees wrapt clofe together,
hen you are fure of a queen there; then tear
funder the common bees immediately, and make
he queen your prifoner; and as foon as the
reat heat and hurry is over, you may put the
rifoner queen to the hive that needs her. As
oon as a fwarm goes on another hive, and they
ppear to fight; then feize the moment and
urn up the hive, and if you can get both of the
queens make them prifoners: and next take all
he bees out of the old hive, and put them in five
or fix different hives; then fet down the old
hive on her ftance again, and take the hives con-
taining the bees only, and fet them near the old
hive the fwarm came off, and thofe bees that fly
away will probably go to their mother hives:
but fhould fome quantity of them remain peace-
ably in one of the hives they were put in, as pro-
bably they may, confidering the fright they
have got, you may offer one of the queens to
them, firft wetting her a little to prevent her
flying when you put her to them; and if they
appear to be fond of her, and creep about her
in a friendly manner, then you may let her ftay
with them; for if they do not kill her at firft
they never will do it, but live in the greateft
harmony and love with her ever after: then
you may let her ftand or night, and reinforce
her

her with more bees from the two old hives, which of either can ſpare them beſt: but if the bees when you offer the queen to them, inſtead of receiving her kindly, ſhould run to her in a rage, and offer to ſting her, you muſt immediately take her from them again, and let them ſtay or night till they are ſenſible that they want a queen; then offer her to them again, and they will receive her gladly: and as ſoon as a good many of the bees are gone back to the old hive that you took them all out of, you may return her the other queen, firſt wetting her wings, and if ſhe is the native one of that hive, they will receive her with joy; but if ſhe is the ſtranger queen, (for it is not eaſy known which one belonged to the ſwarm or hive; if one is larger than the other put her to the old hive, and the ſmalleſt to the ſwarm) they perhaps may be more ſulky to her, in which caſe take her from them, and again keep her till night, when they will be as glad of her return as you are of giving her to them: but if when you take all the bees out of the old hive, you only get one queen, the other being killed in the fray, or perhaps had not gone on with the ſwarm, or ſome way had eſcaped during the battle. Then if your old hive that you took the bees out of, had a royal cell in her, ſhe will do without a queen, and the ſingle queen may ſtill be put to the ſwarm; but if ſhe had no royal cell, and you have no other priſoner queen to ſupply; then you muſt return her to the old hive, and the hives containing only the bees, may be turned up and diſturbed now and then, and they will probably fly each one to their native hives.

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CASE TENTH.

Many times a ſwarm will come off and turn again, and go on to her mother hive, and ſometimes will come clear off and ſettle on ſome place, and go up to a hive, and yet come all out of it again, and go back to their mother hive, and they will ſometimes do that for ſundry days running. I have known them do it five or ſix different times, and yet ſettle in an empty hive and do well at laſt: perhaps the queen had not come along with them, therefore whenever a ſwarm comes off, and returns to her mother hive again, then directly turn her up and drive all her bees (by rapping on her, as directed in page 81) into two empty hives equally divided, then ſearch diligently for two queens, which if you find, put one of them among the bees in one of the hives, which will make a ſwarm; which place where the mother hive ſtood, then put the other queen among the bees in the other hive, and return them to the old hive, by turning up the hive with the bees, and placing the old ſtock on it, they will ſoon run up; and you may ſet the ſtock any part you pleaſe, but keep the ſwarm where her mother hive ſtood; but in caſe you cannot find two queens, but find only one and a royal cell, then put the queen and the half of the commons in a hive which will be a ſwarm, and the other half of the commons being put on the old ſtock having a royal cell in it will do very well, and ſoon get a queen: but if when ſearching the bees and ſtock for queens and royal cells, only one queen be

found, and no royal cell, in this case a queen has probably fallen on the ground when flying, and the bees have lost her, and so returned to their mother hive again. Then if you have no spare queen or royal cell to assist here, in this case you must put them all on the stall again, and give her a large eek, and she will make a good colony.

CASE ELEVENTH.

If a swarm settle among the thick twisted branches of a hedge so as she cannot be cut down, then with a sharp knife cut some branches off above the swarm the best way you can, then place a hive over them, and cause one to hold it firm, and with a hammer rattle on the root of the thorns which will shake the bees and cause them to run up to the hive, also now and then stirr the bees with a stick, all which will make them run up the sooner, and when they are mostly up, the hive may be elevated a little above them, by which the bees will ascend the faster; and as soon as they are mostly up, set down the hive near by, and with a weed brush off the remaining bees, and the noise of those in the hive will call them home.

CASE TWELFTH.

Sometimes, especially in second or third swarms, there will be two or three princesses go off with them, and if they settle all in one cluster, and go up in one hive, they will sometimes fight a good deal before they get determined which

which princeſs ſhall be their Queen, and the ſupernumerary ones ſlain. As ſoon as you ſee a ſwarm fighting in this manner, you may conclude there are more Queens than one among them; then ſearch for Queens, and take them all away but one, by which you may prevent much ſlaughter, and get a Queen or two, which you perhaps may have uſe for in ſome of your other hives.

CASE THIRTEENTH.

If a ſwarm go into a hollow tree, as ſometimes they will, then with a chiſſel and mallet cut a hole in the tree as near as can be to the upper part of the hollow, then place an empty hive upon the hole, and ſtrike the tree all around with the mallet pretty forcibly, which noiſe and diſturbance, may make them run out at the hole into the empty hive, or diſpoſe them to fly to ſome branch of a tree, and ſettle on it, where they may be cut down, and lodged in a hive as in other caſes. and if they were long in the tree, the hive after they are lodged in it ſhould be placed near it to ſtand during that day, to receive the ſtragglers. I have taken a ſwarm out of a hollow tree after they were frightened into good humour, when I could get at them in handfuls and ſpoonfuls, and put them in a hive as eaſily as if they had been all gooſeberries, and ſcarce received a ſting, unleſs I had accidentally preſſed ſome of them againſt the tree, or thoſe that had been at the fields, upon their return home, would been greatly enraged when they ſaw their habitation

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ſo much altered, they would vented their ſpite at me.

CASE FOURTEENTH.

If a hive lies long out for want of room, (but indeed none ſhould be ſuffered to do ſo above eight days) but does not ſwarm, it is a ſign ſhe has not a young queen bred yet, as noticed in page 165; in this caſe, if you have a ſmall ſwarm to exchange bees for bees with, as directed in caſe 7th, it will do very well; or you may take a large quantity of her common bees, and reinforce a weak hive or ſwarm with; or if you can have a ſpare queen, or royal cell, you may take a ſwarm from her, and put the ſaid queen or cell to the old hive, or you may give her a large eek, and ſo make a colony of her, which will be as profitable and pleaſant a way as any, and eaſy done, as you will ſee in page 163, beſides if ſhe have a royal cell coming forward, ſhe will ſtill ſwarm, and therefore muſt be watched although ſhe be eeked.

The way to make an eek is this, cut four rolls of the under part of an old hive, which will make one, or make a new eek on purpoſe of the ſame wideneſs of the hive you want enlarged, and cut a door-way in it the ſame ſize as the one in the hive; then place a board with the eek on it at the ſide of the hive about the middle of the day or any other time when the bees are thongeſt at work, then gently lift up the hive from her board, and immediately ſet it on the eek, and few or no bees will be cruſhed between the hive and eek, as the moſt part of them

hem will be at work in the fields; beſides they re not ſo quarrelſome at this time of the day vhen they are engaged in buſineſs as they are it night when all are in the hive and their guards et: then ſet the hive in her ſtance again, and it night draw a little lime around the joinings o fix the eek to the hive, and keep out vermin ınd cold.

CASE FIFTEENTH.

Before bees ſwarm the ſecond or third time, hey do not ſie out in cluſters about the hive or oard, but whenever ready, come ruſhing off ven in indifferent days; yet we have more ertain ſigns of the time they will caſt their fter ſwarms than when they will do it the firſt ime: nay if the weather be good, we can alnoſt ſet the hour they will do it, for if you lace your ear to a hive at night, about ten or welve days after her firſt ſwarm came off, you vill hear a ſound commonly called tolling, which s made by the young princeſs, in order perhaps o warn, or rather beſeech her companions to nake ready for a march along with her. I cannot pretend ſays one to deſcribe this ſound fully o your underſtanding, it pronounces as it were *eep, peep, peep*, a dozen or twenty times ſucceſſively in one breath; then ſtops, calls the ame way again, and ſo on ſomewhat like a hen's hicken peeping for its dam when it has loſt er. As many princeſſes as there are in a hive, here are ſo many different ſounds; ſometimes have heard their ſound from all quarters in he hive, and as it were anſwering one another;

ſome,

some crying, *peep, peep, peep*, in a treble manner, as already said; and others answering in a more hoarse manner as it were the bass. Whenever you hear these sounds in a hive, you may depend on a swarm in a day or two if the weather be good. The first night they are observed they sound but low, and seldom, and not often cast the next day, but the second night they sound louder and oftener, insomuch that you will sometimes hear them standing two or three yards from the hive, and the next day you are sure of a swarm if the weather answer. It is delightful, says *Thorley*, to hear those peculiar and musical sounds of bees being an eight or chord, which is truly harmonious. Those sounds are scarce ever heard before a first swarm, I believe not one in sixty calls: the reason I suppose is, they have only one queen bred commonly to go out with the first swarm; and as said in page 161, they will sometimes send off the old queen with the first swarm or ever the young queen be out of the pregnant royal cell: whereas before they swarm a second or third time, sometimes they will have four or five queens and royal cells in their hive, by which a queen or royal cell may be got to put to any hive that needs one.

CASE SIXTEENTH.

If a swarm go into a hollow of a wall, take out some stones opposite to her, till you can see the bees, and then pull them into a hive, or rap on the wall with a mallet, which may frighten the bees so as to dispose them to rise and settle

ſettle on ſome place where they will be eaſier hived.

From what has been ſaid concerning the above caſes, there will be little need for making artificial ſwarms; neither am I very fond of giving directions how to make bees ſwarm, unleſs in very particular caſes, in which it may be very profitable. If hives are lying much out for want of room, and thereby ſpending fine weather and doing little work, then they ſhould be either eeked or an artificial ſwarm taken from them, in caſe you have queens or royal cells to ſupply both the old hive and her ſwarm with.

The way to take a ſwarm from a hive is this, lift the ſtall off the board, and place an empty hive over the bees that remain on the board, then carry the ſtall ſix or eight yards off, and turn it up, and drive all the bees, queen and all out of it, as directed in page 81; then when all the bees are out of the ſtall you will ſee if ſhe has any royal cells in her, which if ſhe has, it will ſoon come forward to be a queen to her, and you may lift off the empty hive, and ſet down the ſtall on her own ſtance again, and the common bees will ſoon ruſh into her; then ſet down the ſwarm by her ſide, within a foot of her, and ſometimes ſet the ſwarm in the ſtall's ſtance, and the ſtall in the ſwarm's ſtance, taking great care that the bees be properly divided. There ſhould be twice as many in the ſwarm as there are in the ſtall, for the ſtall having a great many maggots in the cells, will ſoon turn into bees and thereby increaſe the number in her: or as ſoon as you are certain that there is a queen in the ſwarm (as it can

ſcarc-

ſcarce miſs, ſeeing the whole bees were drove out of the ſtall) by their beginning to work; then you may carry her, or rather the ſtall, to the diſtance of a mile, and let her ſtand during ſummer if convenient; or bring her back in eight days, by which you will ſave the trouble of changing the hives, and they will work without any interruption. But ſuppoſe the old ſtall has a royal cell in her, if you have a ſpare queen by you, put her to the ſtall at night, in the ſame way, as directed in caſe 9th, and the bees will receive her kindly, being now ſenſible they want one, and are mourning for her loſs. But in caſe you have neither a ſpare queen, nor the ſtall a royal cell in her, then you muſt return all the bees again to the ſtall, and give her a large eek, and ſo make a colony of her, which is as profitable and as eaſy done.

Perhaps the reader will ſay, ſuppoſing a hive having in her a vaſt multitude of common bees and only one queen, by taking out the queen and two thirds of the bees, they will compoſe a ſwarm; and the third of the common bees being left in the ſtalls will build a royal cell, and thereby get themſelves a queen: true ſo they would, and it may be done if very ſoon in the ſeaſon, and the old ſtock do well too; for an artificial ſwarm is every whit as good as a natural one if they be equal in number of bees and ſwarmed both in the ſame day; but if the ſeaſon be far-gone, perhaps the middle of *July*, and the old hive be left without either a queen or royal cell in her; then ſhe will have a royal cell to build, and it will be twenty-five days or ſhe can have a young queen brought forward and fit for

laying

laying eggs, and after that other twenty-five days or any of her offspring can be fit for labour, by which time it is the firſt week of *September*, and the ſeaſon for gathering honey is gone, and the hive grows commonly daily lighter after ſhe has ſwarmed, and alſo there will be few bees bred, and the hive thereby rendered unfit for keeping for a ſtall.

If you are very keen of having queens bred, you will ſee in page 43, how I made a hive breed me ſome to ſupply me with. Small thriving hives commonly ſwarm ſoon the firſt time, and about nine or ten days after they often found, in order to ſwarm again; in which time there are four or five queens and royal cells in her. At leaſt there will be two queens, therefore if you want queens or royal cells you may drive all her bees out, and take all her queens or royal cells from her, but only one to ſupply herſelf with; which is a better way than to take a queen from a hive in order to cauſe the bees to breed more queens. And in no caſe ſuffer a hive to want a queen, except when you take one from a hive in order to cauſe the hive to breed more for ſome very needful uſe.

It may be uſeful and amuſing to know the weights and number of different ſwarms. 'It 'has been found, ſays *Butler*, that a larger 'number than 40 or 50,000 will not thrive to'gether in one hive. Swarms often amount to '30,000; a large ſwarm may weigh eight 'pounds, and gradually leſs to one pound: con'ſequently a very good one weighs five or ſix 'pounds, a moderate one four pounds. No 'ſwarm leſs than this ſhould be kept, but united

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'with others.' Mr. *Wildman* says, 4928 bees weigh a pound, and that 20000 bees compose a very large swarm. I am of opinion that a swarm that has 15000 bees in her will do very well in a single hive, if not too late in the season: but I have had above 30000 in a swarm: the more always the better.

Most all authors advise to kill the drones (or males as they call them) as soon as the top swarm is gone off. Surprising! how inconsistent with themselves to teach a man to kill all the fathers of his hives in order to make them thrive the better: what incoherence is here, though I cannot agree with them as to their sex, yet I give the same advice with respect to killing of drones. As soon therefore as the top swarm is gone off a hive, the next fine day about eleven o'clock sit down at her side, and as the drones come out at the entry of the hive, (in order to fly off) lay your fore finger on their back, and press them to the board, and in this way you may kill a 100 of them in a short time. You will see another way how to kill them in page 61. The drones are very great eaters and wasters of honey, being bigger than the common bees they take more to support them, and perhaps they have that instinct to know their days will soon be ended, and that they have no need to steward out the honey for the winter, as they will not be suffered to live till that time, as the common bees will soon kill them. I think, supposing the drones were allowed to live out all their days, they would not be long; for they appear to be more tender insects than bees: yet in some hives that want their queens, the drones

are

are permitted to live, and they have been seen, though very rare, in such hives after *Martinmas*.

CHAP. XXI.

HOW TO TAKE HONEY OUT OF HIVES IN SUMMER WITHOUT DESTROYING THE BEES.

A GOOD many directions have been given by different authors how to take a part of the honey combs out of rich hives in summer, and thereby the sooner to share of their treasures. Those that keep bees in colonies, that is one family of them in two or three different boxes; they take the box that is fullest of honey from them at a time, leaving the other one or two boxes, and perhaps if need be, adding another to them for the bees to work in. And those that keep them in single hives, drive the bees all out of them, and then cut out as many of the richest combs as they think the hive can spare; then return the bees to the hive, which replenish it again with combs.

But there is no profit but rather loss by any of these methods, for it disturbs and discourages the bees greatly; and in the boxes taken there is oftentimes young in the cells, which are generally lost: besides it is attended with a deal of trouble, and if the season turns bad after the hive is robbed, it hinders the bees from replenishing the hive or colony with combs and honey, and

thereby prevents them from being fit for ſtalls. Nor need the owner think his hives turning rich of honey and numerous of bees will thereby turn lazy: for the contrary is the caſe, as was formerly ſaid in page 16; the more rich a hive is, it is the keener on riches, and the more numerous, the keener on encreaſing their number. Therefore be aſſured of this, that there is nothing more profitable and delightſome, than to have an exceeding great multitude of bees in a capacious hive carrying on their works in a natural way with the greateſt harmony and ſpeed, not unlike ſome ſtately oak growing, and flouriſhing in its native ſoil with the greateſt luxuriency; where the pruner's knife never comes. Therefore wait patiently till harveſt, and you will come with the greateſt eaſe to the whole lump of honey in the hive, which is a far better way. But ſhould you be very keen to taſte a little fine honey in ſummer you ſhall be gratified. Therefore in the height of the day when the bees are throngeſt at work, and thereby feweſt in the hive; pitch upon the heavieſt of your laſt year's ſwarms, and carry her to ſome diſtance from her ſtance, eight or ten yards or ſo, and place an empty hive where ſhe ſtood, to receive and amuſe the bees during your operation: then turn up the hive and rap her ſmartly on the ſides, (firſt having your armour on) by which the bees will fly thick to the empty hive in their own ſtance: then at one view you will ſee the richeſt combs at the ſide of the hive, where there will be probably the feweſt bees: then with a knife cut them out the beſt way your prudence will direct; then turn up the hive and ſet her

on

on a board again, and let her drip three or four minutes; then ſet her on another dry board, and remove the empty hive, and place the ſtall on her own ſtance, and the bees will fly thick to her again, and ſoon lick up the ſpilt honey. Then about an hour or two after place her on her own board, by which the crumbles of wax that the bees had brought down to the other will be removed. Many others adviſe to drive the whole bees out of the hive in order to rob her the eaſier. Thoſe who chuſe that way may do it, but I eſteem the former way the beſt, as it keeps the queen in the hive, and does not diſturb the young, by looſening the combs which are left in the hive, and I can do it and ſcarcely kill a ſcore of common bees; for the rapping makes them run to one ſide, and I chuſe the other, and it is done in a few minutes; but if there are a very great deal of bees in her, the half of them or ſo may be drove into an empty hive. And as ſoon as ever you ſee a rich comb clear of bees ſeize it. When the edges of the combs you want are looſened from the hive, by turning up the hive, the weight of the comb will make it fall down into a diſh placed below.

A new ſwarm muſt not be thus robbed, nor muſt ſhe be laid on her broad-ſide or her mouth uppermoſt, for by doing that I have often ſeen the fine free young combs both containing honey and young bees, ſway all to the under ſide of the hive, and thereby looſened; and when ſet on their board again, they would have fallen down on it, and ſometimes totally ruined the whole hive.

We have accounts from *Egypt* and *France* and some other countries, that they remove their bees from those fields the flowers of which are faded, to others where they are yet in bloom; (in order for the bees to collect the more honey) and sometimes they will carry them a great distance for fresh flowers to feed on. I have often done that way with my bees and had satisfaction, and other times when the weather had changed had all my trouble lost. In spring I sometimes place hives among whins, in summer in the middle of a clover field, and in *August* I set them in a heather muir. When they are removed from a poor pasture to a good one, they are very fond of so agreeable a change, and carry very brisk. Those who choose to remove them for better pasture, if the weather be good, are sure to be profiters; but should the weather turn bad, they only lose their trouble of removing, and in this case I leave every one to their own choice; only this I affirm, that the nearer the pasture they will carry the faster, and removing in spring as formerly said, is an excellent preservative from robbers. When a hive is to be removed, do it in cloudy or cold days when the bees stir not out of their hives, or in the evenings: they may be carried on a hand-barrow between two men, two or three hives at a time; or a man may carry one upon his head. In winter three or four hives may be carried on one horse with kreels, if properly tied up in sheets, so as not a bee may get out for if they did, they would sting the horse and make him fall a jumping, which would remove the hives more and more off their boards, and thereby

hereby more bees would get out of the hives, nd at the horſe and ſting him, which would nrage him ſo, that he would jump and kick nd run away, and readily ruin all your hives. Beware alſo of carrying hives in carriages, for he jolting of them brings down the combs of-en, and bruiſes both them and the bees; and f any bees get at the horſes to ſting them, ten o one but the carriage be overturned, and all our hives loſt; and perhaps yourſelf and horſes uffer in the calamity.

In the latter end of ſummer or beginning of harveſt, when the flowers begin to turn ſcarce n the neighbourhood, bees will again fall a obbing one another; and waſps (in ſome places) will alſo attack the hives; therefore their ntry ſhould be reduced to only half an inch ong, and as high, by which few bees will the eaſier defend it; and thoſe hives that have few bees in them ſhould be immediately killed.

CHAP. XXII.

ARGUMENTS AGAINST UNITING BEES FOR STALLS.

THE bulk of authors declare their abhorrence of killing bees in harveſt in order to come at their honey, exclaiming loudly againſt ſuch an unhuman, barbarous, and cruel practice, as they are pleaſed to call it; aſſerting alſo with lame

proof, that ſuch a practice is oppoſite to the owner's intereſt. I ſhall give you a little of their ſtuff on that head, and let you ſee how they contradict themſelves; and next offer my reaſons for which I ſtill jog on in the old faſhion of killing bees in order to come at their honey. The author of the natural hiſtory of bees makes his *Clariſſa* ſay, 'Methinks it is 'whimſical enough that a man when he eats his 'ox or ſheep, ſhould imagine he poſſeſſes himſelf of a thing to which he had a juſt and lawful title.'

Eugen. 'The lion may with equal juſtice fancy 'himſelf impowered to feed upon men, and the 'wolf on ſheep; but it is my opinion that neither the one nor the other could find any other 'original title of their ſovereignty, than force or 'cunning. But let us engage no further in a 'queſtion, as this would raiſe up a multitude 'of gainſayers.'—— When ſpeaking of them that kill the bees, he ſays, 'The murderers a-'bove mentioned add, that bees would devour 'during winter all the honey ſtored by them in 'ſummer. By what name would you call a 'peaſant who would kill his goat merely that he 'might come at all the milk contained in the 'bladder of that animal?' Sage Sir, I would call him a fool at leaſt, if not worſe; but were he to kill the goat for the fleſh it would alter the caſe.——When *Eugenia* is grown a little calmer he ſays, 'it muſt be confeſſed that our inſects 'would eat the greateſt part of ſuch honey, and 'perhaps all, ſince they hoard it up merely as 'proviſion for themſelves.'

Dear

Dear Sir, seeing they eat the most part of their provision, if not all, in winter; certainly take a part of it from them they would die of mine, which is none of the easiest deaths; besides all the honey they had in their hives in harvest would be lost too. Mr. *Thorley* says, page 150, on this head, 'From the long observations of these very wonderful creatures, and their inimitable excellencies, together with their great usefulness to mankind, I am become one of their greatest admirers and a public advocate for them, most solemnly protesting against all that notorious ingratitude of their cruel owners, who not contented with all their treasure, collected with infinite pains and many perils, devote them to destruction without any distinction to their own great loss.'

'Is no regard due to these creatures of God, which are so excellent in themselves, and serviceable to men; when the following pages will make it appear with how little trouble and without any expence the owner may come at their riches with safety to their lives. Those who shall hereafter doom them to common death, must be altogether without excuse."

'No new swarms or stocks should be thus united *, except very late ones and casts

'which

* I suppose he means no swarms or stocks that have enty honey and bees in them, and so fit for stalls, ould be thus united. In this he is very right, for h hives will make good stalls as they are; but if ir honey only serve their own bees till next honey son, if put some thousands of more bees to them in vest, they would soon be done with it, (perhaps by

'which have not gained a ſufficient quantity
'honey for their winter ſtore; ſuch I always
'nite to ſave their lives'

'Hives or ſtocks which have ſwarmed on
'or twice, conſequently reduced in their nu
'bers, are the fitteſt to be joined togeth
'which will greatly ſtrengthen and impro
'them†.'

Mr. *Thomas Wildman* ſays, page 169, 'W
'we to kill the hen for the egg, the cow for t
'milk, or the ſheep for the fleece it bears, ev
'ry one would inſtantly ſee how much we ſho
'act contrary to our own intereſt.' All tru
Mr. *Wildman*, but ſhould we kill ſome of th
creatures in harveſt which we can ſpare mere
for their fleſh: (eſpecially when we could n
maintain them through winter, and ſo ti
would die of famine) perhaps you might ta
with us, and think it not ſuch imprudent co
duct.

But to come to the point, let it be ſuppoſed
hive in harveſt that has 16000 bees in her, w
take 20 lb. of honey ‡ to maintain her till *Jun*

by *March*] and conſequently die of famine; and
ſtead of being bettered by adding bees to them, th
would be ruined.

† The reader will certainly obſerve a great blund
here, if one of thoſe weak hives or caſts have no
ſufficiency of honey in her own hive to ſupply h
with in winter, and thereby perhaps die of famine
March; certainly if add the bees of another hive
her, ſhe would ſooner eat all the honey, and there
die the ſooner of famine.

‡ A hive that is 30 lb. wt. I compute will have
lb. of honey in her; the other 10 lb. I allow for
weight of bees, wax, and hive.

s plain to every one, that if add other 8 or
000 bees to her, she will eat all her honey
ng before the foresaid time; and consequent-
die of famine.

Again. should a man have two weak hives that
ve each of them 8000 bees, but only 10 lb.
honey in them; then if put the bees of both
e said hives in one of them, there would be
000 bees in her, and only 10 lb. of honey to
intain them with, which would only maintain
em the half of the time till the honey season.
cording to this, good stalls (as agreed by all)
ed no uniting; and light hives have not ho-
y enough to support their own bees, and far
s to maintain their neighbours too if added
them.

Again, a man has twelve good heavy hives,
ery one of which as they presently are, will
ke an excellent stall, each having 16000
es in her; a sufficient number to eat all the
ney in a hive that is 30 lb. wt. and he wants
take the honey of six of them for his use, and
keep the other six for stalls. I would ask
e *Frenchman*, *Thorley*, and *Wildman*, what must
do with the bees of the six hives determined
be taken, seeing the other six set aside for
lls, have as many bees in them as they are
le to maintain?

It is well known that after a very bad sum-
er, a great many hives are very light, and per-
ps a man has 30 hives, 10 of which are only
for stalls, which he very wisely keeps for that
rpose; the other twenty have very little ho-
y at harvest, and a good number of bees in
ch of them. Please, gentlemen, what must he

do

do with the bees of the forlorn twenty ligl hives? muſt he force them all on the 10 ſtalls which would ſtarve them altogether by a linger ing death, and thereby become a broken bee maſter; or muſt he end their days in three mi nutes, and preſerve the other 10 ſtalls for fur ther uſe?

Upon the whole, a hive that is 30 lb. wt. i harveſt, with a ſufficiency of bees in her, as on of ſuch a weight commonly has, ſhe will make good ſtall, and need no more trouble but to co ver her well, &c. as directed in page 79. But i in harveſt one ſhould have a hive that is 30 lb wt. but very few bees in her, which will very ſel dom be the caſe, he may drive all her own bee our, as directed in page 8 , and put a large ſwarm of bees on her, (which he may take out of any light hive) and ſo ſhe will have a ſuf ficient number.

Or he may reinforce her with bees, as direct ed in page 83, but by no means do either a long as he can get a hive for a ſtall, that is both 30 lb. wt. and plenty bees of her own.

As it is impoſſible for bees to live when they are deprived of their food, we are under a ne ceſſity to kill all thoſe hives in harveſt that have not a ſufficiency to maintain them till the flower ſeaſon return.

The time of killing of hives is ſometimes ſooner and ſometimes later, according to the earlineſs or lateneſs of the flowers in the neigh bourhood, or the goodneſs or badneſs of the weather. I have known hives waſte their ho ney and turn lighter after the firſt week of *Au guſt*. And other times I have ſeen them when

weather was good, and near heather, work keen ll the month of *August*, and turn daily heavier. Therefore the honey harveſt is like the corn one, ooner and later, in different years. As a gene- al direction, whenever the weather ſets in loudy or rainy about the middle of *August*, or henever your bees give almoſt over work, for nough they carry ſome at this ſeaſon, their fa- nily being commonly very large, perhaps for ne lb. of honey they gather, they may eat two. Therefore at this time, in the firſt place chooſe our ſtalls according to the directions given in hap. 11. for that purpoſe, to which I refer you. Then put a mark on every ſtall you have choſen or yourſelf, then kill or kill all the reſt whether ood or bad; for the ſooner the honey is made, he better will it run out, and there will be the ewer bees to moleſt your ſtalls in the robbing ay.

You will remember in page 152, I adviſed ou to drive the bees out of very light hives in arveſt, and keep them in order to put ſwarms next ſummer. Having directed you how to hooſe your ſtall hives, there is no need to di- ect what to kill, ſeeing all the reſt may be either ld or killed.

CHAP. XXIII.

OF KILLING BEES, AND SEPARATING THE HONEY AND WAX.

AS to the killing of the bees of thoſe hives you deſign to take, the beſt way is with brimſtone; prepare a few rags dipped in melted brimſtone, then dig a hole in the ground a foot and a half deep, ſome narrower than the mouth of the hive; then take two ſmall pieces of wood eight inches long, and make a ſlit in one end of each of them, into which thruſt the brimſtone matches, then thruſt the pieces of wood containing the matches into the ſide of the hole, and kindle the matches with a candle or coal, then nimbly place the hive over it, and lay a little earth around the ſkirts of the hive to keep in the ſmoke for ten or twelve minutes; in which time frequently beat the hive with your hand to cauſe the bees to fall down. I have wrote this with a deal of feeling and reluctance, as much as when I ſee a harmleſs ſheep or any other innocent creature killed for the uſe of man; for during the whole year I ſo much ſympathiſe with the bees, that even when one ſtings me I rub it off, but never kills a ſingle one; and ſuppoſe I ſee my neighbour's bees robbing mine, I never deſtroy one of them. I generally drive the bees out of a hive when I deſign

ign to take her, as in page 81, and then fmoak hem after. My reaſon for it is, when a hive is fmoaked, a good many bees lodge in the cells and ſides of the combs; and thereby ſiles and loſes ſome of the honey; beſides ſome of them being only half dead oftentimes ſting thoſe that are making the honey. The reader may do either of which he pleaſes. All your uteníils for he honey having been before prepared, ſuch as arge diſhes, jars, ſeives, knives, and ſpoons; ou are immediately to fall to work while the oney is warm, as then it will run more quickly out. To further this intention the hive hould be brought into a warm room, then with pair of pinchers grip the end of the ſticks in the ive, and give them a twiſt round which will ooſen them; then puſl them all out, and with a nife looſe the edges of the combs from the hive ll around, and give the hive a ſmart knock on he floor on one of the ſides to which the broadide of the combs is oppoſite, which will make he combs fall to that ſide; then turn the hive nd give it another knock on the oppoſite ſide, hich will effectually looſen all the combs which ou could not get ſo well at with your knife; hen keep the hive ſtill on its broad ſide, and the ombs will lie all one above another; then take lways the uppermoſt comb off firſt, and ſhould ny dead bees be on it blow or bruſh them off; ien divide it into three parts, and lay the empty ombs firſt by themſelves; next, the combs conaining eggs or maggots by themſelves, and then ay the fine ſealed up combs on a diſh by themelves, ordering an aſſiſtant to cut them into thin ices, firſt obſerving to pair off all the ſealed

mouths of the cells in order that the honey may run the ſooner out. The combs ſhould be laid in this ſtate on ſeives or ſome other contrivance which will afford the honey a free paſſage; it will run quite clear, and the honey thus obtained ſhould be kept by itſelf, as being the pureſt and beſt.

Thoſe combs which may be partly filled with young bees, bee-bread and honey may be given to hives to take their honey out of them, in the way directed in page 113, which is the beſt uſe they can be put to, and the bees will ſoon make them honeyleſs.

After the fine combs will run no more, put them in a pan over a ſlow fire, conſtantly ſtirring them about with your hand till they are more than milk warm; then put them in a ſtrong canvaſs bag and ſqueeze out the honey, which you may keep for feeding your bees or any external uſe.

All thoſe combs which the honey was ſqueezed from may be ſteeped in water and made into mead; or you may ſteep the combs in water for that purpoſe after the fineſt of the honey is run out without ſqueezing for more.

Now your combs being all honeyleſs, are fit for making wax. The way I do is very ſimple, I put the combs in a kettle with a ſufficient quantity of water, and make them boil over a ſlow fire for 40 minutes or ſo (often ſtirring them about) in which time they are all melted; then I lay a pair of tongs or ſo over a ſmall tub with ſome water in it, and ſet a ſtrong made cullender (which is flat on the under ſide with round holes in it) on the tongs; then with a ladle

ladle I put the melted combs in the cullender, and preſs them down with a piece wood made on purpoſe, flat on the under ſide, which ſqueezes out the thin wax into the tub below, and the droſs remains in the cullender. I generally boil the droſs again a ſecond time, and ſqueeze for more wax. Indeed the wax in this way cannot be got entirely out from the droſs, neither can it in any other way that ever I ſaw tried or heard of. All that is left among the droſs in my way of ſeparating it is very inſignificant, and will not pay the charge of any further trouble *.

After the wax is cold in the tub I put it again in the kettle among clean water, and melt and pour it in a bowl wider at the top than bottom, and ſkim off any droſs that may float on the top of it, and let it ſtand in ſome warm part to cool ſlowly, which prevents cracking. Then I take out the cake of wax, and pair off all the droſs in the underſide of it, till there be nothing but clean wax, and then it is fit for the merchant.

* I have tried many other ways in order to get all the wax out of the droſs. More than a dozen of years ago I made a preſs for that end, ſomething like a candle-maker's, which they ſqueeze the tallow with, but laid it aſide. I have ſqueezed it with bags, but they would never ſtand the ſtreſs long. I have done ſomething like Mr. *Key's* method, but it did not ſatisfy either.

CHAP. XXIV.

OF BEES ENEMIES, AND HOW TO GUARD AGAINST THEM.

THE three capital enemies to bees are cold, robbers, and famine, to which may be added the mouse: these are enemies that kill many hundreds of hives in this island every year; (other enemies hurt them but rarely) but these are constant murderers if not guarded against.

You have been directed already how to preserve your bees from all those capital enemies in different parts of this book, to which the contents will refer you.

Wasps are enemies to bees, especially in dry warm years, and those hives that are near plantings (where they resort much) are the greatest sufferers by them. But where I live, a wasp is scarcely ever seen at a hive, except some chance time a mother one will appear before a hive in *May*, and offer to go in; but her hoarse voice and fool's coat discover her to the bees, and they banish her from their territories. I know not if ever a hive in my neighbourhood was ever a shilling the worse by wasps: but four or six miles distance from this place sundry hives have been killed by them.

In spring destroy the mother wasps wherever you see them, for by killing one of these, you destroy a whole nest. Also their nests should be

sought

ſought out and as many deſtroyed (by burning, ſcalding, or drowning) as poſſible.

If many waſps are ſeen to attempt any hive in the latter end of ſummer or beginning of harveſt, the entry ſhould be reduced to one half an inch long, and as high, by which the bees will be able to defend it; and thoſe hives that have but few bees in them ſhould be immediately killed and the hives taken, as in page 211. But thoſe hives you deſign for ſtalls, if ſeverely attacked, (as is ſeldom the caſe that ſtrong hives ſuffer) may be removed to ſome place not near plantings, where they may remain till robbing time (by either waſps or bees) is over. Phials having honey or ſugar mixed with ale in them, will allure them to it to their own deſtruction; but in fine days it will alſo allure the bees and deſtroy them, and often by placing phials in apiaries it attracts all the waſps in the neighbourhood, and brings many that otherwiſe would not have come, and makes the cure worſe than the diſeaſe. This however ſhould be cautiously avoided, in general they are of little ſervice.

Another enemy is a large moth called the wax moth, for the maggots proceeding from it eat the wax for their ſuſtenance. The moth is very attentive to diſcover any part about the outſide of the ſkirts of the hive where ſhe may conveniently lay her eggs; but if not ſucceſsful about the outſide of the hive, ſhe nimbly runs in at the entry unnoticed by the bees, and lays them there, the egg ſoon becomes a large white voracious maggot, more than half an inch long, which ſpins over itſelf a covering for defence. Theſe maggots turn very numerous in ſome

hives,

hives, and consume the combs, and discourage the poor bees so much that they will sometimes die of famine or desert the hive.

For my part I never suffered the smallest loss by these invaders, for I never saw any of these maggots in my hives except once, and then I saw only two of them in one hive; nor did I ever hear any person complain of them in this neighbourhood. But about 20 miles off this I once saw a dozen in one hive, and the owner told me that he once had two hives in one year which had as many maggots in them as bees, which was a very loathsome sight, and he burnt both the hives root and branch, bees, combs, honey, hive, and maggots altogether; and in so doing thought he did manfully, but I thought he would have done wiser had he driven all the bees of them into empty hives and made swarms of them, or added them to some other weak hives, and then smoaked the maggots to death, and given his other bee-hives the combs to suck the honey out of, and after made them into wax, and his empty hive would have served another year, by which he would have sustained no loss but the maggots, which he would have esteemed but very small. The poorest hives are forest molested with those as well as other enemies. If you see either in the outside or within the hive any signs of such vermin breeding or bred, destroy them.

Several birds are also enemies of bees, such as the swallow, sparrow, lark, duck, and even hens, I have seen them peck them up; but in general they hurt them very little. Take all ways you can to preserve them from such creatures.

Spiders

Spiders alſo deſtroy many bees, by catching them in their enſnaring nets they kill them. To preſerve your bees deſtroy all their nets which are ſpread any way about the hive or cover of it.

Earwigs are alſo enemies, and *Keys* ſays, they ſteal in at night to the hive, and drag out bee after bee, ſucking out their vitals, and leaving nothing but their ſkins as ſo many ſcalps, emblems of their butchery. They breed between the ſkirts of the hive and the boards; in which place ſearch for their neſts and deſtroy them.

Noiſe diſturbs bees ſomething, which is remedied by being ſet in a quiet remote place, bad weather, as wind, rain, cold, heat, &c. which is prevented by the ſituation of the apiary, and the hives being properly covered, &c.

Ants ſometimes make their neſts between the hive and covering, 'without moleſting or being moleſted' ſays Mr. *Wildman*. I never was ſenſible of them doing any hurt, but I have heard ſome ſay that they go into hives in the night and ſuck out the honey, and that they have ſeen hives ruined by them. Remove the covers in the latter end of ſummer, and deſtroy the ants.

Wood-lice are alſo deſtroyers of bees, and they harbour much about old decayed wood which is near them. They ſhould be often ſought for and deſtroyed.

Keep your hives always clean and neat, removing from them all filth or impurity that may at any time gather upon the board, or around the outſide of the hives.

F I N I S.